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

**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**

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

*Partie 2: Méthode utilisant la teneur en matière non volatile
déterminée conformément à l'ISO 3251 et la masse volumique du
feuil sec déterminée par le principe d'Archimède sur des panneaux
d'essai revêtus*



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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 3233-2:2014), which has been technically revised. The main changes compared to the previous edition are as follows:

- the definitions and sources in [Clause 3](#) have been updated;
- a minimum mass of 25 mg of the coating on the plate has been added in [7.2.2](#), because measurements and simulation calculations demonstrate the need for a minimum mass for the coated panel.

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.

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

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

1 Scope

This document specifies a method for determining the non-volatile matter by volume (NV_V) of coating materials by determining the practical dry-film density. This method determines the volume percentage of non-volatile matter in paints, varnishes and related products by measuring the density of a dry coating for any specified temperature range and period of drying or curing. The non-volatile matter content is determined in accordance with ISO 3251.

Using the non-volatile matter by volume results obtained in accordance with this document, it is possible to calculate the practical spreading rate of coating materials.

This method specifies an additional shape of plate to those described in ISO 3233-1 and is suitable for all products which can be applied by dipping.

This document is not applicable to coating materials which exceed the Critical Pigment Volume Concentration (CPVC).

[Annex A](#) gives an overview of the existing methods for the determination of non-volatile matter content and of non-volatile matter volume.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1513, *Paints and varnishes — Examination and preparation of test samples*

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

ISO 2811 (all parts), *Paints and varnishes — Determination of density*

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

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1
non-volatile matter
NV

residue by mass obtained by evaporation under specified conditions

Note 1 to entry: Instead of the term “non-volatile matter”, different terms, such as solid, dry residue, dry matter, solid matter, stoving residue are being used commonly with the respective abbreviations. The term “non-volatile matter” which is also applied in ISO 3251 should be used together with the abbreviation “NV” instead of these terms.

[SOURCE: ISO 4618:2014, 2.176]

3.2
non-volatile matter by volume
NV_v

percentage residue by volume obtained by evaporation under specified conditions

[SOURCE: ISO 4618:2014, 2.177]

3.3
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 m²/l or m²/kg.

Note 2 to entry: See also *practical spreading rate* (3.4).

[SOURCE: ISO 4618:2014, 2.238, modified — “Application rate” and “theoretical spreading rate” have been deleted from Note 2 to entry.]

3.4
practical spreading rate

s_p
spreading rate (3.3) which is obtained in practice on the particular substrate being coated

[SOURCE: ISO 4618:2014, 2.203, modified — Symbol, s_p, has been added.]

3.5
practical dry-film density

ρ_p
practically determined density of a dried and cured coating

[SOURCE: ISO 3233-1:2013, 3.4]

4 Principle

The non-volatile matter by volume is calculated from the quotient of the density of the coating material and the dry film, with the dry-film density being determined practically.

5 Apparatus

Standard laboratory apparatus together with the following: