Australian Standard™

Paints and related materials—Methods of test

Method 408.2: Adhesion—Knife test

METHOD

1 SCOPE

This Standard method sets out two procedures for assessing qualitatively the adhesion of a coating or coating system of any thickness, to a metal substrate by cutting through the coating in a prescribed manner. This method may be used on other substrates but has limitations on soft friable substrates.

The method may be used to compare the adhesion of paint films or to assess the change in adhesion of a coating after exposure, e.g., to natural weathering.

With appropriate modifications and by waiving the restraints of preconditioning and test conditions, the test is readily applicable to field use.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1580	Paints and related materials—Methods of test
1580.101.5	Method 101.5: Conditions of test—Temperature and humidity control
1580.107.3	Method 107.3: Determination of wet film thickness by gauge
1580.108.1	Method 108.1: Determination of dry film thickness on metallic substrates—Non-destructive methods
1580.108.2	Method 108.2: Dry film thickness—Paint inspection gauge
1580.408.4	Method 408.4: Adhesion (crosscut)
3894	Site testing of protective coatings
3894.3	Part 3: Determination of dry film thickness

3 PRINCIPLE

The coating or coating system applied to the requisite metal substrate is cut through to the metal in a prescribed manner and the ease of removal of the coating determined.

4 OCCUPATIONAL HEALTH AND SAFETY

Care should be taken when using sharp objects. Refer Manufacturer's Safety Data Sheet (MSDS) when handling products.

5 APPARATUS

5.1 Knife blade

A sharp-edged, freshly honed knife blade with a sharp point of 45 degrees or less, such as a scalpel.

NOTE: A scalpel would be suitable for low-build commercial coatings, however a more substantial blade may be required for a high-build heavy duty coating.

5.2 Straightedge

Of steel at least 50 mm long.

5.3 Surface temperature measuring device

Used for field tests only.

5.4 Film thickness gauge

As specified in AS 1580.108.1, AS 1580.108.2 or AS 1580.107.3.

6 TEST CONDITIONS (For laboratory tests only)

The test shall be performed under the routine conditions specified in AS 1580.101.5 (see also Clause 1).

NOTE: In field testing, the ambient conditions will have to be accepted, however the temperature of the test surface should be noted and reported.

7 PREPARATION OF TEST PANELS

If required, pretreat the test panels by the appropriate method. Coat the test panels at the appropriate film thickness and dry them by the appropriate methods.

If required, determine the coating wet film thickness in accordance with AS 1580.107.3.

8 PROCEDURE

8.1 General

The parallel cut method is essentially an abridged version of AS 1580.408.4 but in practical terms is mainly intended as a ‘pass’ or ‘fail’ test, viz ‘complete removal’ or ‘no removal’ of the coating strip. It is not applicable for coatings less than 100 μm thick. This contrasts with the 30-degree angle cut method which has no thickness restriction and gives a gradation in performance, because the distance between the two cuts increases as the coating is pulled away from the vertex.

8.2 Parallel cut method (Method A)

The procedure shall be as follows:

(a) Establish the film thickness of the test surface in the intended test area using AS 1580.108.1, AS 1580.108.2 or AS 1580.107.3 as appropriate.

(b) Hold the knife blade at right angles to the test surface to avoid ‘undercutting’ and, using a single cutting action, make two parallel cuts through the coating, of minimum length 25 mm, separated by a distance equal to about 10 times the coating system thickness. Use the straightedge to guide the direction of the cut.

NOTE: If the scoring through to the substrate is not achieved in a single cutting stroke, disregard the cut and perform another.

(c) Make a crosscut at right angles to the original cuts near one extremity of the original cuts.

(d) Insert the point of the knife blade under the paint coating at the crosscut and attempt to lift it from the substrate by a gentle prising action (see also Note to Clause 8.3(d)).

(e) Assess the adhesion of the coating at each location and record whether or not there has been removal of the coating from the substrate or other coatings.

NOTE: A brief recorded description of the ease and extent of removal to assist in the assessment of the adhesion is required.