BS 1070:1993



## Specification for

# Black paint (tar-based)

Confirmed
October 2008

# Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Surface Treatments and Coatings Standards Policy Committee (STC/-) to Technical Committee STC/27, upon which the following bodies were represented:

Aluminium Finishing Association
Aluminium Window Association
British Railways Board
British Telecommunications plc
Consumer Policy Committee of BSI
Department of the Environment (Building Research Establishment)
European Resin Manufacturers' Association
Institute of Corrosion
METCOM
Ministry of Defence
National Federation of Painting and Decorating Contractors
Oil and Colour Chemists' Association
Paint Research Association
Paintmakers Association of Great Britain Ltd.
Society of Chemical Industry
Steel Window Association
Union of Construction, Allied Trades and Technicians
Zinc Development Association

This British Standard, having been prepared under the direction of the Surface Treatments and Coatings Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 September 1993



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The following BSI references relate to the work on this standard:
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# Contents

# Foreword

This British Standard has been prepared under the direction of the Surface Treatments and Coatings Standards Policy Committee and supersedes BS 1070:1973, which is withdrawn.

This British Standard gives requirements for black tar-based paints for use as a protective rather than a decorative finish. Such paints are intended for application to the usual constructional metals, but may also be used on other materials; the resulting film will, however, depend upon the type and condition of the surface and the method of application employed. When applied over other types of paint special precautions could be needed as indicated in the general recommendations for the use of tar-based paint, which are set out in Annex C. Tests for the uniformity and corrosion resistance of the film are included, but it has not been found possible to develop satisfactory accelerated tests for durability.

This standard was first published in 1942 and was revised in 1956, when a further type of paint, type 3, was added. The 1973 edition covered materials of types 2 and 3 (now designated types A and B respectively). Type 1 was omitted as it was slow drying and very little used.

The changes in this 1993 edition are the replacement of carburetted water-gas tar by steam cracker tar and the use of high boiling high aromatic hydrocarbon solvent in place of volatile coal tar distillate as a solvent for the tars.

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**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 the properties and general composition of black tar-based paints. The standard is restricted to paints for cold application, based on coal tars and steam cracker tar or blends of these but not containing pigments or extenders. It does not include emulsions, stoving paints or paints designed solely for application by dipping.

Two types of paint, type A and type B, differing in their rates of drying, are specified.

## 2 References

### 2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

### 2.2 Informative references

This British Standard refers to another publication that provides information or guidance. The edition of this publication current at the time of issue of this standard is given on the inside back cover but reference should be made to the latest edition.

## 3 Description

The material shall be a homogeneous black solution consisting of a base prepared from coal tar or steam cracker tar or a blend of these, together with either volatile coal tar distillate or high boiling high aromatic hydrocarbon solvent derived from petroleum. The material shall be one of the types indicated in clause **6**.

## 4 Sample

For the purpose of the tests described below, representative samples measuring not less than 1 l shall be taken and packed by the method described in BS 3900-A1:1992.

## 5 Consistency

The material shall be supplied in a condition suitable for application by brush. The material shall have a time of flow to collect 50 ml of 45 s ± 15 s, when measured by the method described in BS EN 535:1991 using a No. 4 cup.

## 6 Application properties and drying time

The material, when applied in the manner described in Annex A, shall give a uniform film, without sagging on to the unpainted section, which shall permit the satisfactory application of a second coat of paint after not more than the following periods:

Type A (normal drying) 8 h

Type B (quick drying) 4 h

## 7 Finish

When two coats of paint are applied to a panel, as described in Annex A, and allowed to dry, the resulting film, shall be smooth, glossy, continuous and free from runs and sags.

## 8 Corrosion resistance

When the material is tested by the method described in BS 3900-F4:1968, amplified as follows in relation to the preparation of the test panel:

a) using a single coat;

b) applied by brush;

c) applied to give a dry film mass of 35 g/m$^2$ ± 5 g/m$^2$;

d) dried horizontally for 48 h before testing under conditions of 23 °C ± 2 °C and a relative humidity of 50 % ± 5 %;

and then examined after a period of 7 days, the metal shall show no signs of corrosion.

## 9 Bend test requirement

When the material is tested by the method described in BS 3900-E1:1970, using the type 1 apparatus with a 10 mm mandrel and amplified as follows in relation to the preparation of the tinplate test panel:

a) using a single coat;

b) applied by brush;

c) applied to give a dry film mass of 35 g/m$^2$ ± 5 g/m$^2$;

d) dried horizontally for 96 h before testing under conditions of 23 °C ± 2 °C and a relative humidity of 50 % ± 5 %;

the film shall show no signs of cracking or detachment from the substrate.

## 10 Water content

The material shall contain not more than 0.5 % (*m*/*m*) of water when tested by the method described in Annex B.

## 11 Loss on heating

The loss on heating of the material, when determined by the method described in BS 3900-B2:1970 but using a temperature of 145 °C to 150 °C, shall not exceed 50 % (*m*/*m*).

