

Specification for
Powder cement paints

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Pigments, Paints and Varnishes Standards Committee (PVC/-) to Technical Committee PVC/28 upon which the following bodies were represented:

British Railways Board
 British Resin Manufacturers' Association
 British Wood Preserving Association
 Building Employers' Confederation
 Cement Makers' Federation
 Consumers' Association
 Department of the Environment (Building Research Establishment)
 Electricity Supply Industry in England and Wales
 Greater London Council
 London Regional Transport
 Ministry of Defence
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 Oil and Colour Chemists' Association
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 Royal Institute of British Architects
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 Timber Research and Development Association
 Titanium Pigment Manufacturers' Technical Committee
 Union of Construction, Allied Trades and Technicians
 White Lead Manufacturers' Association

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Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
<hr/>	
1 Scope	1
2 Definitions	1
3 Description	1
4 Composition	1
5 Sample	1
6 Colour	1
7 Film properties	1
8 Keeping qualities	2
9 Identification of containers	2
<hr/>	
Appendix A Preparation of coated test panels	3
Appendix B Determination of film properties	3
Appendix C Recommendations for use of powder cement paints	4
<hr/>	
Publications referred to	Inside back cover
<hr/>	

Foreword

This revision of BS 4764, prepared under the direction of the Pigments, Paints and Varnishes Standards Committee, supersedes BS 4764:1971 which is withdrawn.

This revision of BS 4764 has been prepared in order to accommodate the changes that have occurred since the 1971 edition was published. Some pigments that are no longer economic to use or readily available have been replaced by more modern and less fugitive (see BS 2015) alternatives. The test for chalking has been made less subjective to facilitate independent quality assessment. The composition requirements have been modified to permit the addition both of more suitable curing agents and of materials to provide textured finishes. The test for acid-soluble residue on sieve has not been included as it is no longer relevant for products designed to give textured finishes.

Considerable thought has been given to the provision of suitable tests to evaluate the durability of cement paints, and the tests described in Appendix B are considered the best that can be put forward to define the requirements for satisfactory products.

The Technical Committee is currently investigating alternative cementitious substrates that could be suitable replacements for the asbestos-cement test panels detailed in Appendix A. Until these alternatives have been evaluated, it will be necessary to continue the use of asbestos-cement test panels when assessing the powder cement paint specified in this standard. Meanwhile, attention is drawn to the hazards associated with the use of asbestos-containing materials (see clause 1 and Appendix A). It should also be noted that the procedures described in this standard are intended to be carried out only by suitably trained and/or supervised personnel. The substances and procedures described may be injurious to health if adequate precautions are not taken. This standard refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Products complying with this standard have been found to give satisfactory service in the UK and similar temperate climates. Also, experience has shown that these materials are suitable for use in most other climates, although in hot dry climates extra care should be given to the prevention of premature drying out (see C.5). General recommendations for the use of cement paints are given in Appendix C.

It should be noted that compliance with this standard is dependent upon the use of photographic reference standards contained in *Pictorial standards of coating defects*, published by the Federation of Societies for Coatings Technology (see the footnote to clause 7).

Purchasers ordering to this standard are advised to specify in their purchasing contract that the supplier operate a quality system in compliance with BS 5750-3 to ensure, to their satisfaction, that products claiming to comply with BS 4764 consistently achieve the required level of quality. A guide to the use of BS 5750-3 is given in BS 5750-6.

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 and ii, pages 1 to 6, 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 a Portland cement-based paint powder that, when mixed with water, provides decorative and protective coatings for interior and exterior use on porous surfaces of masonry, concrete, cement renderings, bricks, building blocks and asbestos-cement. Recommendations for the use of powder cement paints are given in Appendix C.

This standard is not suitable for products to be applied to gypsum or any other surface with an appreciable water-soluble sulphate content.

CAUTION. In order to test products claiming compliance with this standard, the use of asbestos-cement test panels is stipulated (see the foreword). Attention is drawn to the hazards associated with asbestos-containing materials and the precautions that should be taken (see Appendix A).

