



**SLOVENSKI STANDARD**  
**SIST EN 326-2:2011+A1:2014**

**01-oktober-2014**

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**Lesne plošče - Vzorčenje, razžagovanje in kontrola - 2. del: Začetno preskušanje tipa in kontrola proizvodnje v obratu**

Wood-based panels - Sampling, cutting and inspection - Part 2: Initial type testing and factory production control

Holzwerkstoffe - Probenahme, Zuschnitt und Überwachung - Teil 2: Erstprüfung des Produktes und werkseigene Produktionskontrolle

Panneaux à base de bois - Échantillonnage, découpe et contrôle - Partie 2 : Essai de type initial et contrôle de la production en usine

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**Ta slovenski standard je istoveten z: EN 326-2:2010+A1:2014**

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**ICS:**

79.060.01	Lesne plošče na splošno	Wood-based panels in general
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## Wood-based panels - Sampling, cutting and inspection - Part 2: Initial type testing and factory production control

Panneaux à base de bois - Echantillonnage, découpe et contrôle - Partie 2 : Essai de type initial et contrôle de la production en usine

Holzwerkstoffe - Probenahme, Zuschnitt und Überwachung - Teil 2: Erstprüfung des Produktes und werkseigene Produktionskontrolle

This European Standard was approved by CEN on 7 August 2010 and includes Amendment 1 approved by CEN on 17 July 2014.

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**EN 326-2:2010+A1:2014 (E)****Foreword**

This document (EN 326-2:2010+A1:2014) has been prepared by Technical Committee CEN/TC 112 “Wood-based panels”, 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of an identical text or by endorsement, at the latest by February 2015, and conflicting national standards shall be withdrawn at the latest by February 2015.

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 includes Amendment 1 approved by CEN on 17 July 2014.

This document supersedes <sup>A1</sup> EN 326-2:2010 <sup>A1</sup>.

The start and finish of text introduced or altered by amendment is indicated in the text by tags <sup>A1</sup> <sup>A1</sup>.

<sup>A1</sup> This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association. <sup>A1</sup>

A revision of EN 326-2:2000 was necessary in order to adapt this standard to the harmonized European Standard EN 13986:2004.

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Compared to EN 326-2:2000 the following main changes have been made:

- (standards.iteh.ai)
- a) the procedures of initial type testing as well as of factory production control have been adapted to those specified in EN 13986; [SIST EN 326-2:2011+A1:2014](https://standards.iteh.ai/catalog/standards/sist/9b22ad2b-b7c0-4a08-a270-3e69-9968/sist-en-326-2-2011a1-2014)
  - b) the terminology has been adapted to EN 13986; <https://standards.iteh.ai/catalog/standards/sist/9b22ad2b-b7c0-4a08-a270-3e69-9968/sist-en-326-2-2011a1-2014>
  - c) the specification requirement of the lower 5 % value or the upper 95 % value, respectively, is also fulfilled, if all single 30 mean values comply with the specification limit;
  - d) the procedure of evaluation of linear correlations between test results has been improved.

This standard is one of a series of European Standards dealing with sampling, cutting and inspection of wood-based panels. The other parts of this series are listed in Clause 2 and in the Bibliography.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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 methods for internal initial type testing (ITT) and internal factory production control (FPC) as well as external control of wood-based panels for their compliance with EN 13986 and other relevant product specifications. However, it may also apply, at the option of the manufacturer, to wood-based panels applied for non-construction purposes.

This European Standard is not applicable for the assessment of compliance with specifications of panels comprised in consignments. In such cases, EN 326-3 applies.

For internal factory production control, if required, methods for the assessment of conformity of batches and of production over longer periods are given.

For external control, if required, methods for the initial inspection of a factory and initial type testing of a product, and for the surveillance of the factory production control, are given.

In the factory production control small test pieces are used. The statistics of evaluation is based on normal distribution.

## 2 Normative references

<sup>A1</sup> 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. <sup>A1</sup>

EN 326-1:1994, *Wood-based panels — Sampling, cutting and inspection — Part 1: Sampling and cutting of test pieces and expression of test results*

EN 13986, *Wood-based panels for use in construction — Characteristics, evaluation of conformity and marking*

ISO 8258, *Shewhart control charts*

## 3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN 326-1:1994 and the following apply.

### 3.1

#### **acceptable quality level**

*AQL*

maximum percentage of non-conforming panels that for the purpose of sampling inspection can be considered satisfactory as a process average

### 3.2

#### **at random**

sampling of panels in such a way that each panel of the inspection lot has an equal chance of being selected, and cutting of test pieces from a single panel in such a way that each part of the panel has an equal chance of being selected as a test piece

### 3.3

#### **attribute**

qualitative panel characteristic which can be taken for a yes or no decision about the conformity of a panel characteristic with the specification requirements

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NOTE An example is given in Annex C.

