

BS EN 927-3:2012



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Paints and varnishes — Coating materials and coating systems for exterior wood

Part 3: Natural weathering test

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National foreword

This British Standard is the UK implementation of EN 927-3:2012. It supersedes BS EN 927-3:2006 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee STI/28, Paint systems for non-metallic substrates.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISBN 978 0 580 73650 6

ICS 87.040

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2012.

Amendments issued since publication

Date	Text affected
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 927-3

July 2012

ICS 87.040

Supersedes EN 927-3:2006

English Version

**Paints and varnishes - Coating materials and coating systems
for exterior wood - Part 3: Natural weathering test**

Peintures et vernis - Produits de peinture et systèmes de
peinture pour bois en extérieur - Partie 3: Essais de
vieillesse naturelle

Beschichtungsstoffe - Beschichtungsstoffe und
Beschichtungssysteme für Holz im Außenbereich - Teil 3:
Freibewitterung

This European Standard was approved by CEN on 9 June 2012.

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Contents

Page

Foreword.....	4
1 Scope	5
2 Normative references	5
3 Principle	6
4 Apparatus and materials	6
5 Sampling	6
6 Test panels	7
6.1 Wood	7
6.2 Preparation and selection of wood panels	8
6.3 Preparation of coated panels	8
6.3.1 Wood conditioning	8
6.3.2 Preparation of panels for the test coating	8
6.3.3 Preparation of panels for the Internal Comparison Product (ICP)	8
6.3.4 Sealing and ageing	8
6.3.5 Thickness of the coating.....	9
7 Procedure	10
7.1 General.....	10
7.2 Examination before exposure	10
7.3 Exposure.....	10
7.4 Examination after exposure.....	10
7.4.1 Examination on the exposure racks	10
7.4.2 Laboratory examination of unwashed panels	10
7.4.3 Laboratory examination of washed panels.....	11
8 Precision data	11
9 Expression of results and test report.....	11
Annex A (normative) Internal Comparison Product (ICP) alkyd stain	12
Annex B (normative) Details of test methods	14
B.1 Gloss and change of gloss	14
B.2 Colour and colour change	14
B.3 Blistering	14
B.4 Flaking	14
B.5 Mould growth	14
B.6 Cracking.....	15
B.7 Chalking.....	15
B.8 General appearance	15
B.9 Adhesion.....	15
B.9.1 General.....	15
B.9.2 Apparatus	15
B.9.3 Procedure	15
B.10 Test for abnormally porous wood.....	16
B.11 Test for heartwood in pine.....	16
Annex C (normative) Assessment requirements for panels of test coatings and ICP	17
Annex D (informative) Suggested format for a test report.....	18
Annex E (informative) Optional tests including variations to standard weathering test procedure to obtain additional information on coating performance	21

E.1	Principle.....	21
E.2	Tests on alternative wood substrates	21
E.3	Tests with water trap.....	21
E.3.1	Apparatus and materials.....	21
E.3.2	Preparation.....	22
E.3.3	Panel assessment	22
E.4	Tests with back sealing of the panels	23
Annex F	(informative) Explanatory notes	24
F.1	Natural weathering test.....	24
F.2	Validity of test reports.....	24
F.2.1	System	24
F.2.2	Climate and region	24
Annex G	(informative) Precision data	25
Bibliography		26

Foreword

This document (EN 927-3:2012) has been prepared by 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 January 2013, and conflicting national standards shall be withdrawn at the latest by January 2013.

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.

This document supersedes EN 927-3:2006.

The main technical changes are:

- a) Precision data were added in an informative Annex G;
- b) Using the multi-blade cutting tool for cross-cut test is allowed.

EN 927 consists of the following parts under the general title: *Paints and varnishes — Coating materials and coating systems for exterior wood*:

- *Part 1: Classification and selection;*
- *Part 2: Performance specification;*
- *Part 3: Natural weathering test;*
- *Part 5: Assessment of the liquid water permeability;*
- *Part 6: Exposure of wood coatings to artificial weathering using fluorescent UV lamps and water.*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard 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 in accordance with EN 927-2.

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.

