

Australian/New Zealand Standard®

Paints and related materials—Methods of test

Method 403.2: Abrasion resistance—Taber abraser

PREFACE

This Standard was prepared by the Joint Australia/New Zealand Standards Committee CH/3, on Paints and Related Materials, under the direction of the Multitechnics Standards Policy Board, to provide a method of determining the abrasion resistance of a paint film using the Taber abraser*. This method is derived from ASTM D 4060, *Test method for abrasion resistance of organic coatings by the Taber Abraser*, and Fed. Test Method Std. No. 141 C Method 6192.1.

METHOD

1 SCOPE This Standard sets out a method for determining the abrasion resistance of a paint coating or other finishes, such as anodising, electroplating, paper products, rubbers, plastics, textiles, glass and concrete, using the Taber abraser.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

1580 Paints and related materials—Methods of test

1580.101.1 Method 101.1: Air drying conditions

1580.104.1 Method 104.1: Recommended materials for test panels

ASTM

D 2240 Test method for rubber property—Durometer hardness

3 DEFINITIONS For the purpose of this Standard, the following definitions apply:

3.1 Mass loss—the mass loss in milligrams, determined after a specified number of abrasion cycles.

3.2 Wear appearance—the change in appearance of a test film after it has been subjected to abrasion under a specific set of test conditions.

3.3 Wear index—the rate of wear, expressed as 1000 times the loss in weight in milligrams per cycle.

4 PRINCIPLE Coated test panels or panels of a specified material are subjected to an abrasion test by means of a pair of weighted rotating abrasive wheels for a specific number of cycles. The characteristic rub-wear action of the Taber abraser is produced by the contact of a test sample, turning on a vertical axis, against the sliding rotation of the abrading wheels. The abrading wheels rotate in opposite directions about a horizontal axis displaced tangentially from the axis of the test

* The abraser and its accessories are manufactured by the Teledyne Taber Company, North Tonawanda, New York, 14120.

sample. One abrading wheel rubs the test panel outwards toward the periphery and the other inwards toward the centre of the test panel. The resulting abrasion marks form a pattern of crossed arcs over an area of approximately 300 square millimetres.

The abrasion resistance of the test coating or test material is assessed by determining—

- (a) the wear appearance;
- (b) the mass loss; or
- (c) the wear index.

5 APPARATUS

5.1 Taber abraser—constructed so that wheels of several grades of abrasiveness can be readily used. Loads of 250, 500 and 1000 g on each wheel shall be obtained by the use of changeable weights and counterweights. The turntable of the abraser shall rotate substantially in a plane with a deviation at a distance of 2 mm from its periphery, of not greater than ± 0.5 mm.

5.2 Abrasive wheels—resilient calibre wheels of type CS-10 or CS-17, as appropriate.

NOTES:

- 1 Because the rubber bonding material on the abrasive wheels has a tendency to harden with age, only wheels which are no more than 12 months old should be used. This can be determined by the date of manufacture located on the side of the wheels, or by keeping a record of the date of purchase. Alternatively, the hardness may be checked by a Shore Durometer using the A-2 scale in accordance with ASTM D 2240. The acceptable hardness is 81 ± 5 units. When wheels are replaced, they are to be replaced in pairs.
- 2 CS-17 wheels produce a harsher abrasion than CS-10 wheels.

5.3 Refacing components—paper refacing discs of Type S-11 to reface the abrasive wheels. Alternatively, a diamond wheel refacing tool may be used.

5.4 Vacuum pick-up assembly—consisting of a vacuum unit, a variable transformer suction regulator, a nozzle with a variable adjustment bracket attachment and a connecting hose.

5.5 Analytical balance—accurate to 0.005 g.

5.6 Small brush—a soft bristle brush.

6 TEST PANELS Test panels shall be 100 mm x 100 mm x 2 mm plain low carbon steel sheet conforming to AS 1580.104.1 unless otherwise specified. The panels shall be flat, and for safety reasons should have all corners and edges rounded. A 7 mm hole shall be drilled in the centre of each panel to enable it to be held in position on the turntable.

7 PREPARATION OF TEST PANELS Test panels shall be prepared, coated and cured in accordance with the appropriate methods. A minimum of two test panels is required for each test.

NOTE: The abrasion resistance of the coating may be affected by the degree of cure before testing. This should be recognized when preparing the test panel and scheduling the timing of the test.

8 TEST CONDITIONS The test shall be carried out under routine conditions specified in AS 1580.101.1. In cases of dispute, the panel preparation, curing and abrasion test shall be carried out under Referee Conditions specified in AS 1580.101.1.

9 EQUIPMENT PREPARATION The instrument and wheels shall be prepared as follows:

- (a) Mount the specified abrasive wheels on their respective flange holders, taking care not to touch the abrasive surfaces. Unless otherwise specified, adjust the mass on each wheel to 1000 g.