

CONFIRMED
FEBRUARY 1991

Specification for

Adhesives for use with ceramic tiles and mosaics

UDC [691.42/.43]:666.3-413:666.968.3:621.792.053

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Cooperating organizations

The Adhesives Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following:

- Association of British Plywood and Veneer Manufacturers
- British Adhesive Manufacturers' Association*
- British Furniture Manufacturers' Federated Associations
- British Paper Bag Federation
- British Plastics Federation*
- British Woodworking Federation
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Building Research Establishment, Princes Risborough Laboratory)
- Department of Trade
- Federation of Gelatine and Glue Manufacturers Limited
- Ministry of Defence*
- Royal Institute of British Architects*
- Society of Chemical Industry
- Wall Paper Manufacturers Ltd.

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the Technical Committee entrusted with the preparation of this British Standard:

- British Ceramic Research Association
- British Ceramic Tile Council
- British Floor Covering Manufacturers' Association
- British Railways Board
- Cement Admixtures Association
- Contract Flooring Association
- Federation of Epoxy Resin Formulators and Applicators Ltd.
- Mastic Asphalt Council and Employers' Federation
- National Federation of Plastering Contractors
- Plastics and Rubber Institute
- Timber Research and Development Association
- Wallcovering Manufacturers' Association of Great Britain Ltd.
- Individual expert

This British Standard, having been prepared under the direction of the Adhesives Standards Committee, was published under the authority of the Executive Board and comes into effect on 31 October 1980

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The following BSI references relate to the work on this standard:
Committee reference ADC/10
Draft for comment 78/52115 DC

ISBN 0 580 11602 6

Amendments issued since publication

Amd. No.	Date of issue	Comments
5861	February 1989	Indicated by a sideline in the margin

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Foreword

This British Standard has been prepared under the direction of the Adhesives Standards Committee.

BS 5980 takes into account the earlier specification for ceramic tile adhesives included as Appendix A of BS 5385-1:1976. That specification has been revised and an attempt has been made to simplify it, without losing the accumulation of experience of effective correlation between results of laboratory testing and performance in service under practical conditions.

It should be noted that, in this British Standard, adhesion strengths are specified in terms of force (expressed in newtons) rather than as force per unit area (expressed in pascals); this change has been made because the force required is not proportional to the contact area.

Where an adhesive is required for tiling on vertical surfaces working downwards it is important that the tiles do not slip downwards during the tiling operation. No requirement for this is included in this standard, but a simple test is described in Appendix H.

WARNING NOTE. The methods of test in the appendices do not necessarily detail all precautions to meet the requirements of the Health and Safety at Work etc. Act 1974. Attention should be paid to any appropriate precautions, and the methods should be operated by trained personnel.

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 12, 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 the minimum requirements for adhesives used for fixing ceramic tiles to ensure that they are suitable for their proposed application.

In particular, these adhesives are for use with tiles complying with the requirements of BS 6431. Most ceramic tiles and mosaics are suitable for bonding with adhesives in accordance with this specification but there are some very porous tiles available which are not suitable.

NOTE Guidance on the suitability of adhesives for different applications is given in BS 5385.

2 References

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

3 Definitions

For the purposes of this British Standard the following definitions apply.

3.1

thin-bed fixing

a process of tile fixing into a bed of an adhesive not exceeding 3 mm in final bed thickness

3.2

thick-bed fixing

a process of tile fixing into a bed of an adhesive not less than 3 mm and not exceeding 12 mm in thickness. In some countries the term is confined to cement/sand fixing

3.3

normal laboratory conditions

a test atmosphere in the temperature range of 20 ± 2 °C and the humidity range of 45 % to 75 % r.h

3.4

test piece tiles¹⁾

test piece tiles of the types specified in 3.4.1, 3.4.2 and 3.4.3 are required

3.4.1

101 mm × 101 mm × 9 mm, made in a standard body composition with an apparent porosity of 30 % to 35 %

3.4.2

75 mm × 75 mm × 8 mm, cut from 152 mm × 152 mm biscuit tiles made in a standard body composition with an apparent porosity of 30 % to 35 %

3.4.3

108 mm × 108 mm × 6.5 mm tiles of the white body type, having an apparent porosity in the range of 30 % to 35 %

4 Classification

4.1 General. The adhesives are classified into five types by their chemical composition and physical form and into three classes based on their resistance to water.

4.2 Types. The five types of adhesive dealt with in this standard are:

Type 1: Hydraulically-hardening mortar which consists of a mixture of a hydraulic binding agent, usually Portland cement, mineral aggregates and organic additives, produced as a dry mixture, to be mixed with water before use.