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard, the definitions given in BS 2015 apply.

3 Description

The product shall be in powder form and shall mix with water to form, on simple stirring, a homogeneous paint showing no unwetted material. The powder shall be free from lumps and, except for powders designed to give a textured finish, the powder shall be capable of passing through a sieve with a nominal aperture size of 1.5 mm, complying with BS 410.

NOTE With products designed to give a textured finish, the added texturing material may exceed the size specified.

4 Composition

The product shall consist essentially of Portland cement, complying with BS 12, pigments and extenders. The extenders shall be limestone (including chalk and whiting) or silicious matter as specified in BS 1795, or shall be hydrated lime.

NOTE 1 Whenever possible, the pigments should comply with BS 1014. The pigments most commonly used are iron oxides, chrome oxides, carbon black, titanium dioxide and green and blue phthalocyanine pigments.

NOTE 2 Experience has shown that a composition based on the following will comply with this standard:

Portland cement, complying with BS 12	65 % (minimum) (<i>m/m</i>)
Calcium chloride (CaCl ₂)	4 % (maximum) (<i>m/m</i>) of the dry cement calculated as the anhydrous material

In addition, the amount of any water-soluble non-volatile organic matter, used in the composition, should not exceed a maximum of 2.5 % (*m/m*), as many commonly used additives can have a deleterious effect on durability. Also, not more than 10 % (*m/m*) of additives may be introduced.

5 Sample

For the purposes of the tests specified in clauses 6, 7 and 8, representative samples of the product, weighing not less than 1 kg, shall be taken and stored as described in BS 3900-A1.

Each sample shall be packed in dry, airtight, non-absorbent containers on which the product has no action, and shall be labelled as described in BS 3900-A1.

6 Colour

When a coated test panel, prepared as described in Appendix A, is tested by the procedure described in BS 3900-D1, the colour of the coating shall be uniform and free from streaks, spots or mottling and shall closely match the nominated reference colour.

NOTE The colour range available is limited by the nature of the product but, as far as possible, the colour specified should be chosen from BS 4800. If this is not possible, the colour of a reference sample should be agreed between the supplier and the purchaser.

7 Film properties

A coated test panel, when prepared as described in Appendix A and tested by the procedures described in Appendix B, shall show no chalking in excess of the minimum illustrated in the photographic reference standards in *Pictorial Standards of Coating Defects*¹⁾.

NOTE 1 Appearance of lime bloom (i.e. calcium sulphate or carbonate) and efflorescence may occur on cement paint films that have been applied to cement products. In cases of dispute, the test should be carried out using a substrate complying with either BS 402 or BS 1286.

NOTE 2 With products designed to give a textured finish, the texturing material may cause difficulties in interpreting the results of this test. Displacement of the coarse texturing material in the finish and the attachment of this material to the velvet cloth (see B.1.2) are not to be considered in relation to this test.

¹⁾ The pictorial photographic reference standards, contained in *Pictorial Standards of Coating Defects*, are published by the Federation of Societies for Coatings Technology. Copies of this publication are obtainable from the Federation at 1315 Walnut Street, Suite 830, Philadelphia, Pa 19107, USA or from Technical Standards Services Limited, 17 Temple Street, Aylesbury, Bucks HP20 2RN. (The reference standards are illustrated in ASTM D 659-80 but these illustrations are for information and not for use in evaluating the degree of chalking.)

8 Keeping qualities

The product, when stored in its original sealed container at between 4 °C and 25 °C for a period of 12 months from the end of the month of manufacture [see item d) of clause 9], shall comply with clauses 3, 6 and 7.

NOTE If conditions of storage are abnormal, the manufacturer of the product should be informed so that any special recommendations can be made.

9 Identification of containers

The containers of products shall be clearly and indelibly marked with the following information:

- a) the name of the supplier or manufacturer;
- b) trade name, if any;
- c) colour (or colour code);
- d) identification or batch number, including month and year of manufacture;
- e) the number and date of this British Standard, i.e. BS 4764:1986²⁾;
- f) mixing and application instructions;
- g) statutory requirements and information, as necessary.

