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NSAI Standards

Irish Standard
I.S. EN ISO 3233-3:2015

Paints and varnishes - Determination of the percentage volume of non-volatile matter - Part 3: Determination by calculation from the non-volatile-matter content determined in accordance with ISO 3251, the density of the coating material and the density of the solvent in the coating material (ISO/FDIS 3233-3:2014)

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I.S. EN ISO 3233-3:2015

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 3233-3

May 2015

ICS 87.040

Supersedes EN ISO 23811:2009

English Version

Paints and varnishes - Determination of the percentage volume of non-volatile matter - Part 3: Determination by calculation from the non-volatile-matter content determined in accordance with ISO 3251, the density of the coating material and the density of the solvent in the coating material (ISO 3233-3:2015)

Peintures et vernis - Détermination du pourcentage en volume de matière non volatile - Partie 3: Détermination par calcul à partir de la teneur en matière non volatile déterminée conformément à l'ISO 3251, de la masse volumique du produit de peinture et de la masse volumique du solvant du produit de peinture (ISO 3233-3:2015)

Beschichtungsstoffe - Bestimmung des Volumens nichtflüchtiger Anteile - Teil 3: Bestimmung durch Berechnung des nach ISO 3251 bestimmten Gehaltes an nichtflüchtigen Anteilen, der Dichte des Beschichtungsstoffes und der Dichte des Lösemittels im Beschichtungsstoff (ISO 3233-3:2015)

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Foreword

This document (EN ISO 3233-3:2015) 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of an identical text or by endorsement, at the latest by November 2015, and conflicting national standards shall be withdrawn at the latest by November 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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INTERNATIONAL STANDARD

ISO 3233-3

First edition
2015-05-15

Paints and varnishes — Determination of the percentage volume of non-volatile matter —

Part 3: Determination by calculation from the non-volatile-matter content determined in accordance with ISO 3251, the density of the coating material and the density of the solvent in the coating material

Peintures et vernis — Détermination du pourcentage en volume de matière non volatile —

Partie 3: Détermination par calcul à partir de la teneur en matière non volatile déterminée conformément à l'ISO 3251, de la masse volumique du produit de peinture et de la masse volumique du solvant du produit de peinture

Reference number
ISO 3233-3:2015(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This first edition of ISO 3233-3 cancels and replaces ISO 23811:2009, which has been technically revised and, in addition to the change in number, contains the following changes:

— symbols have been harmonized with those used in ISO 3233-1 and ISO 3233-2;

— determination of dry film thickness has been added;

— statement on the density of the solvents of waterborne systems has been added;

— informative annex (Annex D) for an overview on the existing methods for determination of non-volatile matter content and volume of non-volatile matter has been added;

— text has been editorially revised and Normative References has been updated.

ISO 3233 consists of the following parts, under the general title *Paints and varnishes — Determination of percentage volume of non-volatile matter*:

— *Part 1: Method using a coated test panel to determine non-volatile matter and to determine dry film density by the Archimedes principle*

— *Part 2: Method using the determination of non-volatile-matter content in accordance with* ISO 3251 *and determination of dry film density on coated test panels by the Archimedes principle*

— *Part 3: Determination by calculation from the non-volatile-matter content determined in accordance with* ISO 3251*, the density of the coating material and the density of the solvent in the coating material*

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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.

Other methods for determination of the percentage volume of non-volatile matter are described in ISO 3233-1 and ISO 3233-2. The method described in this part of ISO 3233 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 this part of ISO 3233 differs from the methods described in ASTM D 2697 and ASTM D 5201-05, 5.5 and gives different results.

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Paints and varnishes — Determination of the percentage volume of non-volatile matter —

Part 3: Determination by calculation from the non-volatile-matter content determined in accordance with ISO 3251, the density of the coating material and the density of the solvent in the coating material

1 Scope

This part of ISO 3233 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 part of ISO 3233, it is possible to calculate the theoretical spreading rate of a coating material.

This part of ISO 3233 is not applicable to coating materials which exceed the critical pigment volume concentration (CPVC).

2 Normative references

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

ISO 2808, *Paints and varnishes — Determination of film thickness*

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 to entry: It is expressed in m^2/l or m^2/kg.

Note 2 to entry: See also practical spreading rate and theoretical spreading rate.

[SOURCE: ISO 4618:2014, 2.238, modified — Application rate was deleted in Note 2.]

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