

Second edition
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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

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

Partie 1: Méthode utilisant un panneau d'essai revêtu pour déterminer la matière non volatile et pour déterminer la masse volumique du feuil sec par le principe d'Archimède



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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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 3233-1:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the definitions and sources have been updated in [Clause 3](#);
- a minimum mass of 25 mg of the coating on the plate has been added in [7.4.1](#) because measurements and simulation calculations demonstrate the need for a minimum mass for the coated panel;
- the text has been editorially revised.

A list of all parts in the ISO 3233 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This method is used to measure the density and to determine the volume of a dry coating obtainable from a given volume of liquid paint. This volume is considered to be the most meaningful measure of the coverage (area of surface covered at a specified dry-film thickness per unit volume) of a paint, varnish or related product. The value obtained by this method might not be the same as that calculated on the basis of the addition of masses and volumes of the raw materials in a formulation. The volume occupied by a combination of resin and solvent can be the same as, greater than or less than the combined volume of the separate components, due to contraction or expansion of the resin and solvent. A second factor affecting the volume of a dry coating formulation 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.

The values obtained for the non-volatile matter by volume are dependent on the temperature and time of heating, and these conditions should be carefully considered for the material being tested.