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

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

EN ISO 2431, *Paints and varnishes — Determination of flow time by use of flow cups (ISO 2431)*

EN ISO 2808:2007, *Paints and varnishes — Determination of film thickness (ISO 2808:2007)*

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

EN ISO 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85° (ISO 2813)*

EN ISO 4628-1:2003, *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 4628-1:2003)*

EN 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 4628-2)*

EN 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 4628-4)*

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

EN 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 4628-6)*

EN ISO 11664-4, *Colorimetry — Part 4: CIE 1976 $L^*a^*b^*$ Colour space (ISO 11664-4)*

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

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

3 Principle

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

The standard test substrate selected was *Pinus sylvestris* (European redwood or Scots pine, subsequently referred to as pine) in order to obtain relevant results more rapidly. The sapwood, which is usually present in joinery timber, was chosen for use instead of heartwood because paint failure is more evident on the former.

Differences in quality of wood, and in the weather and site conditions, are recognised and allowed for in the method by comparing the test with a reference system. The composition of the reference system (designated as "Internal Comparison Product" or "ICP") is specified in Annex A.

The standard test substrate is pine sapwood with the rear side of panels untreated. However, supplementary information on coating performance may be obtained by conducting optional tests on additional wood species, on pine modified or impregnated by industrial processes, by using a pine panel containing a water trap in its exposed face, or by coating the rear side of the panels.

Optional tests are described in Annex E. It is emphasised that they can serve only to provide additional information.

4 Apparatus and materials

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

4.2 Glossmeter, for the measurement of specular gloss in accordance with EN ISO 2813, at 60° geometry.

4.3 Tristimulus colorimeter or **spectrophotometer**, for the measurement of colour and calculation of colour difference in CIELAB colour coordinates in accordance with EN ISO 11664-4.

4.4 Tape and **cutting tool**, for the assessment of adhesion in accordance with EN ISO 2409.

4.5 Microscope, with a magnification of $\times 10$ for the assessment of surface defects.

4.6 Microscope, for measurement of film thickness in accordance with ISO 2808:2007, method 6A.

4.7 Self-adhesive, transparent tape, in accordance with EN ISO 4628-6 for the assessment of chalking.

4.8 Climate chamber.

5 Sampling

Take a representative sample of the product tested or of each product in the case of a multi-coat system, as described in EN ISO 15528.

Examine and prepare each sample for testing as described in EN ISO 1513.

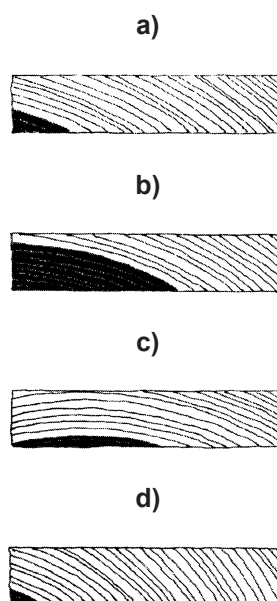
6 Test panels

6.1 Wood

The wood shall be pine that has been selected to be free from knots, cracks and resinous streaks and to be straight-grained and of normal growth rate (i.e. 3 to 8 annual rings per 10 mm). The inclination of the growth rings to the face shall be 5° to 45° (see Figure 1).

The wood shall be free from blue stain and evidence of surface or bulk fungal infection. Abnormal porosity (caused by bacterial attack) shall be avoided (see Annex B, Clause B.10).

The wood shall be conditioned at $(20 \pm 2)^{\circ}\text{C}$ and a relative humidity of $(65 \pm 5)\%$ (in accordance with ISO 554) to an equilibrium moisture content of $(13 \pm 2)\%$.



Key

- a) Example of a panel with no heartwood (if present) closer than 10 mm to the test surface fulfilling the requirement for growth ring orientation (5° to 45°) at the front side.
- b) This panel does not meet the specification because the heartwood is too close to the front side.
- c) This panel does not meet the specification because the growth ring orientation is not within the 5° to 45° band. The growth rings incline -10° at the left of the panel and 30° at the right. Consequently a part of the surface contains tangentially cut wood surface (growth ring inclination 0°), with considerable risk of crack formation.
- d) This panel does not meet the specification because the growth ring orientation is not within the 5° to 45° band. The growth rings incline 45° at the left of the panel and 70° at the right.

NOTE The top side of panels is the exposed side; the bottom is the rear face.

Figure 1 — Cross section of panels