

Method for

Determination of the indirect tensile stiffness modulus of bituminous mixtures

Committees responsible for this Draft for Development

The preparation of this Draft for Development was entrusted by Technical Committee B/510, Road Materials, to Subcommittee B/510/1, Coated macadam and hot asphalt, upon which the following bodies were represented:

British Aggregate Construction Materials Industries
British Civil Engineering Test Equipment Manufacturers' Association
County Surveyors' Society
Department of the Environment (Property Services Agency)
Department of Transport
Department of Transport (Transport and Road Research Laboratory)
Institute of Asphalt Technology
Institute of Petroleum
Institution of Civil Engineers
Institution of Highways and Transportation
Low Temperature Coal Distillers' Association of Great Britain Ltd.
Mastic Asphalt Council and Employers' Federation
Mastic Asphalt Producers' Association
Refined Bitumen Association Ltd.
Sand and Gravel Association Limited
Society of Chemical Industry

This Draft for Development, having been prepared under the direction of Technical Committee B/510, was published under the authority of the Standards Board and comes into effect on 15 December 1993

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The following BSI reference relates to the work on this Draft for Development:
Committee reference B/510/1

ISBN 0 580 21582 2

Amendments issued since publication

Amd. No.	Date	Comments

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Foreword

This Draft for Development has been prepared under the direction of Technical Committee B/510. It describes a procedure for determining the indirect tensile stiffness modulus of bituminous materials. There is a need to have such a test method in a standard form so that the method can be used to control and check the performance of bituminous materials as supplied and laid.

This publication is not to be regarded as a British Standard

It is being issued in the Draft for Development series of publications and is of a provisional nature because up to the present individual laboratories have used their own equipment and it is now desired to standardize apparatus and procedure so that direct comparison can be made between laboratories. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

A review of this Draft for Development will be carried out not later than two years after its publication. Notification of the start of the review period, with a request for the submission of comments from the users of this Draft for Development, will be made in an announcement in the appropriate issue of *BSI News*.

According to the replies received, the responsible BSI Committee will judge whether the Draft for Development can be converted into a British Standard or what other action should be taken.

Observations which it is felt should receive attention before the official call for comments will be welcomed.

These should be sent to the Secretary of BSI Technical Committee B/510/1 at the BSI Head Office address as shown on the back cover.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, 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 Draft for Development describes a method for measuring the indirect tensile stiffness modulus of bituminous mixtures. The method is applicable to cylindrical test specimens having a thickness between 30 mm and 80 mm.

2 References

2.1 Normative references

This Draft for Development 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 Draft for Development only when incorporated in it by updating or revision.

2.2 Informative references

This Draft for Development refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this Draft for Development are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this Draft for Development the following definition applies.

indirect tensile stiffness modulus (S_m) in MPa

$$S_m = \frac{L}{(D \times t)} \times (\nu + 0.27)$$

where:

- L is the peak value of the applied vertical load (in N);
- D is the peak horizontal diametral deformation resulting from the applied load (in mm);
- t is the mean thickness of the test specimen (in mm);
- ν is the value of Poisson's ratio for the bituminous mixture at the temperature of test.

4 Apparatus

4.1 Thermometer or thermocouple, of appropriate range, which is accurate to and can be read to $\pm 0.5^\circ\text{C}$ for determining the temperature of the test specimen or the storage and test environment.

4.2 Steel rule, conforming to BS 4372:1968, with 1 mm graduations.

4.3 Straightedge, conforming to BS 5204-2:1977.

4.4 External callipers, capable of measuring to ± 1 mm.

4.5 Glass plate; or

4.6 Steel plate, with the upper surface not deviating from flatness by more than 0.03 mm over the width, a surface texture not exceeding $3.2\ \mu\text{m}$ roughness average when determined in accordance with BS 1134-1:1988, and a Rockwell (scale B) hardness value of at least 95 when tested in accordance with BS 891:1989.

NOTE Indentations on the plate face resulting from the hardness test are acceptable. Capping plates conforming to BS 1881-120 are suitable.

4.7 Jig, to hold a cylinder of test material for cutting of test specimens.

4.8 Saw, capable of cutting and trimming test specimens to the required dimensions.

NOTE A diamond-tipped saw blade is recommended. A grinding and polishing wheel has also been found to be of assistance in end-preparation.

4.9 Test equipment, comprising the following.

4.9.1 Steel load frame, as shown in Figure 1.

4.9.2 Two stainless steel loading platens, having concave loading faces and with a radius of curvature equal to the nominal radius of the test specimen and of dimensions as given in Table 1. The lower platen shall be securely fixed to the load frame and the upper platen shall be connected to the loading system via a spherical seating.

Table 1 — Dimensions of loading platens

Dimensions in millimetres

Nominal specimen diameter	Width of loading face	Length of loading face	Depth of concave segment
100	12.5 ± 1	80	0.4 ± 0.05
150	19 ± 1	80	0.6 ± 0.05
200	25 ± 1	80	0.8 ± 0.05