- 3.4  
batch**  
panels of the same product type produced in a shift
- 3.5  
defective**  
panel which does not meet the required specification limit of the relevant characteristic
- 3.6  
inspection body**  
body which is responsible for external control
- 3.7  
inspection by attributes**  
inspection whereby either the unit of product is classified simply as conforming or non-conforming, or the number of nonconformities in the unit of product is counted, with respect to a given requirement or set of requirements
- 3.8  
inspection by variables**  
inspection whereby the conformity of a panel characteristic can be measured on a continuous scale
- 3.9  
inspection lot** (for factory control)  
portion of production which is presented for sampling and inspection, consisting of panels of the same type, normally within the same thickness range, coming from the same production line and manufactured under essentially the same conditions
- 3.10  
inspection lot size**  
 $N$   
number of panels in one inspection lot
- 3.11  
lower specification limit**  
 $L$   
value required by the EN specification that 95 % of the panels should have values greater than or equal to
- 3.12  
panel**  
piece of wood-based sheet material large enough to permit the cutting of test pieces
- 3.13  
percent defective**  
extent of non-conformity of a panel product expressed by percentage defective panels in the total number of panels inspected
- 3.14  
production site**  
single production line
- 3.15  
product type**  
panel type, irrespective of thickness, as defined in the relevant EN specification



**3.16****reference population**

wood-based panels for which the relationship between test values is relevant

**3.17****quality characteristic**

characteristic that is essential for the evaluation of a product or product type in accordance with a relevant EN specification

**3.18****sample**

collection of panels which are drawn from an inspection lot

NOTE Unless otherwise agreed, the panels of the sample are drawn at random.

**3.19****test piece**

piece of panel cut to the size required for testing a specific characteristic

**3.20****test value**

$x_{ij}$

single value or measurement of a specific characteristic obtained from a test piece

**3.21****thickness range**

panels with a thickness for which the same specification limits are valid according to the relevant EN specification

**3.22****upper specification limit**

$U$

value required by the EN specification that 95 % of the panels should have values lower than or equal to

**3.23****variable**

test value or measurement which can be measured on a continuous scale

**4 Symbols and indices****4.1 Letter symbols (see also EN 326-1:1994)**

$A_c$	Acceptance number
$AQL$	Acceptable quality level
$a$	Linear correlation constant
$b$	Linear correlation factor
$c_{conv}$	Conversion factor
$F$	Statistical factor
$L$	Lower specification limit
$m$	Number of test pieces cut from each single panel of the sample, in either test direction
$n$	Sample size (number of panels)

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$N$	Number of panels in one inspection lot, i.e. inspection lot size
$r$	Correlation coefficient; coefficient of linear regression
$Re$	Rejection number
$S_{\bar{x}}$	Estimate of the standard deviation of a characteristic between panel means $\bar{x}_j$
$S_{\delta\bar{x}}$	Estimate of the standard deviation of the relative differences of the panel means $\delta\bar{x}_j$
$S_{\Delta\bar{x}}$	Standard deviation between panel differences
$S_{w_j}$	Estimate of the standard deviation of a characteristic within a panel $j$ of the sample
$S_{\bar{x}_j,alt}^2$	Variance of panel means of the alternative testing procedure
$S_{\bar{x}_j,ref}^2$	Variance of panel means of the reference standard test
$t$	Statistical factor, see Table 1
$U$	Upper specification limit
$\delta$	Relative difference
$\Delta$	Absolute difference
$V_{w,j}$	Coefficient of variation within a panel $j$ of the sample
$V_{\bar{x}}$	Coefficient of variation between the panel means $\bar{x}_j$
$\phi_{conv}$	Linear conversion function
$x_{ij}$	Single test value or measurement
$\bar{x}_j$	Mean value of the $m$ test values (or measurements) obtained from a single panel $j$
$\bar{\bar{x}}_n$	Grand mean of $n$ single panel mean values
$\bar{x}_{j,alt}$	Test value of the population of the alternative test procedure
$\bar{x}_{j,ref}$	Test value of the population of the reference standard test method
$\Delta\bar{x}_j$	Test value of the difference between the alternative test procedure and the reference standard test method

## 4.2 Indices (see also EN 326-1:1994)

$alt$	Related to alternative testing procedure
$attr$	Related to inspection by attributes
$conv$	Related to conversion function
$cu$	Cumulative value
$d$	Related to double sample plan

ext	Test results from the external control
$i$	Serial test piece number within a panel ( $i = 1, 2, \dots, m$ )
ITT	Test results related to initial type testing
$j$	Test panel identification number within a sample ( $j = 1, 2, \dots, n$ )
$m$	Related to number of test pieces of a panel
$n$	Related to the number of panels of a sample
ref	Related to reference standard test
$si$	Related to single sampling plan
$w$	Characteristic within a panel

## 5 Initial type testing (ITT)

### 5.1 General

Initial type testing shall be performed according to this European Standard on first application of EN 13986, except where tests were previously performed in accordance with the provisions of these standards (i.e. same product, same characteristic(s), test method, sampling procedure, system of conformity, etc.). Initial type testing shall be performed at the beginning of the production of a new product type.

