CEPE Guidance on the Measurement and Provision of Volume Solids Values for Protective Coatings

Volume solids are a measure of the volume of non-volatile portion of a product expressed as a percentage of the total volume of product. Volume solids values are provided by protective coatings manufacturers for each of their products. They are used by users to determine the required wet film thickness required to achieve the specified dry film thickness and so calculate coverage rates. From this the amount of product needed for a project/job can be estimated.

Required wet film thickness is calculated using the following equation:

$$\text{Required Wet Film Thickness} = \frac{\text{Required Dry Film Thickness}}{\text{Volume Solids}} \times 100$$

Theoretical coverage is calculated using the following equation:

$$\text{Theoretical Coverage} = \frac{\text{Volume Solids} \times 10}{\text{Dry Film Thickness}}$$

Users will also have to allow for appropriate loss factors within their own application processes when determining practical coverage rates.

Volume solids can be theoretically calculated from the product formulation. Some manufacturers may indicate these theoretical values on their technical data sheets and other product literature.

Volume solids can also be determined through specific test methods. Such methods which already exist include ISO 3233:1998 Determination of percentage volume of non-volatile matter by measuring the density of a dried coating and ASTM D2697-03(2008) Standard test method for volume non-volatile matter in clear or pigmented coatings. Where manufacturers provide practically determined volume solids values it is recommended that these should be measured using an officially recognised standard such as ISO 3233 or ASTM D2697-03.

In the case of intumescent coatings, industry has agreed to use a specific method based on a modified ASTM 2697-03 (BCF method for the determination of intumescent coatings volume solids, reference IC 001[1]), which combines the use of a practical application method and a typical thickness of coating used in practice. This is necessary because of the relatively high dry film thicknesses involved and the rapid drying of some Intumescent materials.

[1] Obtainable from the British Coatings Federation, Leatherhead, UK; tel: +44 1372 700848; email: enquiry@bcf.co.uk

The method used in calculating the volume solids should be indicated on the product technical data sheet.

Often volume solids are also provided with a range eg 60+/-3. The range is included to allow for batch to batch variations in volume solids that may occur during manufacture or variations due to different colour shades. In these cases the mid-point published should be the theoretically or practically determined figure of the designed formulation with the tolerances applied being representative of the manufacturing variances found with the product or variances in the colour shade range.

CEPE / 2009-08-19