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I.S. EN ISO 23811:2009

Paints and varnishes - Determination of percentage volume of non-volatile matter by measuring the non-volatile matter content and the density of the coating material, and calculation of the theoretical spreading rate (ISO 23811:2009)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 23811

February 2009

ICS 87.040

English Version

Paints and varnishes - Determination of percentage volume of non-volatile matter by measuring the non-volatile matter content and the density of the coating material, and calculation of the theoretical spreading rate (ISO 23811:2009)

Peintures et vernis - Détermination du pourcentage en volume de matières non volatiles par mesurage de la teneur en matières non volatiles et de la masse volumique d'un produit de peinture et calcul du rendement d'application théorique (ISO 23811:2009)

Beschichtungsstoffe - Bestimmung des Volumens nichtflüchtiger Anteile durch Messen des Gehaltes an nichtflüchtigen Anteilen und der Dichte des Beschichtungsstoffes, und Berechnung der theoretischen Ergiebigkeit (ISO 23811:2009)

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Foreword

This document (EN ISO 23811:2009) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 “Paints and varnishes” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2009, and conflicting national standards shall be withdrawn at the latest by August 2009.

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INTERNATIONAL STANDARD

ISO 23811

First edition
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Paints and varnishes — Determination of percentage volume of non-volatile matter by measuring the non-volatile matter content and the density of the coating material, and calculation of the theoretical spreading rate

Peintures et vernis — Détermination du pourcentage en volume de matières non volatiles par mesurage de la teneur en matières non volatiles et de la masse volumique d'un produit de peinture et calcul du rendement d'application théorique

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Foreword

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ISO 23811 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

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Introduction

This method is used to determine the volume of the dry coating obtainable using a coating material by calculation of the percentage volume of non-volatile matter. The value obtained by this method might not be the same as that measured or calculated by adding together the masses and volumes of the raw materials in a formulation. The volume occupied by a combination of resin and solvent might be the same as, greater than or less than the combined volume of the separate components, since contraction or expansion of resin and the solvent can occur. A second factor affecting the volume of a dry coating is the degree to which the spaces between pigment particles are filled with binder. A third factor is the use of volatile components in reactive systems that, by their reaction, change into non-volatile film-building materials, i.e. amines and reactive solvents in high-build two-component coating materials.

Above and close to the critical pigment volume concentration, the volume of a dry paint film is greater than the theoretical volume, due to an increase in unfilled voids between pigment particles. The porosity of the film means that this method is unsuitable.

Another method for determination of the percentage volume of non-volatile matter is described in ISO 3233. The method described in ISO 23811 is a quick method which needs only the results of the non-volatile matter and the density of the coating material and the density of the solvents for the calculation. The precision of the method depends mainly on the determination of the non-volatile matter content and the unknown densities. But the precision of the combination of measurements and calculation is better than the precision of pure calculation methods with no measurements. The simple practical method is often used in the automotive industry, especially for commercial vehicles.

The method described in ISO 23811 differs from the methods described in ASTM D 2697 and Section 5.5 of ASTM D 5201-05a and gives different results.

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Paints and varnishes — Determination of percentage volume of non-volatile matter by measuring the non-volatile matter content and the density of the coating material, and calculation of the theoretical spreading rate

1 Scope

This International Standard specifies a simple practical method for calculating the non-volatile matter by volume, NV_V, of a coating material from the non-volatile-matter content, NV, the density of the coating material and the density of the solvents. Using the non-volatile matter by volume results and the density obtained in accordance with this International Standard, it is possible to calculate the theoretical spreading rate of a coating material.

This International Standard is not applicable to coating materials which exceed the critical pigment volume concentration (CPVC).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pyknometer method*

ISO 2811-2, *Paints and varnishes — Determination of density — Part 2: Immersed body (plummet) method*

ISO 2811-3, *Paints and varnishes — Determination of density — Part 3: Oscillation method*

ISO 2811-4, *Paints and varnishes — Determination of density — Part 4: Pressure cup method*

ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile-matter content*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
spreading rate
surface area that can be covered by a given quantity of coating material to give a dried film of requisite thickness

NOTE 1 It is expressed in m^2/l or m^2/kg.

[ISO 4618:2006]

NOTE 2 See also **practical spreading rate** (3.3) and **theoretical spreading rate** (3.5).

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