## 12 Flashpoint

When the material is tested by the method described in BS 3900-A8:1986, the flashpoint of the material shall be not lower than 33 °C.

## 13 Keeping properties

The material, when stored at normal room temperature in the original sealed containers, shall retain the properties detailed above for a period of at least 6 months from the date of delivery or such other period as may be agreed between the purchaser and the vendor.

## 14 Marking

All containers shall be marked with the manufacturer's name or trade mark, the number of this British Standard, i.e. BS 1070:1993[1)] and the type of paint according to the classification in clause **6**. In addition, the following warning notice shall be clearly marked on the containers.

"This paint has a tar base and contains aromatic solvents. It must be used only in conditions of good ventilation. The use of a suitable barrier skin preparation by operatives is recommended."

[1)] Marking BS 1070:1993 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

## Annex A (normative) Method of test for application properties and drying time

**A.1** Use a 300 mm × 300 mm burnished steel panel 1.25 mm thick, prepared in accordance with the method described in BS EN 605:1992.

**A.2** On the prepared surface of the panel draw a line parallel to the bottom edge and 50 mm from it.

**A.3** Transfer not less than 100 ml of the thoroughly mixed paint to a suitable clean container and weigh it, together with a clean paint brush 5 mm in width, to the nearest 0.1 g. Work the paint into the brush and apply it as rapidly as possible in an even film to cover exactly the 250 mm by 300 mm area. Immediately reweigh the container, paint and brush and calculate the mass of the wet film by difference. From this and the non-volatile content determined as described in clause **11**, calculate the mass of the dry film which should be within the range 35 g/m$^2$ ± 5 g/m$^2$. If the mass of the film is outside this range, prepare a fresh panel.

**A.4** Allow the painted panel to stand in a vertical position in a well ventilated room reasonably free from dust with the painted surface outermost and not exposed to direct sunlight. The panel should be allowed to dry at 23 °C ± 2 °C and a relative humidity of 50 % ± 5 %.

**A.5** At the end of the period specified (see clause **6**), examine the panel for appearance and freedom from sagging on to the area below the line. Apply a second coat immediately and allow to dry. Again examine the dried film for appearance and freedom from sagging.

## Annex B (normative) Determination of water content by the Dean and Stark method

### B.1 Apparatus

**B.1.1** *All-glass Dean and Stark apparatus*, conforming to BS 756:1952, employing a flask of 500 ml capacity and a receiver of 2 ml capacity, both of which have been previously cleaned and dried.

NOTE It is important that the receiver and condenser should be thoroughly clean. They should, therefore, be treated with a mixture of potassium dichromate and sulfuric acid or other suitable cleansing agent prior to use. When the apparatus is in constant use it is usually sufficient to clean it after every third determination.

### B.2 Reagents

**B.2.1** *Either amyl acetate*, conforming to BS 552:1970 or *ethyl acetate*, conforming to BS 553:1990.

**B.2.2** *Toluene*

### B.3 Procedure

Weigh into the flask 100 g of the material under test, add 100 ml of the toluene and 1 ml of the amyl acetate or ethyl acetate and mix the contents of the flask well. Pour toluene into the receiver up to the level of the side tube. Connect the flask to the apparatus and immerse it in an oil bath containing sufficient heavy mineral oil to cover the flask nearly to the neck. Heat the oil bath to such a temperature as to keep the contents of the flask boiling briskly. Continue the distillation until no further water collects in the receiver. At the conclusion of the determination release any water still clinging to the condenser tube, causing it to fall into the receiver, by pushing a wire, or a small camel-hair brush attached to a glass rod, through the condenser tube from the top. Dislodge any condensed water on the sides of the receiver after dismantling the top part of the apparatus. Read off the amount of water collected in the receiver to the nearest 0.05 ml.

### B.4 Test report

The result shall be reported as the percentage of water (*m*/*m*) in the material.

### B.5 Precision

Results of duplicate determinations should not differ by more than the following amounts:

| Repeatability | Reproducibility |
|---|---|
| 0.05 ml | 0.01 ml |

## Annex C (informative) Recommendations for use of tar-based paint

### C.1 General

**C.1.1** Tar-based paints protect a surface by the exclusion of moisture or other corrosive agents. The main function of the paint is thus to provide a waterproof film and for this purpose it is important that it should be applied in suitable atmospheric conditions when the surface is clean and dry, and in such a manner as to give a continuous film of adequate thickness.

**C.1.2** While tar-based paints are used mainly for the protection of iron and steel they are also suitable for application to many building surfaces. However, as already stated, it is essential that their method of use suits the type of surface. Where this is non-porous, it is recommended that application should be by brushing at a spreading rate of from 12.0 $m^2$/l to 16.0 $m^2$/l. The paint is supplied in a suitable condition for application at this rate. In no circumstances should any petroleum thinners such as white spirit or paraffin be used, as these are not compatible with coal tars and could cause flocculation of the paint; if thinning becomes necessary, e.g. in cold weather, coal tar napthas or the special thinners supplied by the manufacturer should be used.

