SLOVENSKI STANDARD
SIST EN 1156:2013

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Nadomešča:
SIST ENV 1156:2000

Lesne plošče - Ugotavljanje faktorjev trajanja obremenitve in lezenja

Wood-based panels - Determination of duration of load and creep factors

Holzwerkstoffe - Bestimmung von Zeitstandfestigkeit und Kriechzahl

Panneaux à base de bois - Détermination des facteurs de durée de charge et de fluage

Ta slovenski standard je istoveten z: EN 1156:2013

ICS:

79.060.01	Lesne plošče na splošno	Wood-based panels in general

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EUROPEAN STANDARD

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English Version

Wood-based panels - Determination of duration of load and creep factors

Panneaux à base de bois - Détermination des facteurs de durée de charge et de fluage

Holzwerkstoffe - Bestimmung von Zeitstandfestigkeit und Kriechzahl

This European Standard was approved by CEN on 1 March 2013.

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

Foreword

This document (EN 1156:2013) 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of an identical text or by endorsement, at the latest by October 2013, and conflicting national standards shall be withdrawn at the latest by October 2013.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 ENV 1156:1998.

Compared to ENV 1156:1998, the following significant technical modifications have been made:

a) status changed from ENV to EN;

b) accuracy of the deflection measurement changed from 0,001 mm to 0,01 mm.

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 a method of determining in a constant climate both a duration of load factor and a creep factor for wood-based panels stressed in flatwise bending with and without a shear component. Details of an alternative but provisional method employing medium sized test pieces are given in Annex A; this method can also be used for test pieces loaded under varying climates.

NOTE The duration of load factor is necessary to modify the characteristic strength values obtained in short-term structural tests in order to derive long-term values. The creep factor obtained in the test is used to predict a long-term deflection from the initial elastic deflection.

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 310, *Wood-based panels — Determination of modulus of elasticity in bending and of bending strength*

EN 325, *Wood-based panels — Determination of dimensions of test pieces*

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

EN 1058, *Wood-based panels — Determination of characteristic 5-percentile values and characteristic mean values*

EN 1995-1-1, *Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings*

3 Principle

Determination in a constant climate of the load duration factor (loss in strength with time under load) and the creep factor (ratio of increase in deflection with time to the initial elastic deflection) in bending by applying and sustaining a constant moment over the central region of a test piece; both the time to failure, and the increase in deflection with time are measured.

4 Apparatus

4.1 Measuring instruments as specified in EN 325.

4.2 A number of test rigs (see Figure 1), that have essentially the following components:

4.2.1 Two parallel cylindrical supports of a length exceeding the width of the test piece and of diameter d = (15 ± 0,5) mm.

The distance between the supports shall be adjustable, and each support shall be capable of rotating in its frame.

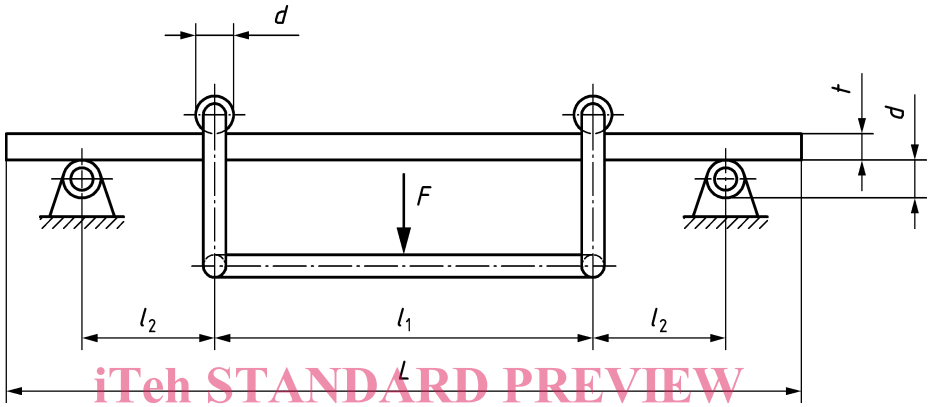
Two cylindrical loading rollers of the same length and diameter as the supports. These shall lie parallel to the supports, be capable of rotating, and be linked together with cross-arms of fixed length.

The distance l_1 between the loading rollers shall be 150 mm, the distance between one support and the nearer loading roller shall be five times the nominal thickness t of the test piece. The horizontal and vertical components of the loading cradle shall be rigidly connected.

NOTE 1 For boards with a low bending stiffness large deflections can occur. In general, the test configuration described here is suitable for a test piece with a stiffness ($E_m I$) greater than 9 000 kNmm^2; test pieces with a lower stiffness can be tested by proportionately reducing the distances between the rollers (l_1+2 l_2) as well as the distance between the deflection measuring points.

NOTE 2 The load can be applied to the cross-arms through some form of mechanical advantage.

