MALAYSIAN STANDARD

MS 1810:2005
(CONFIRMED:2012)

Test method for determining strength of adhesively bonded rigid plastic lap-shear joints in shear by tension loading

ICS: 83.180

Descriptors: plastics, test, adhesive bonds, shear strength, tension

NOTE. This MS has been reviewed by the responsible committee and confirmed that its contents are current

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Committee representation

The Plastics and Plastics Products Industry Standards Committee (ISC J) under whose authority this Malaysian Standard was adopted, comprises representatives from the following organisations:

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Federation of Malaysian Manufacturers
Institut Kimia Malaysia
Jabatan Kerja Raya
Lembaga Getah Malaysia
Malaysian Petrochemical Association
Malaysian Plastics Manufacturers Association
Ministry of Domestic Trade and Consumer Affairs
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SIRIM QAS International Sdn Bhd (Product Certification Section)
The Institution of Engineers, Malaysia
Universiti Kebangsaan Malaysia
Universiti Sains Malaysia
Universiti Teknologi Malaysia

The Technical Committee on General Methods of Test for Plastics which recommends this Malaysian Standard consists of representatives from the following organisations:

Federation of Malaysian Manufacturers

Hicom Teck See Manufacturing (M) Sdn Bhd

IKRAM C and S Sdn Bhd

Institut Kimia Malaysia

Polypropylene (M) Sdn Bhd

SIRIM Berhad (Plastics and Ceramics Programme)

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FOREWORD

The adoption of the ASTM Standard as a Malaysian Standard was recommended by the Technical Committee on General Methods of Test for Plastics under the authority of the Plastics and Plastics Products Industry Standards Committee.

This Malaysian Standard is identical to ASTM D 3163-01, *Standard test method for determining strength of adhesively bonded rigid plastic lap-shear joints in shear by tension loading*, published by the ASTM International, with the exception as listed below.

MALAYSIAN STANDARD EXCEPTIONS

a) in 7.1, the rate has been changed from “8.3 to 9.7 MPa (1200 to 1400 psi)” to “8 MPa to 10 MPa” and the speed has been changed from “0.05 in./min” to “1.0 mm/min”.

b) in 9.1.11, the average thickness has been changed from “0.0127 mm (0.0005 in.)” to “130 ?m”.

Compliance with a Malaysian Standard does not of itself confer immunity from legal obligations.

Designation: D 3163–01

ENGLISH

Standard Test Method for

Determining Strength of Adhesively Bonded Rigid Plastic Lap-Shear Joints in Shear by Tension Loading[1]

This standard is issued under the fixed designation D 3163; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (?) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method is intended to complement Test Method D 1002 and extend its application to single-lap shear adhesive joints of rigid plastic adherends. The test method is useful for generating comparative shear strength data for joints made from a number of plastics. It can also provide a means by which several plastic surface treatments can be compared.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 907 Terminology of Adhesives[2]

D 1002 Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)[2]

D 2093 Practice for Preparation of Surfaces of Plastics Prior to Adhesive Bonding[2]

D 4896 Guide for Use of Adhesive-Bonded Single Lap-Joint Specimen Test Results[2]

3. Terminology

3.1 *Definitions*—Many of the terms used in this test method are defined in Terminology D 907.

4. Significance and Use

4.1 Due to the increased use of adhesive-bonded plastics as a result of the inherent advantages afforded by bonded rather than mechanically fastened joints, particularly the alleviation of stress raisers and stress cracking, there is a need for standard tests by which joints of various plastic substrates and adhesives can be compared. This test method is intended to meet such a need.

4.2 This test method is limited to test temperatures below the softening point of the subject adherends, and is not intended for use on anisotropic adherends such as reinforced plastic laminates.

4.3 The misuse of strength values obtained from this test method as allowable design-stress values for structural joints could lead to product failure, property damage, and human injury. The apparent shear strength of an adhesive obtained from a given small single-lap specimen may differ from that obtained from a joint made with different adherends or by a different bonding process. The normal variation of temperature and moisture in the service environment causes the adherends and the adhesive to swell and shrink. The adherends and adhesive are likely to have different thermal and moisture coefficients of expansion. Even in small specimens, short-term environmental changes can induce internal stresses or chemical changes in the adhesive that permanently affect the apparent strength and other mechanical properties of the adhesive. The problem of predicting joint behavior in a changing environment is even more difficult if a different type of adherend is used in a larger structural joint than was used in the small specimen.

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[1] This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.40 on Adhesives for Plastics.

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[2] *Annual Book of ASTM Standards,* Vol 15.06.