



# SLOVENSKI STANDARD

## SIST ENV 927-2:2001

01-februar-2001

---

### Barve in laki - Premazi in premazni sistemi za zunanjo zaščito lesa - 2. del: Specifikacija za vrsto uporabe

Paints and varnishes - Coating materials and coating systems for exterior wood - Part 2:  
Performance specification

Lacke und Anstrichstoffe - Beschichtungsstoffe und Beschichtungssysteme für Holz im  
Außenbereich - Teil 2: Leistungsanforderungen

Peintures et vernis - Produits de peinture et systèmes de peinture pour le bois extérieur -  
Partie 2: Spécifications de performance

<https://standards.iteh.ai/catalog/standards/sist/f941ba4-a29d-45ba-9698-a3eca57a7309/sist-env-927-2-2001>  
SIST ENV 927-2:2001

**Ta slovenski standard je istoveten z: ENV 927-2:2000**

---

#### **ICS:**

71.100.50	Kemikalije za zaščito lesa	Wood-protecting chemicals
87.040	Barve in laki	Paints and varnishes

**SIST ENV 927-2:2001**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST ENV 927-2:2001](#)

<https://standards.iteh.ai/catalog/standards/sist/ff941ba4-a29d-45ba-9698-a3eca57a7309/sist-env-927-2-2001>

EUROPEAN PRESTANDARD  
PRÉNORME EUROPÉENNE  
EUROPÄISCHE VORNORM

ENV 927-2

August 2000

ICS 87.040

English version

Paints and varnishes - Coating materials and coating systems  
for exterior wood - Part 2: Performance specification

Peintures et vernis - Produits de peinture et systèmes de  
peinture pour le bois extérieur - Partie 2: Spécifications de  
performance

Lacke und Anstrichstoffe - Beschichtungsstoffe und  
Beschichtungssysteme für Holz im Außenbereich - Teil 2:  
Leistungsanforderungen

This European Prestandard (ENV) was approved by CEN on 6 August 2000 as a prospective standard for provisional application.

The period of validity of this ENV is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the ENV can be converted into a European Standard.

CEN members are required to announce the existence of this ENV in the same way as for an EN and to make the ENV available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the ENV) until the final decision about the possible conversion of the ENV into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST ENV 927-2:2001](https://standards.iteh.ai/catalog/standards/sist/f941ba4-a29d-45ba-9698-a3eca57a7309/sist-env-927-2-2001)

<https://standards.iteh.ai/catalog/standards/sist/f941ba4-a29d-45ba-9698-a3eca57a7309/sist-env-927-2-2001>



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

**Contents**

	Page
Foreword .....	2
Introduction .....	2
1 Scope .....	2
2 Normative references .....	2
3 Terms and definitions .....	3
4 Performance tests .....	3
5 Optional tests .....	5
6 Expression of results and interpretation .....	5
Annex A (informative) – Application of weathering test criteria to some representative test results .....	7
Annex B (informative) – Information and guidelines on interpretation .....	9
Bibliography .....	12

**Foreword**

This European Prestandard has been prepared by Technical Committee CEN/TC 139 "Paints and varnishes", the secretariat of which is held by DIN.

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

Part 1: *Classification and selection*

Part 2: *Performance specification* (standards.iteh.ai)

Part 3: *Natural weathering test*

Part 4: *Assessment of the water-vapour permeability*

Part 5: *Assessment of liquid water permeability* NV 927-2:2001

The annexes A and B are informative. <https://standards.iteh.ai/catalog/standards/sist/f941ba4-a29d-45ba-9698-3eca57a7309/sist-env-927-2-2001>

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this European Prestandard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

**Introduction**

This is one of a number of parts of EN 927. Part 1 addresses the issue of an unequivocal terminology for the wide variety of exterior coatings for wood that are now available. Part 1 also provides a framework for communicating information on the suitability of a coating for particular specific end-use categories. Improved communication is beneficial in the removal of technical barriers to trade. However there remains the problem of comparing products tested, or likely to be exposed, in different climatic regions. ENV 927-2 addresses this latter issue and sets specific performance criteria.