²⁾ Marking BS 4764:1986 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the Director, Quality Assurance Division, BSI, PO Box 375, Milton Keynes MK14 6LO for certification marks administered by BSI or to the appropriate authority for other certification marks.

Appendix A Preparation of coated test panels

A.1 Apparatus and materials

A.1.1 Test panels of asbestos-cement³⁾ (see note), complying with BS 690-2, with nominal dimensions 150 mm × 100 mm × 5 mm.

WARNING. Asbestos-cement dust is a health hazard. Ensure that the operator and environment are protected from any dust which may be produced. In all cutting and handling operations, avoid the use of power tools and ensure that the dust is not inhaled. Prepare panels either by wet cutting or by scribing and breaking. The wearing of suitable respirators (see BS 4275) is recommended. It is essential to refer to current legislation on asbestos and to the current editions of the Health and Safety Executive Guidance Notes EH 10, EH 36 and EH 44⁴⁾.

NOTE If, by agreement between the supplier and the purchaser, test panels of an alternative substrate material are to be used, this material should be essentially cementitious and should have, when tested as described in BS 4624, a water-absorption comparable to that for the asbestos-cement panels.

A.1.2 Curing boxes of a non-corrodible material with airtight lids.

Polyethylene food boxes with the dimensions 225 ± 25 mm long, 175 ± 25 mm wide and 80 ± 12.5 mm deep, have been found to be suitable.

A.1.3 Frames, made of an inert material (a suitable material is 6 mm × 6 mm poly methylmethacrylate strip) to support the test panels horizontally at a distance of 25 ± 2.5 mm below the under surface of the lid of the curing box (A.1.2).

A.2 Test procedure

A.2.1 Preparation of test panels. Immediately before use, immerse the test panels in water for 24 ± 1 h. Remove the panels from the water and wipe off excess water with a clean dry cloth.

A.2.2 Preparation of the curing boxes for use. Place into each curing box (A.1.2), a frame (A.1.3) and a saturated aqueous sodium chloride solution containing excess salt so that the level of the solution will be 50 ± 5 mm below the under surface of the lid. Replace the lid.

Maintain the boxes at 23 ± 2 °C.

A.2.3 Preparation of the paint. Ensure that the room is at 23 ± 2 °C and that all the materials are conditioned at this temperature before mixing.

Mix the sample of paint according to the manufacturer's instructions; if a range of proportions of paint to water is given, use the mean proportion.

Allow the paint to stand for 30 ± 5 min and then remix it immediately before application.

NOTE To aid adequate mixing, a minimum of 100 g of the dry cement paint should be taken.

A.2.4 Coating and curing of test panels. Coat the rough textured side of each of the washed test panels (A.2.1) with the paint, by means of a brush, to give a spreading rate of 5 ± 1 m²/kg of the dry film mass.

Immediately after coating, place each test panel in a curing box so that the painted surface is facing downwards.

NOTE The box should remain open for as short a time as possible.

Remove each test panel after 24 ± 0.5 h and apply a second coat of paint. Cure in the same way for a further 24 ± 0.5 h, remove the panel and allow it to dry.

Appendix B Determination of film properties

B.1 Apparatus and materials

B.1.1 Hard-drying time apparatus, complying with BS 3900-C3.

B.1.2 Velvet cloth, of "best quality" black velvet (or white velvet for dark colours) for use in place of the twill cloth specified in BS 3900-C3. Use a new piece of velvet for each test.

B.1.3 Artificial weathering apparatus, complying with BS 3900-F3.

B.2 Procedure

B.2.1 Carry out the procedure described in **B.2.2** and **B.2.3** in triplicate.

³⁾ It is preferable to use ready prepared test panels. Manufacturers of asbestos-cement test panels, complying with BS 690-2, will either supply panels cut to size or advise on suppliers of pre-cut panels.