Type 2: Dispersion adhesive which is manufactured as a ready-for-use mixture and consists of organic binding agent(s) as an aqueous emulsion or latex with mineral filling materials.

Type 3: Dispersion/cement adhesive which consists of either Portland cement complying with the requirements of BS 12, or other prepared powder component, mixed into an aqueous dispersion of a polymeric material a short time before use.

Type 4: Dissolved resin adhesive which is manufactured as a factory-prepared ready-for-use mixture and consists of fillers dispersed in a solution of an organic binding agent in volatile solvent.

Type 5: Reaction resin adhesive which consists of two or more separately supplied components, each of which may contain mineral filler(s), and which have to be mixed together in specified proportions immediately before use. Hardening occurs by chemical reaction between the organic constituents of the various components.

4.3 Classes. The three classes of adhesive dealt with in this standard are:

Class AA: materials with a faster development of water resistance.

Class A: materials with a slower development of water resistance.

Class B: materials with no requirement for water resistance.

¹⁾ Information on the availability of test tiles is available on application to the Central Enquiries Section of BSI.

5 General requirements

5.1 Adhesives supplied in accordance with this specification, when mixed and spread in accordance with the manufacturer's instructions, shall be suitable for the practical process of tile fixing on those types of background for which they are recommended by the manufacturer.

5.2 The manufacturer's instructions shall be carefully followed when any pre-mixing of the adhesive is required (see Appendix A).

5.3 The requirements of clauses 8, 9, 11 and 12 shall be satisfied using the adhesive for thin-bed fixing or thick-bed fixing or both in accordance with the manufacturer's claim of suitability (see 13.4).

NOTE If the manufacturer claims that the adhesive is suitable for both thin-bed and thick-bed fixing, the number of test specimens required in Appendix C, Appendix D and Appendix F should be doubled.

6 Storage stability

6.1 When stored in a dry place in the temperature range 5 °C to 30 °C, or such other wider temperature range as the manufacturer claims [see clause 13 c)], the adhesive shall show no signs of microbiological attack and shall comply with the requirements of this British Standard for a period of not less than 12 months.

6.2 Adhesives with a shorter shelf life than that specified in 6.1, but which nevertheless comply with the other requirements of this British Standard, shall be deemed to comply with the requirements of this standard, provided that the manufacturer states the maximum storage life clearly on the containers.

7 Resistance to mould growth

The adhesive, when tested as described in Appendix B, shall not show any evidence of mould growth.

8 Resistance to excessive strain development

The adhesive, when tested as described in Appendix C, shall not cause a tensile strain development of more than 250 microstrain. If a clearly defined peak value is not obtained in 6 months, the tensile strain shall be taken as the final value of eight consecutive weekly readings where the increase is not more than 1 % of the previous reading.

9 Tensile adhesion strength

The mean tensile adhesion strength of the adhesive, when tested as described in Appendix D, shall satisfy each of the following requirements as appropriate for its class:

Classes AA, A and B: not less than 950 N after conditioning for 14 days under normal laboratory conditions;

Class AA only: not less than 560 N after conditioning for 7 days under normal laboratory conditions followed by 7 days immersion in water at laboratory temperature;

Class A only: not less than 560 N after conditioning for 14 days under normal laboratory conditions, followed by 7 days immersion in water at laboratory temperature.

10 Shear adhesion strength

The mean shear adhesion strength of the adhesive, when tested as described in Appendix E, shall satisfy each of the following requirements as appropriate for its class:

Class AA, A and B: not less than 8.9 kN, after conditioning for 14 days under normal laboratory conditions;

Classes AA, A and B: not less than 4.5 kN, after conditioning for 7 days under normal laboratory conditions, followed by 7 days storage in an oven at a temperature of 100 ± 2 °C;

Class AA only, not less than 4.5 kN, after conditioning from 7 days under normal laboratory conditions followed by 7 days immersion in water at laboratory temperature;

Class A only, not less than 4.5 kN, after conditioning for 14 days under normal laboratory conditions followed by 7 days immersion in water at laboratory temperature.

11 Open time

When tested as described in Appendix F, the open time, defined as the interval after which the tensile adhesion strength drops below 950 N, shall be not less than that stated by the manufacturer [see 13 c)].

12 Adjustability

The mean tensile strength of the adhesive, when tested as described in Appendix G, shall be not less than 730 N after conditioning for 14 days under normal laboratory conditions following an adjustment time of 5 minutes, and not less than 450 N after conditioning for 14 days under normal laboratory conditions following an adjustment time of 10 minutes.