**1 Scope**

This part of EN 927 addresses performance criteria for coating systems on exterior wood. Performance requirements are specified according to the categories of 'end use' and 'exposure conditions' (defined in EN 927-1) in terms of the results of natural weathering performance testing carried out in accordance with EN 927-3:2000. A mandatory water permeability test in accordance with EN 927-5 : 2000 is also specified. Additional optional tests are identified which may be used by suppliers to provide voluntary additional information, to a standardized format, on aspects of performance relevant to specific building components such as windows.

## 2 Normative references

This European Prestandard incorporates, by dated or undated references, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 152-1	1988	Test methods for wood preservatives – Laboratory method for determining the preventive effectiveness of a preservative treatment against blue stain in service – Part 1: Brushing procedure
EN 152-2	1988	Test methods for wood preservatives – Laboratory method for determining the protective effectiveness of a preservative treatment against blue stain in service – Part 2: Application by methods other than brushing
EN 927-1	1996	Paints and varnishes – Coating materials and coating systems for exterior wood – Part 1: Classification and selection
EN 927-3	2000	Paints and varnishes – Coating materials and coating systems for exterior wood – Part 3: Natural weathering test
EN 927-5	2000	Paints and varnishes – Coating materials and coating systems for exterior wood – Part 5: Assessment of the liquid water permeability
EN 971-1	1996	Paints and varnishes – Terms and definitions for coating materials – Part 1: General terms
EN ISO 4618-2		Paints and varnishes – Terms and definitions for coating materials – Part 2: Special terms relating to paint characteristics and properties (ISO 4618-2 : 1999)
EN ISO 4622	1994	Paints and varnishes – Pressure test for stackability (ISO 4622:1992)

(standards.iteh.ai)

## 3 Terms and definitions

For the purposes of this Prestandard, the definitions listed in EN 927-1, EN 971-1 and EN ISO 4618-2 apply.

## 4 Performance tests

### 4.1 Resistance to natural weathering

#### 4.1.1 Principle

The assessment of a coating material to this specification will require a natural weathering test to be carried out in accordance with EN 927-3:2000, using a flat wood panel of pine (*Pinus silvestris*) with a planed surface. Coating systems meeting one or more of the performance profiles described below can claim conformity with the specification as described in Section 6. Coating systems not meeting the performance criteria cannot claim full conformity but may offer information gained from one or more of the optional tests.

The external durability of the coating system under test is assessed by a number of performance criteria. Guide values enable an assessment to be made of the suitability of the system for the proposed end-use. Comparative trials have shown that conformity to the criteria outlined below (table 1) sets a performance standard capable of verification, but they do not in themselves constitute a certification procedure. Further guidance on the interpretation of the results is given in annex B.

The severity of the exposure conditions is determined by reference to the performance of an **Internal Comparison Product** (ICP), which also serves as a reference standard for the optional evaluation of mould resistance.

#### 4.1.2 Performance criteria - Natural Weathering

The scores for the assessment criteria, Blistering, Cracking, Flaking and Adhesion (from EN 927-3:2000) and the Water Absorption Value (from EN 927-5 : 2000), are interpreted as meeting, or not meeting the required standard, relative to the end-use category, according to the criteria tabulated in Table 1. These rankings are relative to the exposure conditions as described in 4.1.3:

Interpretation of criteria:

(1) The first four values in each column each represents the maximum allowed for the arithmetic mean (to one decimal place) of the three replicates from the natural weathering test (EN 927-3:2000).

