British Standard

BRITISH STANDARD

BS 5212-1: 1990

Cold applied joint sealant systems for concrete pavements —

Part 1: Specification for joint sealants

UDC 625.848.083

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Road Engineering Standards Policy Committee (RDB/-) to Technical Committee RDB/10, upon which the following bodies were represented:

Association of Consulting Scientists
British Adhesives and Sealants Association
British Airports Authority
British Tar Industry Association
County Surveyors' Society
Department of the Environment (Property Services Agency)
Department of Transport
Department of Transport (Transport and Road Research Laboratory)
Institution of Civil Engineers
Institution of Highways and Transportation
Coopted members

This British Standard, having been prepared under the direction of the Road Engineering Standards Policy Committee, was published under the authority of the Board of BSI and comes into effect on 31 July 1990

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

Foreword

This Part of BS 5212 has been prepared under the direction of the Road Engineering Standards Policy Committee. BS 5212:1975 has been revised in three Parts, namely:

— *Part 1: Specification for joint sealants;*

— *Part 2: Code of practice for the application and use of joint sealants;*

— *Part 3: Methods of test.*

BS 5212-1, BS 5212-2 and BS 5212-3 supersede BS 5212:1975 which is withdrawn.

Exposure to excessive heat (e.g. jet blast) can have deleterious effects on all sealants but knowledge of this effect is limited. A test method has been included to assess flame resistance qualitatively.

Information which should be given with an enquiry or order is shown in Appendix A, and a typical form of manufacturer's certificate is shown in Appendix B.

Hot applied joint sealants are specified in BS 2499.

It has been assumed in the drafting of this standard that the execution of its provisions is entrusted to appropriately experienced people.

Product certification. Users of this British Standard are advised to consider the desirability of third party certification of product conformity with this British Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality systems against the appropriate Part of BS 5750.

Enquiries as to the availability of third party certification schemes will be forwarded by BSI to the Association of Certification Bodies. If a third party certification scheme does not already exist, users should consider approaching an appropriate body from the list of Association members.

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 Part of BS 5212 specifies requirements for hand applied and machine applied, ordinary, fuel and flame resistant cold applied sealants for use in joints in roads, airfields and other exposed concrete pavements.

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 Part of BS 5212 the following definitions apply.

2.1
joint

a vertical discontinuity between adjacent faces of slabs in the concrete layer of a pavement

2.2
joint filler

a strip of compressible material used to fill a joint space

2.3
joint sealant

a material that, when applied in a uniform state to a joint, seals it by adhering to appropriate surfaces within the joint

2.4
primer

a surface coating applied to the faces of the joint before placing the sealant in order to secure its adhesion

2.5
cold applied sealant

a base component and a curing component that, when mixed at ambient temperature in the correct proportions and applied to a joint, will chemically cure to form a joint sealant

3 Sampling

3.1 Sealant

The sample shall comprise components sufficient for at least 2.5 kg of mixed sealant material and be in unopened containers (see clause **6**). When a 2.5 kg sample constitutes more than one packaging unit, the units shall be from the same batch.

3.2 Primer

A sample shall consist of a minimum of 0.5 L taken at random from the stock supplied with the sealant.

3.3 Stages of sampling

Provision shall be made for sampling at the following stages.

a) At the factory or source of distribution to determine the quality of the material as manufactured;

NOTE 1 Representative samples may be tested by the manufacturer to enable him to provide a certificate of quality for a particular production batch.

b) From the packages or containers to determine the quality of the material as delivered.

NOTE 2 The purchaser may take samples on site to determine the quality of the material applied to a joint in accordance with BS 5212-2.

4 Types of sealant

4.1 Cold applied joint sealants

The sealant shall be one of the types specified in Table 1.

4.2 Primers

The primer shall be identified as part of the sealant system and there shall be a visual indication of its presence.

NOTE A suitable primer should always be specified by the manufacturer.

Table 1 — Types of cold applied joint sealants

Material	Type	Compliance criteria	Hand or machine applied
Normal	N	Clause **5** except **5.9** and **5.10**	Either or both
Fuel resistant	F	Clause **5** except **5.10**	Either or both
Flame and fuel resistant	FB	Clause **5**	Either or both

NOTE 1 See BS 5212-2 for guidance on selection of type of sealant.

NOTE 2 Where the purchaser requires resistance to specific fuels, to hydraulic fluids or to de-icing fluids then the tests and limits for those specific fuels or fluids should be in accordance with the tests for resistance to immersion in fuel (see **5.9**).