**C.1.3** Brushes should be cleaned immediately after use. The recommended thinners may be used for this purpose or the brushes may be wiped as free from paint as possible, washed with solvent and then with soap and warm water. White spirit or paraffin should not be used.

**C.1.4** While there is no evidence of harmful effects arising from brushing tar-based paints in the open, they are not recommended for use in confined situations unless steps are taken to provide adequate ventilation. Similarly, the application of these paints by spraying is not recommended if there is any risk of the operator breathing the fine mist that accompanies this form of application or of becoming seriously contaminated with it.

**C.1.5** The use of a suitable barrier skin preparation to protect the hands of the operator is recommended.

### C.2 Preparation of surfaces[2)]

#### C.2.1 *Bare non-porous surfaces*

All dirt and grease should be removed from the surface in the case of metals; loose or broken mill scale and corrosion products should also be removed and painting should immediately follow cleaning.

#### C.2.2 *Surfaces previously painted with tar-based paint*

All dirt, grease and loosely adhering paint should be removed by washing or other suitable means. Any bare patches of metal should be treated as recommended in **C.2.1** and spot primed with tar-based paint prior to applying the general coating.

#### C.2.3 *Porous surfaces*

All dirt and dust should be removed by thorough brushing and any loosely adhering flakes of material should be detached. Washing of porous surfaces is not usually satisfactory unless adequate time is given for the water to evaporate.

### C.3 Painting

#### C.3.1 *General*

All surfaces should be dry following the preparation, and painting during humid weather or in conditions giving rise to condensation should be avoided.

#### C.3.2 *Application to non-porous surfaces*

A full coat should be applied, preferably by brush, working the paint well into the surface and taking care to obtain a uniform and continuous film at the recommended spreading rate of 12.0 $m^2$/l to 16.0 $m^2$/l. Particular care should be taken to coat thoroughly all recesses, edges, joints, intersection of members, rivet and bolt heads and nuts. No subsequent coat should be applied until the previous coat has dried thoroughly and can be recoated without "picking-up".

#### C.3.3 *Systems of tar-based paint on bare steel*

Experience shows that a life of approximately 2 years can be expected in most situations from a two-coat application of tar-based paint properly applied to suitable surfaces, although much longer periods have been obtained. Considerably extended service can be obtained by applying a further coat with 1 year. The following systems are recommended:

a) two coats of tar-based paint, the second applied as soon as the first is thoroughly dry;

b) two coats of tar-based paint followed by a further coat within 12 months.

#### C.3.4 *Systems of tar-based paint on porous surfaces*

For these materials, of which asbestos cement products and wood are examples, at least two coats of tar-based paint are necessary, the second coat following the first as soon as the latter is thoroughly dry. It is essential that the spreading rate is adjusted accordingly. If the original surface has a high degree of porosity, a third coat could be required.

If, in addition, the surface is rough, as with some concrete surfaces, or irregular or jointed, as with brickwork, the method and paint should be agreed with the manufacturer of the tar-based paint.

[2)] Further notes on the preparation of surfaces will be found in BS 6150.

### C.3.5 *Use of tar-based paints in other paint systems*

Tar-based paints are unsuitable where it is desired to finish the work with other types of paint, since bleeding of a tar-based paint through the top coat and crazing of the finish could result. Where it is necessary to apply an oil paint over a tar-based paint, these faults can be mitigated by the use of a suitable barrier coat. Similarly, tar-based paints should not be applied in less than 1 month over an oil or bitumen paint film since softening of the existing coating could occur.

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# List of references (see clause 2)

## Normative references

### BSI standards publications

BRITISH STANDARDS INSTITUTION, London

BS 756:1952, *Specification for Dean and Stark apparatus.*
BS 552:1970, *Specification for amyl acetate.*
BS 553:1990, *Specification for ethyl acetate for industrial use.*
BS 3900, *Methods of test for paints.*
BS 3900:Group A, *Tests on liquid paints (excluding chemical tests).*
BS 3900-A1:1992, *Sampling.*
BS 3900-A8:1986, *Test for flash/no flash (closed cup equilibrium method).*
BS 3900:Group B, *Tests involving chemical examination of liquid paints and dried paint films.*
BS 3900-B2:1970, *Determination of volatile matter and non-volatile matter.*
BS 3900:Group E, *Mechanical tests on paint films.*
BS 3900-E1:1970, *Bend test (cylindrical mandrel).*
BS 3900:Group F, *Durability tests on paint films.*
BS 3900-F4:1968, *Resistance to continuous salt spray.*
BS EN 535:1991, *Method for determination of flow time of paints by use of flow cups.*
BS EN 605:1992, *Paints and varnishes — Standard panels for testing.*

## Informative references

### BSI standards publication

BRITISH STANDARDS INSTITUTION, London

BS 6150:1991, *Code of practice for painting of buildings.*

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