- (2) The 'maximum sum value' is the limit which must not be exceeded for the sum of the 12 ( $4 \times 3$ ) individual results.
- (3) The 'Maximum difference between highest and lowest score to qualify', refers to the difference between the highest and lowest score in any of the individual test panels. If this figure is exceeded the test is declared invalid and must be repeated.
- (4) The 'Water Absorption Value' is the maximum allowed for the arithmetic mean of the five replicates as determined by the procedure described in EN 927-5 : 2000.
- (5) Coating systems not meeting any of these profiles cannot claim full conformity in any of the three end use categories.

Examples of the application of these criteria to hypothetical test results are given in annex A.

**Table 1 - Limit values for performance criteria – Natural weathering and water absorption**

	'Stable'	'Semi-stable'	'Non-stable'
Blistering	0,3	0,7	1
Cracking	0,7	1,7	3
Flaking	0,3	0,7	1,3
Adhesion	0,7	1,7	2,7
Maximum sum value	6	12	18
Maximum difference to qualify as valid test	2	3	4
EN 927-5 : 2000 Water absorption value	$\leq 175 \text{ g/m}^2$	$\leq 250 \text{ g/m}^2$	no limit

**NOTE Test precision**

SIST ENV 927-2:2001

<https://standards.iteh.ai/catalog/standards/sist/f941ba4-a29d-45ba-9698->

An estimate of the standard deviation of the weathering test method was made in a large comparative exercise carried out by members of the CEN Working Group. The findings of this exercise have been incorporated into the criteria matrix so that the underlying target values incorporate a tolerance to allow for variation in the performance of panel replicates. Attention has also been given to the expected distribution of results for a given test. Thus for example an arithmetic mean criterion of 1,3 for 'cracking' could be achieved as (1,1,2), (0,1,3) or (0,0,4). The 'Maximum difference' criteria considers the probability of such scores occurring, and rules out those which are well outside the expected distribution.

#### 4.1.3 Exposure conditions

If the internal comparison product (ICP – see EN 927-3:2000) meets the weathering criteria for the 'stable' end-use category the exposure conditions are rated as 'medium', if it does not meet these criteria the conditions are rated 'severe' (see EN 927-1 : 1996).

Exposure conditions during the test are recorded in the 'Expression of results' (Clause 6).

#### 4.1.4 Water permeability

Water permeability shall be assessed in accordance with EN 927-5 : 2000 and expressed as a 'water absorption value'. The criteria for each end-use category are given in table 1.

## 5 Optional tests

The test methods listed in table 2 are recommended where additional information is required from the supplier of the coating system to meet specific end-user needs. They are not required for compliance with this standard, nevertheless when carried out they shall be reported in the format prescribed in clause 6.

Table 2 - Additional optional tests

Test description	Test method
Blister box test	any test method can be agreed, e.g. BS 7956 : 2000, annex C
Blocking	any test method can be agreed
Stackability	EN ISO 4622 : 1994
Compatibility with glazing (sealing) compounds and profiles	Overcoat following suppliers recommendations
Blue stain in service	EN 152-1 : 1988 and EN 152-2 : 1988
Mould resistance value	EN 927-3: 2000 and 6.2.1
Natural weathering with water trap	EN 927-3 : 2000, annex G
Natural weathering with alternative substrates	EN 927-3 : 2000, annex G

## 6 Expression of results and interpretation

### 6.1 Mandatory tests

The ratings achieved in the weathering and permeability tests shall be reported and expressed to the conventions listed in table 3 or 4. Manufacturers claiming conformity with this standard for a specified coating system shall on request supply a data sheet containing the results in this format.

Manufacturers may at their discretion expand the table format to include information from table 5.

(standards.iteh.ai)  
Table 3 - Mandatory tests for claiming full conformity

Test description	Reporting convention
Appearance definition	Build, hiding power and gloss in accordance with EN 927-1
End use category or categories meeting full performance criteria	'Stable' and/or 'Semi-stable' and/or 'Non-stable'
Exposure conditions	'Medium' or "severe in accordance with 4.1.3

NOTE Some coating systems may meet more than one of the performance profiles. It is at the manufacturer's discretion whether to claim conformity with more than one end-use category.