5 Performance

5.1 Shelf life

When stored in the original unopened containers and within the temperature range recommended by the manufacturer, the base component, the curing component and the primer shall be capable of being readily mixed to form a compound which complies with this standard, at any time up to the manufacturer's stated expiry date.

5.2 Application life

NOTE 1 The application life of hand applied sealants is that time after mixing during which the sealant exhibits sufficient flow to comply with clause **3** of BS 5212-3:1990.

When tested in accordance with clause **3** of BS 5212-3:1990, hand applied sealants shall have an application life of at least 0.5 h.

NOTE 2 For machine applied sealants the application life and its method of determination should be agreed between the supplier and the purchaser.

5.3 Resistance to flow

5.3.1 *General*

The sealant shall comply with both **5.3.2** and **5.3.3**.

5.3.2 *Using a horizontal mould at 5 °C*

When tested in accordance with **5.3** of BS 5212-3:1990, the flow of a properly mixed sealant shall not exhibit a difference in depth between highest and lowest readings of more than 3 mm.

5.3.3 *Using a mould inclined at 2.5 % at 23 ± 2 °C*

When tested in accordance with clause **5.4** of BS 5212-3:1990, the flow of a properly mixed sealant shall not exhibit a difference in depth at either end of the channel greater than 4 mm.

NOTE Where a crossfall is steeper than 2.5 % or where a joint width is greater than 20 mm the resistance to flow should be agreed between the supplier and the purchaser.

5.4 Tack-free time

When tested in accordance with clause **4** of BS 5212-3:1990 the sealant shall not adhere to the polyethylene film after a period of 3 ± 0.1 h for machine applied sealants or after 16 ± 0.1 h for hand applied sealants.

5.5 Plastic flow

When tested in accordance with clause **6** of BS 5212-3:1990, the flow of a properly mixed sealant down an aluminium plate inclined at 75° at 60 °C shall not exceed 2 mm.

5.6 Penetration and recovery

When tested in accordance with clause **7** of BS 5212-3:1990, the initial ball penetration shall not exceed 2.0 mm and the recovery shall be not less than 75 %.

5.7 Forces and adhesion and cohesion in tension and compression

5.7.1 *General*

When subjected to three cycles of compression at 15 ± 1 °C and extension at – 20 ± 1 °C the sealant shall exhibit forces within the range specified in **5.7.2** and adhesion and cohesion properties within the range specified in **5.7.3**. Three specimens shall be subjected to three cycles each in accordance with the requirements of **8.5** of BS 5212-3:1990.

If the sealant fails to comply with **5.7.2.1**, a fresh set of samples shall be tested.

If only one specimen fails to comply with **5.7.2.2** or **5.7.2.3** or **5.7.3**, then a retest of three specimens shall be permitted, all of which shall pass the requirements of **5.7.2.2** and **5.7.2.3** and **5.7.3**. In all other cases of failure to comply with the above requirements, the material shall be deemed to have failed the test.

5.7.2 *Force on specimen*

5.7.2.1 *Difference between specimens*

The highest and lowest of the three maximum tensile forces recorded for the three samples on the first cycle of extension shall not differ from the average of the three maximum tensile forces by more than 20 N or 20 % whichever is the lower.

5.7.2.2 *Maximum force*

The highest maximum tensile force on any sample on any of the three cycles shall not exceed 300 N.

5.7.2.3 *Lowest maximum force*

The lowest maximum tensile force in extension on any sample on any of three cycles shall be 40 N.

5.7.3 *Adhesion and cohesion*

The total area of the face of any specimen in which the sealant becomes completely separated from the primer during test plus the total superficial area of any ruptures on the face of the sealant shall together not exceed an area of 100 mm^2.

5.8 Resistance to heat ageing

5.8.1 *General*

After heat ageing at 70 °C for 14 days, in accordance with clause **9** of BS 5212-3:1990, the sealant shall comply with **5.7** and **5.8.2** to **5.8.4** inclusive.

5.8.2 *Mass loss*

When tested in accordance with **9.3** of BS 5212-3:1990, the sealant shall not lose more than 6 % of its original mass.

5.8.3 ***Penetration and recovery***

When tested in accordance with **9.4** of BS 5212-3:1990, the initial ball penetration shall be not more than 2.0 mm and the recovery shall be not less than 75 %.