### 5.2 Initial type testing by variables

<https://standards.iteh.ai/catalog/standards/sist/9b22ad2b-b7c0-4a08-a270-3f2868c14db8/sist-en-326-2-2011a1-2014>

#### 5.2.1 General

In general, the requirements of the panel properties are fulfilled if at least 95 % of the panel means for each characteristic are above the lower  $L$  or below the upper  $U$  specification limit respectively.

NOTE For examples, see Annex A.

#### 5.2.2 Sampling of panels

The initial type testing shall comprise panels from not less than three production shifts.

The minimum number of panels in the initial type testing sample  $n_{ITT}$  of a factory production is 12 panels per product type with at least two panels from each production line.

The minimum number of panels may be reduced to 6, if the product properties can be documented from internal records of at least 12 tested panels in the start up period.

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## 5.2.3 Evaluation

## 5.2.3.1 Evaluation by using the test results directly

## 5.2.3.1.1 Compliance of the ITT sample

Calculate the mean value  $\bar{x}_{ITT,j}$  for each panel, the grand mean value  $\bar{\bar{x}}_{ITT}$  for the panels and, the standard deviation between the panels  $s_{\bar{x},ITT}$  for each relevant characteristic in accordance with Equations (1) and (2):

$$\bar{\bar{x}}_{ITT} = \frac{\sum_{j=1}^{j=n_{ITT}} \bar{x}_{ITT,j}}{n_{ITT}} \quad (1)$$

and

$$s_{\bar{x},ITT} = \sqrt{\frac{\sum_{j=1}^{j=n_{ITT}} (\bar{x}_{ITT,j} - \bar{\bar{x}}_{ITT})^2}{(n_{ITT} - 1)}} \quad (2)$$

To fulfil the specification requirement the lower 5 % value or upper 95 % value shall be higher than or equal to the lower specification limit  $L$  or lower than or equal to the upper specification limit  $U$  respectively, when calculated according to the Equation (3) or (4), respectively:

$$L_{5\%} = \bar{\bar{x}}_{ITT} - t_{n_{ITT}} \cdot s_{\bar{x},ITT} \quad (3)$$

or

$$U_{95\%} = \bar{\bar{x}}_{ITT} + t_{n_{ITT}} \cdot s_{\bar{x},ITT} \quad (4)$$

where

$t_{n_{ITT}}$  shall be taken from Table 1.

**Table 1 — Single sided  $t$  – values for different sample sizes  $m$  and  $n$**

Number of test pieces $m$ or of panels $n$ , respectively	4	5	6	8	10	12	16	18	30
$t_m$ or $t_n$ , respectively	2,35	2,13	2,02	1,89	1,83	1,80	1,75	1,74	1,70

NOTE The table values correspond to a 95 % confidence limit, single-sided case, in accordance with ISO 2602:1980.

## 5.2.3.1.2 Variability within panels of the ITT sample

The mean standard deviation within panels of the ITT sample  $\bar{s}_{w,ITT}$ , where "w" is indicating "within" panels, shall be derived from the standard deviation within each panel  $s_{w,j}$  of the sample [Equation (13)] according to Equation (5):

$$\bar{s}_{w,ITT} = \sqrt{\frac{\sum_{j=1}^{j=n_{ITT}} S_{w,ITT,j}^2}{n_{ITT}}} \quad (5)$$

### 5.2.3.2 Evaluation by using relative test results

If the sample consists of panels which are covered by different lower  $L$  and/or upper  $U$  specification limits (for example by combining different thickness ranges of the same standard type of panel product), the evaluation shall be carried out on test results related to each specification limit as follows:

Calculate for each individual panel the relative mean  $\bar{\delta x}_j$  relevant to either the lower  $L$  or upper  $U$  specification limit according to Equation (6) or (7), respectively:

$$\bar{\delta x}_{j,L} = \frac{(\bar{x}_j - L)}{L} \quad (6)$$

or

$$\bar{\delta x}_{j,U} = \frac{(\bar{x}_j - U)}{U} \quad (7)$$

Calculate the grand mean of the relative differences of all panels of the inspection sample according to:

$$\bar{\delta x} = \frac{\sum_1^n \bar{\delta x}_j}{n} \quad (8)$$

and the standard deviation  $s_{\bar{\delta x}}$  of the relative differences between the panel means according to:

$$s_{\bar{\delta x}} = \sqrt{\frac{\sum_1^n (\bar{\delta x}_j - \bar{\delta x})^2}{n-1}} \quad (9)$$

To fulfil the specification requirement the lower 5 % value or the upper 95 % value, respectively, shall be equal to or greater than zero for characteristics with a lower specification limit  $L$  or equal to or less than zero for characteristics with an upper specification limit  $U$  when calculated according to Equation (10) or (11), respectively:

$$L_{\delta,5\%} = \bar{\delta x} - t_n \cdot s_{\bar{\delta x}} \quad (10)$$

or

$$U_{\delta,95\%} = \bar{\delta x} + t_n \cdot s_{\bar{\delta x}} \quad (11)$$

## 5.3 Initial type testing by attributes

### 5.3.1 Sampling

The initial type testing shall comprise panels from not less than three production shifts.