

STANDARDS AUSTRALIA

RECONFIRMATION

OF

AS 2331.1.1—2001

Methods of test for metallic and related coatings

Method 1.1: Local thickness tests—Micrographic examination of cross-sections

RECONFIRMATION NOTICE

Technical Committee MT-009 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 20 March 2017.

The following are represented on Technical Committee MT-009:

Australasian Institute of Surface Finishing
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Steel Institute
Bureau of Steel Manufacturers of Australia
Galvanizers Association of Australia
Galvanizing Association of New Zealand
New Zealand Metal Roofing Manufacturers

NOTES

Australian Standard™

AS 2331.1.1

Methods of test for metallic and related coatings**Method 1.1: Local thickness tests—Micrographic examination of cross-sections**

PREFACE

This Standard has been prepared by the Joint Standards Australia/Standards New Zealand Committee MT-009, Metal Finishing, to supersede AS 2331.1.1—1980. It is the result of a consensus among representatives on the Joint Committee to produce it as an Australian Standard. The objective of this revision is to upgrade the requirements so that they closely align with ISO 1463:1982, *Metallic and oxide coatings—Measurement of coating thickness—Microscopical method*.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

METHOD

1 SCOPE

This Standard specifies a method for the measurement of the local thickness of metallic coatings, oxide layers, and porcelain or vitreous enamel coatings, by the microscopical examination of cross-sections using an optical microscope. This Standard does not apply to paint coatings. Test methods for paint and related coatings are specified in the AS/NZS 1580 series of Standards.

Under good conditions, when using an optical microscope, the method is capable of giving an absolute measuring accuracy of 0.8 µm; this will determine the suitability of the method for measuring the thickness of thin coatings.

NOTES:

- 1 The test procedures described in this Standard do not necessarily include all of the precautions required to satisfy health and safety aspects. Care should be taken to ensure that the procedures are carried out only by people who have received suitable training. Guidance in the handling and use of hazardous chemicals is given in AS/NZS 2243.1 and AS/NZS 2243.2.
- 2 Factors relating to measuring accuracy are given in Appendix A.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS/NZS
1580 Paints and related materials—Methods of test (all Standards)



AS/NZS

2243 Safety in laboratories

2243.1 Part 1: General

2243.2 Part 2: Chemical aspects

ISO

2064 Metallic and other inorganic coatings—Definitions and conventions concerning the measurement of thickness

3 DEFINITIONS

For the purpose of this Standard the definitions in ISO 2064 and those below apply.

3.1 Local thickness

The mean of a specified number of thickness measurements made within a reference area.

3.2 Reference area

The area within which a specific number of test measurements are required to be made.

4 PRINCIPLE

A portion of the test specimen is sectioned and mounted. The mounted cross-section is prepared by suitable techniques of grinding, polishing and etching. The thickness of the coating cross-section is measured by means of a calibrated scale.

NOTE: These techniques will be familiar to experienced metallographers, but some guidance is given in Appendices A and B for less experienced operators.

5 PREPARATION OF CROSS-SECTIONS

The specimen shall be prepared, mounted, ground, polished and etched, so that —

- (a) the cross-section is perpendicular to the coating;
- (b) the surface is flat and the entire width of the coating image is simultaneously in focus at the magnification to be used for the measurement;
- (c) all material deformed by cutting or cross-sectioning is removed; and
- (d) the boundaries of the coating cross-section are sharply defined by no more than contrasting appearance, or by a narrow, well defined, line.

NOTE: Further guidance is given in Appendices A and B. Some typical etchants are described in Appendix C.

6 MEASUREMENT

The procedure for measuring the coating thickness shall be as follows:

- (a) Calibrate the microscope and its measuring device with a certified or calibrated stage micrometer.
- (b) Measure the width of the image of the coating cross-section at a minimum of five points distributed along a length of the microsection.

NOTE: Appropriate attention should be given to the factors listed in Appendices A and B.

7 ACCURACY REQUIREMENT

The microscope and associated equipment, their use and calibration and the method of preparation of the cross-section shall be chosen so as to allow the coating thickness to be