⁴⁾ HSE Guidance Note EH 10 — Asbestos: control limits and measurement of airborne dust concentrations (HMSO)

HSE Guidance Note EH 36 — Work with asbestos cement (HMSO)

HSE Guidance Note EH 44 — Dust in the workplace: general principles of protection (HMSO)

The corresponding guidance notes issued by the Northern Ireland Department of Economic Development, which are applicable in Northern Ireland, are available from HMSO, 80 Chichester Street, Belfast BT1 4JY.

B.2.2 Using the method described in BS 3900-C3 but with a piece of velvet cloth (**B.1.2**) on the plunger of the apparatus, apply the cloth to the middle of a coated test panel prepared as described in Appendix A. Examine the velvet for signs of chalking and compare any marking with the photographic reference standards in *Pictorial Standards of Coating Defects* (see footnote to clause 7).

B.2.3 Using the procedure described in BS 3900-F3, expose a second panel in the artificial weathering apparatus (**B.1.3**) for a total of 1 000 h. Remove the panel and allow it to stand at 23 ± 2 °C for 24 h. Carry out the test as described in **B.2.2** and examine for signs of chalking.

Appendix C Recommendations for use of powder cement paints

C.1 General

Cement paints may be used for decorative purposes to give a matt finish. They may also be used to improve the resistance to penetration by rain by choking any fine fissures and blocking wide pores. It should be noted that certain colours are liable to become lighter in exposed situations and are better restricted to use on dry and sheltered walls. If colour fastness is of importance, the paint manufacturer should be consulted.

The products complying with this standard are suitable for most climates and are designed to limit the rate at which the film is eroded so that a life of five or more years may be expected in temperate climates from a two-coat application. The paint may, however, become soiled in heavily polluted atmospheres and erosion will be more rapid in strongly acid atmospheres.

The paint is suitable for use on porous building materials such as brickwork, stonework, concrete, cement renderings, building blocks, brick and asbestos-cement, but not on metal, timber products, gypsum plaster or bituminous felt. Since it is resistant to the alkali in cement and permits moisture in the wall to dry out freely, it is particularly suitable for immediate decoration of cement products. Its use on non-absorbent surfaces, on dense bricks or tiles where substantial quantities of sulphates are present, or on walls which will be continuously wet (for example, below the damp course level) is not generally advised but the paint manufacturer should be consulted about particular cases.

C.2 Preparation of the surface

Before cleaning the surface, it is advisable to refer to BS 6270-1. The surface should be porous and should absorb water freely. Surfaces which do not absorb water may need special treatment and, in these cases, the paint manufacturer should be consulted. The surface should be free from loose matter, dirt, dust, oil or grease and from previous coatings of cement paint which show chalking, and should be brushed with a bristle brush (not a wire brush), scrubbed or washed down, or otherwise prepared to ensure this. **A wall previously painted with other types of paints is generally not suitable for decoration with a cement paint.**

Where algal or fungal growths are present, they should be destroyed with a suitable proprietary fungicide and, when dry, the dead growths should be removed by brushing with a bristle brush. After the new coat of cement paint is hard, it may be advantageous to apply a fungicidal wash to retard re-growth.

C.3 Mixing

The manufacturer's directions should be followed exactly. It is essential to avoid using two separate mixings where a junction is conspicuous since there may be slight variations in shade.

For use on coarse textured concrete blocks, either a cement paint in which sand has been incorporated by the manufacturer can be used to fill the gaps at the intersections, or a clean fine sand may be added to the cement paint. Alternatively, a cement/sand slurry can be worked well into the surface before painting. In all cases the paint manufacturer should be consulted beforehand.

C.4 Application

The surfaces should be wet in order to assist in the hardening of the cement paint, but there should not be free water on the surface when the paint is applied. Application should not be carried out in direct sunlight. It is recommended that the first coat should be thoroughly brushed or scrubbed into the surface, preferably with a stiff bristle brush. A second coat is usually necessary to achieve the best appearance and should be applied not less than 24 h later, after re-wetting the surface as necessary, but removing any free water. The second coat may be applied by brush, spray or roller. If application is by spray, provision for stirring the paint in the pot is required, and it will be necessary to check that the nozzle is suitable for use with cement paint.