5.8.4 ***Forces and adhesion and cohesion in tension and compression***

5.8.4.1 The sealant shall be tested in accordance with **9.5** of BS 5212-3:1990 except that the sealant shall be subjected to only one cycle of compression at 15 ± 1 °C and extension at – 20 ± 1 °C. Forces shall be within the range specified in **5.7.2** and adhesion and cohesion properties shall be as specified in **5.7.3**. Additionally, the mean force in extension shall not differ by more than 100 N from that measured in **5.7.2**.

5.8.4.2 The procedures of **5.8.4.1** shall be repeated but with the period of ageing, in accordance with **5.8.1**, extended to 28 days.

Sealants shall comply with **5.8.4.1**, except that the mean force in extension shall not differ from that reported from **5.8.4.1** by more than 25 %.

5.9 Resistance to fuel immersion of sealant types F and FB

5.9.1 ***Change in mass***

When tested in accordance with **10.5** of BS 5212-3:1990, the mass of the sealant shall not increase by more than 5 % nor decrease by more than 10 %.

5.9.2 ***Penetration and recovery***

When tested in accordance with **10.6** of BS 5212-3:1990, the initial ball penetration shall be not more than 2.0 mm and the recovery shall be not less than 75 %.

5.9.3 ***Forces and adhesion and cohesion in tension and compression***

When tested in accordance with **10.7** of BS 5212-3:1990 and subjected to three cycles of compression at 15 ± 1 °C and extension at – 20 ± 1 °C, the sealant shall exhibit forces within the range specified in **5.7.2** and adhesion and cohesion properties as specified in **5.7.3**.

5.10 Resistance to flame

During heating in accordance with clause **11** of BS 5212-3:1990, the sealant shall not show any visual evidence of ignition, support of combustion or flow and separation. On subsequent examination when cool the sealant shall not show any visual evidence of hardening or loss of flexibility.

6 Containers

6.1 Delivery

Joint sealants and primers shall be supplied in containers which are sealed and which allow the sealant to be stored without detriment for the full shelf life under the manufacturer's recommended conditions.

6.2 Disposal

The manufacturer shall supply relevant advice regarding the disposal of empty containers on the container label.

NOTE Attention is drawn to the provisions of the Health and Safety at Work Act 1974 and related legislation.

7 Marking

7.1 Certificate

A certificate containing at least the information shown in Appendix B shall be supplied if requested by the purchaser.

7.2 Joint sealant components

Each container of sealant component shall be clearly and indelibly marked with the following:

a) the manufacturer's name;

b) the type, grade and batch number of the compound;

c) the expiry date or the date of manufacture together with the storage life under the conditions specified by the manufacturer;

d) whether the sealant is for hand or machine application;

e) the type of primer to be used;

f) the number and date of this British Standard, i.e. BS 5212-1:1990[1)].

Each container shall be clearly and indelibly marked to differentiate between the components of the sealant and, where required, with the batch numbers of components that are to be used together.

[1)] Marking BS 5212-1:1990 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 therefore solely the responsibility of the person making the claim. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

7.3 Primer system

Each container of the primer system shall be clearly and indelibly marked with the following:

a) the manufacturer's name;

b) designation and batch number;

c) last date for use;

d) the type of sealant with which it is to be used;

e) directions for use.

Appendix A Information to be given with enquiry or order

The following information should be given with an enquiry or order:

a) type (e.g. normal, fuel resistant or flame and fuel resistant) (see Table 1);

b) whether a factory sample is required;

c) whether samples from containers are required;

d) whether for hand or machine application;

e) cross fall and joint width (see **6.7** of BS 5212-2:1990);

f) whether a certificate is required (see **7.1**).

Appendix B Typical manufacturer's certificate

A typical manufacturer's certificate should contain the following items:

a) manufacturer's name;

b) normal, fuel resistant or flame and fuel resistant type as appropriate and whether hand applied or machine applied;

c) manufacturer's grade;

d) batch number;

e) expiry date or date of manufacture and storage life;

f) date of last full test of a production sample in accordance with **3.3** a);

g) recommended storage conditions;

h) type of primer required.

The certificate should be signed for and on behalf of the manufacturer by an authorized signatory.

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Publications referred to

BS 2499, *Specification for hot applied joint sealants for concrete pavements*[2)].
BS 5212, *Cold applied joint sealant systems for concrete pavements.*
BS 5212-2, *Code of practice for the application and use of joint sealants.*
BS 5212-3, *Methods of test.*
BS 5750, *Quality systems*[2)].

[2)] Referred to in the foreword only.

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