



SLOVENSKI STANDARD

SIST EN 12509:2002

01-julij-2002

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Timber poles for overhead lines - Test methods - Determination of modulus of elasticity, bending strength, density and moisture content

Holzmaße für Freileitungen - Prüfverfahren - Bestimmung des Elastizitätsmoduls, der Biegefestigkeit, der Dichte und des Feuchtigkeitsgehalts

Poteaux en bois pour lignes aériennes - Méthodes d'essai - Détermination du module d'élasticité, de la résistance à la flexion, de la masse volumique et de la teneur en humidité

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Ta slovenski standard je istoveten z: **EN 12509:2001**

ICS:

29.240.20	Daljnovodi	Power transmission and distribution lines
79.080	Polizdelki iz lesa	Semi-manufactures of timber

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EUROPEAN STANDARD

EN 12509

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2001

ICS 29.240.20; 79.080

English version

Timber poles for overhead lines - Test methods - Determination of modulus of elasticity, bending strength, density and moisture content

Poteaux en bois pour lignes aériennes - Méthodes d'essai - Détermination du module d'élasticité, de la résistance à la flexion, de la masse volumique et de la teneur en humidité

Holzposte für Freileitungen - Prüfverfahren - Bestimmung des Elastizitätsmoduls, der Biegefestigkeit, der Dichte und des Feuchtigkeitsgehalts

This European Standard was approved by CEN on 13 October 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 124 "Structural timber", the secretariat of which is held by DS.

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 May 2002, and conflicting national standards shall be withdrawn at the latest by May 2002.

This standard includes an informative annex A describing a suitable test method for cantilever bending.

This standard includes a 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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This standard is one of five standards covering requirements for visual or machine grading, test methods, determination of characteristic values, methods of specifying durability and sizes.

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1 Scope

This European Standard specifies methods of test to determine modulus of elasticity, bending strength, density and moisture content of solid wood poles for overhead transmission and telecommunication lines. It is applicable to both hardwood and softwood poles.

This standard covers only single poles under cantilever and/or compression loading. For example, this standard does not cover poles used as beams.

The provision of poles for use in any overhead line or cable infrastructure shall take into account a range of factors not covered by this standard which will necessitate the specification by the end user of complementary and synonymous attributes to those defined in this standard. This refers to requirements for a number of factors including safety, overhead plant, handling, fittings, installation machinery and working practices including climbing.

2 Normative references

This European Standard incorporates by dated or undated reference, 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 Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 212, *Wood Preservatives - Guide to sampling and preparation of wood preservatives and treated timber for analysis.*

EN 12465:2001, *Wood poles for overhead lines - Durability requirements.*

prEN 12479, *Wood poles for overhead lines - Sizes, Methods of measurement and limit deviations.*

prEN 12510, *Wood poles for overhead lines - Strength grading criteria.*

ISO 3130, *Wood - Determination of moisture content for physical and mechanical tests.*

ISO 3131, *Wood - Determination of density for physical and mechanical tests.*

3 Terms and definitions

For the purposes of this European Standard, the following the terms and definitions apply.

3.1

bulk density

mass per unit volume of material, including voids and liquids

3.2

dry density

mass of material, dried to constant mass at $(103 \pm 2)^\circ\text{C}$, per unit volume of undried materials

3.3

minimum diameter

minimum diameter of the pole at the section of measurement

3.4

moisture content

ratio of the mass of the quantity of water in a material to the mass of the dry material

EN 12509:2001 (E)**3.5****nominal diameter**

- a) theoretical diameter for poles with 5 % or less ovality;
- b) minimum diameter for pole with greater than 5 % ovality

3.6**ovality**

difference between the maximum and minimum diameter at a cross section expressed as a percentage of the minimum diameter

3.7**pole**

long round timber for use in a free standing application

3.8**pole butt**

lowermost point of the thicker end of the pole

3.9**pole tip**

uppermost point of the narrow end of the pole

3.10**population**

group of poles defined by having the same species, source and grade

3.11**sample size**

number of test poles from one population

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3.12**section of maximum stress**

section of pole where the diameter equals 1,5 x diameter at point of application of load, if this section is above ground line or otherwise the actual ground line section

3.13**theoretical diameter**

diameter of a circle with the same circumference as the actual circumference at the section of measurement

4 Symbols

d_g	nominal diameter at assumed ground-line, in millimetres
d_q	nominal diameter at point of load application, in millimetres
d_{max}	nominal diameter at section of maximum stress, in millimetres
E	modulus of elasticity parallel to grain in bending, in newtons per square millimetre
f_m	bending strength - maximum stress at assumed ground line or point of maximum stress if this is above the assumed ground line, in newtons per square millimetre
I_q	second moment of area of cross section at point of load application, in millimetres to the fourth power
l	pole length measured from butt to tip, in millimetres
l_g	distance from butt to assumed ground-line, in millimetres

l_{\max}	distance from butt to section of maximum stress or ground line, whichever is the greater, in millimetres
l_q	distance from tip to position of applied load
Q	applied load, in newtons
s_a-s_0	movement of load application point parallel to longitudinal axis of the pole during testing, in millimetres (see Figure 1)
t_a-t_0	deflection at point of load application, in millimetres (see Figure 1)

5 Requirements for determination of sizes, moisture content and density

5.1 Determination of sizes

The method of taking measurements and the type of equipment to be used shall be in accordance with prEN 12479.

The sizes of the test poles shall be measured in millimetres to three significant figures. All measurements shall be made when the test poles are in the moisture condition required for the tests.

5.2 Determination of moisture content

5.2.1 For untreated poles, the moisture content of test specimens shall be determined in accordance with the procedure of ISO 3130 on a disc of timber cut from the pole. The disc shall be of full cross-section, free from knots and resin pockets and shall be at least 50 mm in thickness.

5.2.2 In the case of preservative treated poles, the determination of moisture content using the above method shall be restricted to material cut from untreated areas. If the moisture content of treated material is required then methods appropriate to the specific preservative treatment shall be used. The presence or otherwise of treatment in the specimens shall be recorded.

NOTE In the case of creosote treated timber, moisture content may be determined in accordance with EN 212.

5.2.3 In the case of ultimate strength tests, the disc shall be cut as closely as possible to the fracture.

5.2.4 For determining the moisture content of a pole prior to treatment or test the procedures given in ISO 3130 may be applied to borings taken in accordance with EN 12465:2001, annex A. The boring sample used for determination of moisture content shall include the full depth of sapwood or the innermost 75 mm of sapwood whichever is the lesser. Alternative methods of measurement, such as electrical resistance moisture meters, may be used provided that it can be demonstrated that the measurements taken relate to measurements taken in accordance with the above method.

5.3 Determination of density

5.3.1 For untreated poles the dry density of the whole cross-section of the test pieces shall be determined in accordance with the procedures given in ISO 3131 on a disc of timber cut from the poles. The disc shall be of full cross-section, free from knots and resin pockets and shall be at least 50 mm in thickness. For poles that have been treated, the presence or otherwise of treatment in the test piece shall be recorded.

5.3.2 Where separate heartwood and sapwood densities are required these should be determined from rectangular prisms cut from appropriate regions of the disc in accordance with ISO 3131. In the case of ultimate strength tests, the discs for determination of density shall be cut as closely as possible to the fracture.

5.3.3 The bulk density of the poles shall be determined from the overall weight and volume of the pole at the time of test. The weight shall be measured and the volume shall be determined from circumference measurements taken at 0,5 m intervals along the length of the pole.