

Australian Standard™

Paints and related materials—Methods of test

Method 213.2: Dry hiding power—Contrast ratio

FOREWORD

Paints cannot be readily applied at any nominated spreading rate with sufficient reproducibility to establish accurately a paints contrast ratio. Thus, to establish the contrast ratio at any nominated spreading rate, films of thicknesses approaching the nominated film thickness are prepared and the actual spreading rate of each is determined from a knowledge of the wet paint density and non-volatile content by mass. Because there is an approximate linear relationship between the contrast ratio (CR) of conventional decorative white or light-coloured paints and the spreading rate, the contrast ratio at a nominated spreading rate can be interpolated from those of the prepared films. This method requires the preparation of four separate films of thickness spanning the specified spreading rate.

The graphical interpolation is made from the linear relationship of CR versus spreading rate, rather than the non-linear CR versus dry film mass, to overcome the difficulties of interpolation for non-linear plots.

METHOD

1 SCOPE

This Standard describes procedures for the quantitative determination of the opacity (by contrast ratio measurement) of a dry, light-coloured paint film at a specified spreading rate.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1580	Methods of test for paint and related materials
1580.101.1	Method 101.1: Conditions of test—Temperature, humidity and airflow control
1580.101.5	Method 101.5: Conditions of test—Temperature and humidity control
1580.103.1	Method 103.1: Preliminary examination and preparation of samples for testing
1580.202.1	Method 202.1: Density
1580.202.2	Method 202.2: Density of water-dispersed paints subject to foaming
1580.301.1	Method 301.1: Non-volatile content by mass

AS/NZS

2310	Glossary of paint and painting terms
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3 DEFINITION

For the purposes of this Standard, the definitions of AS/NZS 2310 apply.

4 PRINCIPLE

A minimum of four sample paint films are prepared over a range of spreading rates spanning the specified value. Each film is weighed, and the reflectance of the paint film over a black and a white substrate is determined. The contrast ratio and spreading rate are calculated for each paint film, and used to prepare a graph of spreading rate and contrast ratio for the particular paint. The contrast ratio for a specified spreading rate is read from the resultant graph.

5 OCCUPATIONAL HEALTH AND SAFETY GUIDANCE

During handling follow precautions for use outlined in suppliers Materials Safety Data Sheet (MSDS).

Exercise care when handling sharp cutting tools.

6 APPARATUS

6.1 Polyester film

Untreated, colourless transparent film, $45 \pm 10 \mu\text{m}$ thick, between 90 to 120 mm wide, and 150 to 300 mm long.

6.2 Applicators

An applicator or a series of film applicators, such as bar coaters, automatic applicators, or draw-down blade and shim sets, capable of delivering a range of wet film thickness and corresponding spreading rates. At least one of these thicknesses shall exceed the specified spreading rate.

6.3 Metal template

A rectangular corrosion-resistant metal template, of not less than 60 mm $\times$ 60 mm, the area of which shall be calculated by measurement of the length and width to the nearest 1 mm.

6.4 Glass panel

A float glass panel, of minimum thickness 5 mm, and of a width and length greater than the template dimensions (Clause 6.3) such that the film applicator system may be appropriately accommodated to prepare the requisite coated polyester film.

6.5 Tweezers

Of appropriate size, of inert material.

6.6 Sharp cutting tool

Such as a scalpel or rigid razor blade.

6.7 Spring clip or adhesive tape

Which will satisfactorily secure the polyester sheets in position on the glass panel.

6.8 Analytical balance

Accurate and readable to 0.0001 g.

6.9 Reflectometer

A photoelectric instrument providing, within 0.3 percent, a reading (R_Y) proportional to the intensity of light reflected from the surface under test, having a spectral response approximating the Y tristimulus value of the relative spectral energy distribution of CIE Illuminant D₆₅/10° observer, or the Illuminant C/2° observer.

6.10 Rectangular tiles

Black and white tiles, of dimensions greater than the metal template, with reflectances which are respectively not more than 5 percent, and 80 ± 5 percent, relative to a freshly prepared smoked surface of magnesium oxide, when measured using a reflectometer complying with Clause 6.9.

6.11 Hydrocarbon solvent or water

6.12 Cleaning solvent

6.13 Cotton lint

6.14 Squeegee

Suitable for gently pressing the polyester film against the glass panel without deforming or scratching the film.

6.15 Clean envelopes

7 TEST CONDITIONS

The test shall be performed under conditions complying with AS 1580.101.1 and AS 1580.101.5, where applicable.

8 PROCEDURE

The procedure shall be as follows:

- (a) Prepare the paint sample in accordance with AS 1580.103.1.
- (b) Determine the density of the paint sample in accordance with AS 1580.202.1 or AS 1580.202.2 as appropriate.
- (c) Determine the non-volatile content of the paint sample in accordance with AS 1580.301.1.
- (d) Using the appropriate applicator, prepare four separate films of thicknesses spanning the specified spreading rate, in the following manner—
 - (i) place a polyester sheet on the plate glass panel, ensuring that all surfaces are clean and dust free;
 - (ii) clamp the film firmly to the glass by means of the spring clip or adhesive tape, ensuring that the sheet does not overlap any side of the glass panel;
 - (iii) ensure that the glass panel rests on a uniform substrate and, using the squeegee, remove all bubbles under the polyester film; and
 - (iv) using the applicator with a minimum of pressure and uniform action, and with the paint sample freshly reincorporated (see Clause 8(a)), draw the paint down such that the time for the drawdown is 1 to 2 s.

NOTES:

- 1 A few trial drawdowns may be needed to develop the action which yields the desired uniform paint film.
 - 2 For this test, wet film thicknesses in the range 40 to 100 μm for conventional solvent-borne and latex paints are suggested.
- (e) Reject any drawdown which contains foreign matter or displays unevenness of film when viewed by transmitted light.
 - (f) Allow each drawdown to dry for 48 ± 2 h under conditions complying with AS 1580.101.1.