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Paints and varnishes — Determination of wet-scrub resistance of coatings

Peintures et vernis — Détermination de la résistance au frottement humide des revêtements

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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 document 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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This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 139, *Paints and varnishes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 11998:2006), which has been technically revised.

The main changes are as follows:

— the title has been changed to “Determination of wet-scrub resistance of coatings”;

— the introduction has been deleted;

— cleanability has been deleted completely;

— weighing accuracy has been changed from 1 mg to 0,1 mg;

— the description of the abrasive pad has been clarified;

— five new Annexes B to F have been added;

— a batch control of the non-woven abrasive has been introduced in Annex B;

— criteria for the acceptance of new non-woven abrasive have been introduced in Annex C;

— preparation and formulation of a general reference paint have been introduced in Annex D;

— preparation and formulation of an example reference paint have been introduced in Annex E;

— details on the interlaboratory comparison have been introduced in Annex F;

— the statistical data on reproducibility and repeatability have been updated.

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Paints and varnishes — Determination of wet-scrub resistance of coatings

1 Scope

This document specifies an accelerated method for the determination of wet-scrub resistance. The determination of cleanability is not covered in the scope of this document.

NOTE The ability of coatings to withstand wear caused by repeated cleaning operations is an important consideration both from a practical point of view and when comparing and rating such coatings. Since wet-scrub resistance depends not only on the quality of a coating but also on the substrate, the method of application, the drying conditions and other factors, the results obtained are not directly transferable to actual practice. In this document, the evaluation of the coating is based on a defined substrate, a fixed application method, specified drying conditions and a defined method of wet scrubbing.

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 4618, *Paints and varnishes — Vocabulary*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 and the following apply.

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

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
scrub cycle
one reciprocal movement of the scrub pad over the *scrub length* (3.2) in both directions

3.2
scrub length
stroke length (3.3) plus the length of the pad

3.3
stroke length
distance traversed by one stroke of the apparatus

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3.4
wet-scrub resistance
ability of a dry coating film to sustain less than a specified loss in film thickness, averaged over a defined area, when exposed to a defined number of wet-scrub cycles

4 Principle

The test coating is applied to a test panel using a film applicator at the appropriate gap clearance. After drying and conditioning, the coated panel is weighed and subjected to a defined number of wet-scrub cycles in a scrub testing machine as described in 8.2.

NOTE Some classification standards, e.g. EN 13300, require fewer scrub cycles.

It is then washed, dried and weighed again to determine its loss in mass, from which the mean loss in film thickness is calculated.

Through comparison of the mean loss in film thickness with a specified value, as agreed between interested parties, the coating can be rated in wet-scrub resistance classes.

5 Reagents

5.1 Washing liquid. Use a 2,5 g/l solution of sodium *n*-dodecylbenzenesulfonate (CAS Registry Number ®[1)] 25155-30-0) in water conforming to the requirements of grade 3 of ISO 3696. Allow the solution to stand before use until all air-bubbles and foam have dissipated.

6 Apparatus

6.1 Test panel, made of polyvinyl chloride (PVC) film free of migration-susceptible chemical plasticizers, of sufficient rigidity to ensure a flat surface, impervious to and unaffected by water or aliphatic organic solvents and of a nominal thickness of 0,25 mm, approximately 430 mm long and not less than 80 mm wide.

Other types of film may be used where the coating contains solvent, which can adversely affect the PVC film, e.g. a metal alloy with a thickness of about 0,25 mm. If the coating delaminates before or during the test, another more suitable substrate shall be used.

6.2 Film applicator, preferably an automatic film applicator, used at an application speed of 10 mm/s to 15 mm/s and fitted with a doctor blade with an appropriate gap clearance and a gap width of at least 60 mm.

6.3 Wet-scrub tester apparatus, consisting of a reciprocating scrub testing machine with a stroke length of (300 ± 10) mm and operating at approximately (37 ± 2) scrub cycles per minute. A counter for recording the number of scrub cycles shall be provided.

6.4 Scrub pad holder, consisting of a metal plate fitted with pins to hold the abrasive pad. A mounting device with elongated holes is loosely fitted on the top of the plate (see Figure 1 and Figure 2). Alternatively, other scrub pad holders, e.g. with hook-and-loop fastener, can be used. The mass of the scrub pad holder, which exerts a downward force on the test panel shall be (135 ± 1) g.

1) CAS Registry Number® is a trademark of the American Chemical Society (ACS). This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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