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Paints and varnishes — Coating materials and coating systems for exterior wood — Natural weathering test

Peintures et vernis — Produits de peinture et systèmes de peinture pour bois en extérieur — Essai de vieillissement naturel

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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).

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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 fourth edition cancels and replaces the third edition (ISO 16053:2018), which has been technically revised.

The main changes are as follows:

— the provision for using alternative wood species has been updated;

— the internal comparison product (ICP) has been replaced by a nominated reference material as weathering reference material (WRM);

— mould growth assessment has been extended to visual disfigurement by microorganisms;

— former Annex A was deleted;

— new Annex G for typical properties for common wood species was added;

— new Annex H for adhesive tape testing was added;

— new Annex I for thermal/chemical modification of wood was added;

— the document has been editorially revised.

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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Paints and varnishes — Coating materials and coating systems for exterior wood — Natural weathering test

1 Scope

This document specifies a natural weathering test for exterior wood coating systems mainly intended for decoration and protection of planed and sawn wood.

The test provides a means of evaluating the performance of a wood coating system during outdoor exposure. It forms the basis for the performance specification according to EN 927-2. It also facilitates the comparison of coating systems performance on different substrates including the wood species, or other wood modifications.

For further information, see Annex E.

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 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 2409, *Paints and varnishes — Cross-cut test*

ISO 2808:2019, *Paints and varnishes — Determination of film thickness*

ISO 2810, *Paints and varnishes — Natural weathering of coatings — Exposure and assessment*

ISO 2813, *Paints and varnishes — Determination of gloss value at 20°, 60° and 85°*

ISO 4628-1:2016, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 1: General introduction and designation system*

ISO 4628-2, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering*

ISO 4628-4, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 4: Assessment of degree of cracking*

ISO 4628-5, *Paints and varnishes — Evaluation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 5: Assessment of degree of flaking*

ISO 4628-6, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 6: Assessment of degree of chalking by tape method*

ISO/CIE 11664-4, *Colorimetry — Part 4: CIE 1976 L*a*b* colour space*

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

ISO 18314-1, *Analytical colorimetry — Part 1: Practical colour measurement*

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EN 16492, *Paints and varnishes — Evaluation of the surface disfigurement caused by fungi and algae on coatings*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
weathering reference material
WRM
coating material of known aging performance

4 Principle

The resistance to natural weathering of the coating system under test, applied to a specified wood substrate, is assessed. Durability is evaluated by determining the changes in decorative and protective properties of coatings after 12 months of exposure.

The reference test substrate is *Pinus sylvestris* (European redwood or Scots pine, subsequently referred to as pine) in order to obtain comparative results more rapidly. The sapwood, which is usually present in joinery timber, was chosen as the substrate reference instead of heartwood, because paint failure is more evident on the former. However, heartwood and other grain orientations may be used as alternatives.

Differences in nature and quality of wood, and in the weather and site conditions, are recognized and allowed for in the method by comparing the test system with a nominated WRM. The WRM is subject to agreement by the customer and test institution, and can be a nominated commercial product.

NOTE Earlier editions of this document have used a tightly specified semi-transparent wood stain as the WRM, known as the internal comparison product (ICP). It has proved increasing difficult to source the raw materials for the ICP and legislation has made some materials unavailable. The ICP was primarily used to assess the severity of the climatic exposure at the weathering site but proved to be relatively insensitive to location. Interpretation of this third edition of the document places more emphasis on the absolute test result but allows manufacturers and research organisations to make comparison with tried and tested compositions.

The standard test substrate is pine sapwood. Performance on substrates additional to pine can be carried out using the same test method principles on a nominated substrate (or substrates), e.g. alternative wood species, wood pre-treatments, and wood modifications. The results can be assessed by the criteria of EN 927-2 and subject to meeting them, conformity claimed for the tested substrate/coating combination.

Optional tests are described in Annex D. They can provide valuable additional information. However, to facilitate comparisons, this document requires that pine panels are included as part of each exposure series. An alternative version of the test panel has a machined water-trap. This can accelerate some types of failure.

5 Apparatus and materials

The usual laboratory apparatus, materials and, in particular, the following shall be used.

5.1 Exposure racks, inclined at an angle of 45° to the horizontal, on which the specimens are facing towards the equator, in accordance with ISO 2810.

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