

Testing coated fabrics —

Part 8: Methods 10A and 10C. Methods for determination of low temperature performance

IMPORTANT NOTE. It is recommended that this Part be read in conjunction with the information in Part 0 “Foreword and general information”.

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Foreword

In reviewing method 10 the Committee responsible was concerned to remove the anomalies in test results which had manifested themselves during attempts to apply method 10 to all forms of coated fabrics. At the same time a number of international methods of test were to be considered. Consequently, whilst method 10 (now method 10A) of the last edition has been maintained, it has also been extended in that crack propagation is now more clearly defined. The limitations of the test also have been acknowledged.

Text deleted. Method 10B no longer applies.

The provisions of method 10C fulfil the requirements of ISO 4646 but additional information has been included concerning test instrument details as it was felt that the information provided by ISO 4646, whilst accurate and unambiguous, was insufficiently detailed and suffered from the criticism that it did not make it explicit that the striking arm needed to be positively driven if problems associated with the dissipation of momentum of the striking arm were to be avoided. Consequently the details of the test instrument described in ISO 4646 have been supplemented by additional data drawn from BS 903-A25. In so doing, however, the criteria set out in ISO 4646 have been adhered to strictly. Method 10C has been included as a means of assessing low temperature impact performance in those cases where method 10A is found unsuitable due to the specimen configuration during the test.

Fabrics coated with rubber or plastics are used in different applications requiring low temperature flexing, and therefore no general relationship between these tests and service performance can be predicted.

Other low temperature test methods include BS EN 1876-1:1998 (bending test), which supersedes method 10B, and BS EN 1876-2:1998 (impact test on loop).

This Part of this standard supersedes method 10 of BS 3424:1973.

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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 Part of this British Standard describes two methods of determining the low temperature performance of coated fabrics.

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

2 Method 10A. Determination of cold crack temperature

2.1 General. The cold crack temperature is not a sharply defined temperature, and it is possible that the range of temperatures over which cracking occurs in some proportion of test specimens varies with different materials.

The cold crack temperature varies also with the rate of folding, in that the quicker the folding the higher the temperature at which cracking occurs. The apparatus used in this test is designed to make available sufficient kinetic energy to ensure a flat fold in the test specimen by impact at a velocity of 2 m/s.

In addition, the test result is influenced by the criterion of cracking since, in the broadest sense, cracking is anything from a local crack in the surface of the coating not visible to the naked eye, to one extending across the width of the specimen and down to the fabric; it is essential, therefore, to define the criterion of cracking in such a way as to give the maximum reproducibility of the result.

NOTE It should be noted however that this method is only considered suitable for those materials which can, at room temperature, be easily bent into the configuration required by the test without damage to the specimen. For those materials which cannot be bent into the required configuration without damage, it is suggested that the alternative methods in 10C or BS EN 1876-1 may be appropriate. Method 10B is no longer appropriate.

The method is applicable to coated fabrics having a thickness not greater than approximately 2 mm.

2.2 Principle. Conditioned specimens are exposed in a coolant to decreasing and increasing temperatures around a datum temperature. At each successive change in temperature the folded specimens are impacted between a plunger and anvil under defined conditions, after which they are examined visually for cracking. The temperature at which cracking occurs is then determined.

2.3 Apparatus. The apparatus (see Figure 1) comprises of a vertical spring loaded plunger (A) terminating in a hammer (B) which strikes an anvil (C) on which the looped test specimen (D) is placed. The anvil and the end of the plunger are immersed in methanol cooled to the appropriate temperature.

NOTE 1 It is permissible to cool the methanol by adding solid carbon dioxide.

The lower part (E) of the plunger consists of nylon or other suitable material of low thermal conductivity and the hammer is of brass and 25 mm in diameter. A handle (F) is fitted to the upper end of the plunger. The anvil is of brass and of the same diameter as the hammer. The surfaces of both hammer and anvil are plane and parallel and coincide when in contact. The total mass of the plunger and hammer is 0.45 kg.

The compression spring (G) which actuates the plunger has a rate of 2.7 ± 0.1 N/mm and is so fitted that when the hammer is raised from the anvil there is 10 mm free movement before compression of the spring.

A trigger mechanism (H) is provided to hold the plunger against the spring pressure in the position such that the hammer is 35 mm above the anvil. It is important that the plunger moves freely in its housing (J), and that the trigger mechanism does not impede the movement of the plunger when released. The plunger spring is in a relaxed state when the apparatus is not in use.

The anvil is fixed to the base of the coolant bath (K), which is provided with a mechanical stirrer and a calibrated partial immersion thermometer.

The specimen holder (L) comprises of a spring clip (M), and means are provided for locating it in accordance with 2.7.

NOTE 2 Care should be exercised to ensure that the spring clip of the specimen holder is positioned so that the specimen is in a horizontal plane and level with the anvil surface, as otherwise additional stress areas may be introduced.

2.4 Preparation of test specimens. Twenty specimens $32 \text{ mm} \times 6 \pm 0.6 \text{ mm}$ shall be cut with the longer dimension in the transverse direction of the roll. The strips shall be evenly spaced from the full usable length and width of the sample and not within 50 mm of the selvage.

NOTE Normally, approximately 20 specimens are sufficient for each determination. However, depending upon the type of coated fabric under investigation, the number of specimens required to be tested before the cold crack temperature can be determined, may be less than 20 or, in other cases, greater than 20. (See also 2.8.)

2.5 Conditioning of test specimens.

Immediately prior to testing, condition the test specimens in accordance with method 4 (i.e. Part 2 of this standard).

2.6 Time interval between manufacture and testing. For all purposes the minimum time between manufacture and testing shall be at least 16 h.

NOTE For evaluations intended to be comparable the tests should, as far as possible, be conducted at the same time interval after manufacture.