For the rate of application, reference should be made to the manufacturer's literature. It is recommended that cement paints should not be applied under freezing or wet weather conditions.

C.5 Curing

To obtain the optimum properties, it is essential that the cement paint remains moist during the curing period. The wetting of the substrate surface before painting is normally sufficient to ensure this, provided that the surface is in the shade when the paint is first applied. In exceptional drying conditions, it may be necessary to apply a fine mist of clean water from time to time during the first 24 h after application.

C.6 Stripping (see also BS 6270-1)

Coatings of cement paint may be removed by mechanical means such as grinding or grit blasting. If the substrate may be damaged by this procedure, the paint may be removed by careful use of a dilute acid (e.g. dilute hydrochloric acid solution). An acid cleaning agent should not be applied to pre-stressed concrete structures or pebbledash finishes. If an acid cleaning agent is used, the following procedure should be used, after protecting any adjacent surfaces which could be affected.

- a) Thoroughly wet the surface to be cleaned with potable water and apply the cleaning agent with a brush.
- b) After not less than 10 min and normally not more than 30 min, thoroughly brush the surface and rinse off the agent, using a high pressure water jet.

CAUTION. Both the mechanical and chemical stripping methods can be hazardous to some degree, so adequate safety precautions should be taken. These should include the provision of suitable breathing apparatus and/or protective clothing, and measures to protect the public. Advice should be sought, if necessary, from a local area office of the Health and Safety Executive or the Northern Ireland Department of Economic Development.

The acid-treated surface should not be allowed to dry before rinsing. However, if this should occur accidentally, it is better to make a fresh application of the acid cleaning agent rather than attempt to wash off the previous coat.

In some cases it may be necessary to apply the chemical agent a second time to obtain a clean surface.

Publications referred to

- BS 12, *Specification for ordinary and rapid-hardening Portland cement.*
- BS 402, *Specification for clay plain roofing tiles and fittings.*
- BS 410, *Specification for test sieves.*
- BS 690, *Asbestos-cement slates and sheets.*
- BS 690-2, *Specification for asbestos-cement and cellulose-asbestos-cement flat sheets.*
- BS 1014, *Pigments for Portland cement and Portland cement products.*
- BS 1286, *Clay tiles for flooring.*
- BS 1795, *Specification for extenders for paints.*
- BS 2015, *Glossary of paint terms.*
- BS 3900, *Methods of test for paints.*
- BS 3900-A1, *Sampling.*
- BS 3900-C3, *Hard-drying time.*
- BS 3900-D1, *Visual comparison of the colour of paints.*
- BS 3900-F3, *Resistance to artificial weathering (enclosed carbon arc).*
- BS 4275, *Recommendations for the selection, use and maintenance of respiratory protective equipment.*
- BS 4624, *Methods of test for asbestos-cement building products.*
- BS 4800, *Specification for paint colours for building purposes.*
- BS 5750, *Quality systems*⁵⁾.
- BS 5750-3, *Specification for final inspection and test.*
- BS 5750-6, *Guide to the use of BS 5750-3 "Specification for final inspection and test".*
- BS 6270, *Code of Practice for cleaning and surface repair of buildings.*
- BS 6270-1, *Natural stone, cast stone and clay and calcium silicate brick masonry.*
- ASTM D 659-80, *Evaluating the degree of chalking of exterior paints.*
- Pictorial Standards of Coating Defects*⁶⁾ published by the Federation of Societies for Coatings Technology.
- HSE Guidance Note EH 10 — Asbestos: control limits and measurement of airborne dust concentrations (HMSO).
- HSE Guidance Note EH 36 — Work with asbestos cement (HMSO).
- HSE Guidance Note EH 44 — Dust in the workplace: general principles of protection (HMSO).

⁵⁾ Referred to in the foreword only.

⁶⁾ Copies of this publication are obtainable from the Federation at 1315 Walnut Street, Suite 830, Philadelphia, Pa 19107, USA or from Technical Standards Services Limited, 17 Temple Street, Aylesbury, Bucks HP20 2RN.

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