Table 4 - Mandatory tests for claiming limited conformity

Test description	Reporting convention
Appearance definition	Build, hiding power and gloss in accordance with EN 927-1
End use category or categories meeting limited performance criteria	'Stable' and/or 'Semi-stable' and/or 'Non-stable'
Substrate for which limited conformity is claimed	Wood species, surface treatment, or machined finish
Exposure conditions	'Medium' or 'severe' in accordance with 4.1.3

### 6.2 Optional tests

Optional tests which may be carried out at manufacturers' discretion, shall be reported in the expanded format to give the information listed in table 5. Guidelines on interpretation are given in annex B.



Table 5 - Optional tests for additional information

Test description	Reporting convention
Blister box test	Occurrence of blistering
Blocking	Degree of damage
Stackability	Degree of damage and mass loading
Compatibility of glazing compounds	Report any sticking, softening or discoloration
Blue stain in service	Depth of clear zone
Mould resistance	'Yes' or 'no', see 6.2.1
Natural weathering with water trap	'Stable' and/or 'Semi-stable' and/or 'Non-stable', see also 6.2.2

### 6.2.1 Criteria for mould resistance

Mould resistance is determined by the following procedure: sum the mould growth results for the ICP in the EN 927-3:2000 exposure test, (3 replicates) and add 2, let this value =  $M$

If the **test system** has a value (sum of three replicates) equal or less than  $M$  then the system is reported as "mould resistant" ('Yes').

If the **test system** has a value (sum of three replicates) greater than  $M$  then the system is reported as "not mould resistant" ('No').

### 6.2.2 Role of internal comparison product (ICP) in optional tests

The additional optional natural weathering tests use for reference purposes the same ICP on the same flat pine panel as that employed in the mandatory weathering test. If the optional tests are carried out at the same time, then one set of ICP panels is used as the reference for all mandatory and optional weathering tests exposed together. If however the additional tests are carried out at another time, then a new standard test substrate (coated with the ICP) shall be included to provide reference for exposure conditions and mould growth. Exposure of the ICP on alternative wood species, or on the water trap panel is not required, but can be carried out at the discretion of interested parties to aid qualitative interpretation of the results.



**Annex A** (informative)**Application of weathering test criteria to some hypothetical test results (see table 1)**

These examples are illustrative but not exhaustive of the possible results.

	Replicate	Replicate	Replicate	Total	Mean score	End-use categories for which compliance may be claimed:  <b>Stable</b> <b>Semi-stable</b> <b>Non-stable</b>  Comment: This system is at the cracking limit for stable end-use categories. Manufacturer has the discretion to claim one, two or all three categories.
Blistering	0	0	0	0	0,0	
Cracking	2	0	0	2	0,7	
Flaking	0	0	0	0	0,0	
Adhesion	0	0	0	0	0,0	
Sum Value	2	0	0	2		
Water Absorption					150 g/m <sup>2</sup>	

	Replicate	Replicate	Replicate	Total	Mean score	End-use categories for which compliance may be claimed:  <b>Semi-stable</b> <b>Non-stable</b>  Comment: Although the cracking score is the same as the above example, the water absorption value for stable end-use has been exceeded.
Blistering	0	0	0	0	0,0	
Cracking	2	0	0	2	0,7	
Flaking	0	0	0	0	0,0	
Adhesion	0	0	0	0	0,0	
Sum Value	2	0	0	2		
Water Absorption					220 g/m <sup>2</sup>	

	Replicate	Replicate	Replicate	Total	Mean score	End-use categories for which compliance may be claimed:  <b>Semi-stable</b> <b>Non-stable</b>  Comment: This system is at the cracking limit for semi-stable end-use categories.
Blistering	0	1	0	1	0,3	
Cracking	2	1	2	5	1,7	
Flaking	1	0	0	1	0,3	
Adhesion	0	0	2	2	0,7	
Sum Value	3	2	4	9		
Water Absorption					200 g/m <sup>2</sup>	