Dimensions in millimetres



Key

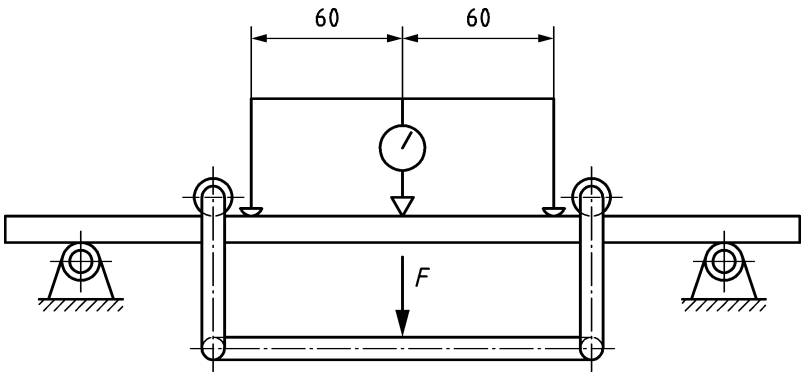
F	dead-load	l_2	= 150
t	thickness	l_2	= 5 t
		L	= l_1+10 t+60
		d	= 15 ± 0,5

Figure 1 — Test arrangement for applying load for static bending and creep tests with test piece in position

4.2.2 A suitable instrument for measuring the deflection of the test piece in the middle of the span which is graduated to allow a reading to 0,01 mm or better and which enables readings of the displacement at the centre of the upper surface of the test piece to be taken in relation to two points on the upper surface of the test piece each 60 mm from the transverse centre line (see Figure 2).

This general method will measure creep in bending free of any influence of shear (method 1).

Dimensions in millimetres



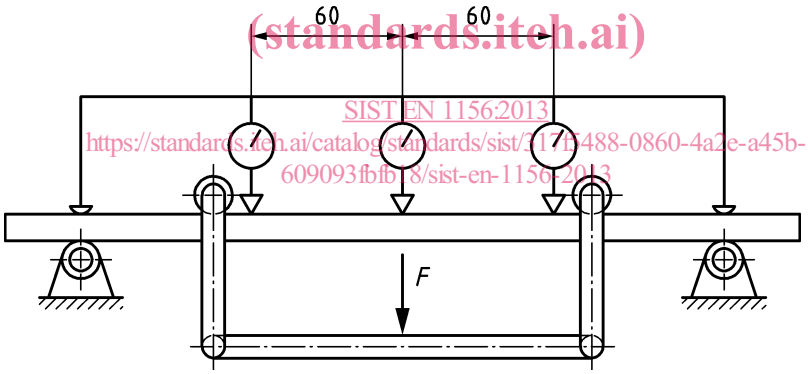
Key

F dead-load

Figure 2 — Method 1 (general method) for the measurement of deflection

Where it is desired to measure creep in bending both with and without a shear component a measuring system as illustrated in Figure 3 shall be used (method 2).

Dimensions in millimetres



Key

F dead-load

Figure 3 — Method 2 for the measurement of deflection with and without a shear component

4.3 An arrangement for testing the short-term bending strength with the same loading configuration to the creep test arrangement.

4.4 Weights (= dead load) for applying different constant loads (forces) on the test pieces.

4.5 A controlled environment room capable of maintaining a fixed temperature to ±1 °C and a fixed relative humidity to ± 3 %.

4.6 Equipment for recording temperature and relative humidity.

5 Sampling of panels and preparation of test pieces

5.1 Sampling and cutting

Panels shall be sampled from production sites in accordance with EN 1058.

Where previous static bending tests have indicated that the differences between the means of strength or modulus of elasticity in the two directions of the panel, i.e. longitudinal and transverse, is equal to, or less than 15 %, then a single set of test pieces may be used, provided that these are orientated in the direction of the lower values of strength and elasticity.

Where these tests have indicated differences greater than 15 % in strength or modulus in the two directions, then two sets of test pieces shall be used. However, if the end-use direction of span is known, then it is only necessary to carry out tests in that direction.

Where there is no available information on the relative strength and modulus in the longitudinal and transverse directions, then this shall be determined prior to the start of creep testing. Test pieces from the two directions shall be removed and tested according to EN 310.

For creep, and load-duration tests, each set of test pieces shall comprise 70 pairs of side-matched test pieces cut in a manner that ensures that all panels and test pieces are sampled as equally as possible. This number of samples is based on the assumption that at low stress levels the material is behaving in a linear viscoelastic mode. However, if there is doubt about this assumption, then creep tests should be carried out at more than one stress level as recommended in 6.4.3, and this will necessitate additional test pieces equivalent to an extra 10 for each additional stress level.

Test pieces shall be free of visible strength-reducing characteristics.

Test pieces containing visible strength-reducing characteristics and of a larger size may be tested according to the provisional test method given in Annex A.

5.2 Dimensions of test pieces

The test pieces shall be rectangular, and of the following dimensions:

The width shall be (50 ± 0,5) mm.

For test pieces having a stiffness ($E_m I$) greater than 9 000 kNmm^2 the length L shall be 10 times the nominal thickness plus 210 mm, with a maximum length of 1 200 mm.

For test pieces having a stiffness ($E_m I$) of 9 000 kNmm^2 or less, the length of test piece may be reduced according to NOTE 1 of 4.2.1.

5.3 Conditioning

Before testing, the test pieces shall be conditioned to constant mass in an atmosphere corresponding to the most severe conditions in each of the service classes (SC) according to EN 1995-1-1 to which the appropriate characteristic values apply: these are 20 °C/65 % relative humidity for SC1, 20 °C/85 % relative humidity for SC2, and 20 °C/95 % relative humidity for SC3 (for tolerances see 4.5). Constant mass is considered to be reached when the results of two successive weighing operations, carried out at an interval of 24 h, do not differ by more than 0,1 % of the mass of the test piece.