SLOVENSKI STANDARD
SIST EN 14229:2011

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Nadomešča:
SIST EN 12465:2002
SIST EN 12479:2002
SIST EN 12509:2002
SIST EN 12510:2002
SIST EN 12510:2002/AC:2004
SIST EN 12511:2002

Konstrukcijski les - Leseni drogovi za nadzemne vode

Structural timber - Wood Poles for overhead lines

Holzbauwerke - Holzmaste für Freileitungen

Structures du Bois - Poteaux en bois pour lignes aériennes

Ta slovenski standard je istoveten z: **EN 14229:2010**

ICS:

29.240.20	Daljnovodi	Power transmission and distribution lines
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English Version

Structural timber - Wood poles for overhead lines

Bois de structure - Poteaux en bois pour lignes aériennes

Holzbauwerke - Holzmaste für Freileitungen

This European Standard was approved by CEN on 28 August 2010.

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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 CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 14229:2010) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

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 12465:2001, EN 12479:2001, EN 12509:2001, EN 12510:2001, EN 12511:2001.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Poles for overhead lines are not covered by EN 1995-1-1 (i.e. Eurocode 5), which is for the design of buildings and civil engineering structures. The supplier is always responsible that all products supplied are in conformity with the requirements of this European Standard and any other specification he is provided with. This European Standard is for the initial determination of the characteristic values for a given population of wood poles (i.e. initial type testing), and additional determination when there is a reason to suspect that the characteristic values for a population have reduced. As far as empirical characteristic values are existing they can be used. Annex E presents some typical minimum characteristic values for wood poles. Furthermore, this standard provides also for requirements on the factory production control with production tolerances to enable the manufacturer of this population of wood poles to be in conformity with the declared characteristic values, derived from the initial type testing.

This European Standard recognises that there are many different visual strength grading rules for timber in use in Europe. These have come into existence to allow for:

— different species or groups of species;

— geographic origin;

— different dimensional requirements;

— varying requirements for different uses;

— the quality of material available;

— historic influences or traditions.

Because of the diversity of existing standards for wood poles for overhead lines in use in different Member States it is currently impossible to lay down a single set of acceptable visual grading rules for all Member States.

This European Standard therefore gives the basic principles to be followed when drawing up regional, national, local or buyer requirements for some characteristics and sets limits for others.

In laying down visual grading rules, two main factors are relevant:

— they clearly define and limit the additional characteristics in poles so that there is a very high confidence that poles supplied meet the required characteristic strength value;

— the rules and the text can be easily understood and be suitable for implementation by grading personnel.

This European Standard is also concerned with the durability characteristics of wood poles for overhead power and telecommunication lines. It assumes that all such poles are constructed from round timber in which the finished product comprises either a central core of heartwood surrounded by a zone of sapwood or the heartwood only.

NOTE Some timber (e.g. abies alba and picea abies) do not allow differentiation between heartwood and sapwood. EN 351-1 specifies how such timber should be treated when preservation is required. For such species there may be different requirements for the incised zone and other parts of the pole.

1 Scope

This European Standard covers requirements for single untreated or preservative treated wood poles for overhead lines under cantilever or compression loading (it does not cover poles used as beams). It covers test methods, determination of characteristic values and methods of specifying durability and sizes. It also establishes principles for visual grading.

This European Standard applies to both softwood and hardwood poles.

This European Standard specifies the evaluation of conformity requirements and the marking of wood poles.

This European Standard does not specify wood poles treated against fire to improve their fire performance.

This European Standard does not quantify the service life that may be expected from a wood pole.

NOTE The service life of a wood pole depends on its geographical location, the associated climate of its service environment and either the natural durability of the heartwood of the species selected, or the combination between selection of species, preservative type, and requirements of retention and any incised zones.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 212, *Wood preservatives — General guidance on sampling and preparation for analysis of wood preservatives and treated timber*

EN 252, *Field test method for determining the relative protective effectiveness of a wood preservative in ground contact*

EN 350-1, *Durability of wood and wood-based products — Natural durability of solid wood — Part 1: Guide to the principles of testing and classification of the natural durability of wood*

EN 350-2, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

EN 351-1:2007, *Durability of wood and wood-based products — Preservative-treated solid wood — Part 1: Classification of preservative penetration and retention*

EN 351-2:2007, *Durability of wood and wood-based products — Preservative-treated solid wood — Part 2: Guidance on sampling for the analysis of preservative-treated wood*

EN 599-1, *Durability of wood and wood-based products — Efficacy of preventive wood preservatives as determined by biological tests — Part 1: Specification according to use class*

EN 13183-1, *Moisture content of a piece of sawn timber — Part 1: Determination by oven dry method*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes (ISO 3166-1:2006)*

EN ISO 9001:2008, *Quality management systems — Requirements (ISO 9001:2008)*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptable quality limit (AQL) for lot-by-lot inspection*

3 Terms and definitions

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

3.1
bark pocket
bark that is partly or wholly enclosed in the wood

3.2
characteristic value
value that corresponds to the 5 % fractile of the statistical distribution of strength or the mean value of modulus of elasticity

3.3
charge
all the wood treated together in one treatment at one time

3.4
crack
separation of wood fibres across the grain

NOTE Cracks may be due to internal strains resulting from unequal longitudinal shrinkage, or the fibres being crinkled by compression or other external forces.

3.5
decay
decomposition of wood by fungi or other micro-organisms resulting in softening, progressive loss of mass and strength, and often a change of texture and colour

3.6
direct testing
testing of the preservative treatment achieved by the direct measurement of the penetration and retention of preservative

3.7
double sweep
sweep characterized by two or more bends in one or several planes

3.8
fibre saturation point
fsp
state of a piece of timber when the cell walls are saturated with moisture but no moisture exists in the cell cavities

3.9
fissure
longitudinal separation of fibres

3.10
grain detector
device for detecting the angle of grain in timber

3.11
growth rate
mean number of growth rings per 25 mm

3.12
heart shake
radial end shake originating at the pith

3.13
incised zone
area of the lateral surface of the pole which has undergone an incising process as an aid to securing deeper and more uniform penetration of preservative

NOTE The minimum limit of the incised zone should be 400 mm above and 400 mm below the specified ground line for the pole in service.

3.14
included sapwood
presence in the heartwood of a complete or incomplete ring having the colour and the properties of sapwood

3.15
indirect testing
testing of the preservative treatment achieved by measurement of a property found to exhibit a correlation between itself and the penetration and retention of preservative

3.16
knot
portion of a branch embedded in wood

3.17
knot cluster
knots located so that no grain recovery is evident between adjacent knots

3.18
knot diameter
dimension of the knot measured on the surface of the pole and perpendicular to the axis of the pole

NOTE The diameter takes the entire knot into account, excluding the sapwood.

3.19
length
distance from the pole butt to the pole tip

3.20
maximum diameter
maximum diameter of the pole at the section of measurement

3.21
minimum diameter
minimum diameter of the pole at the section of measurement

3.22
moisture content
ratio of the mass of the quantity of water in a material to the mass of the dry material

3.23
nominal diameter
a) theoretical diameter for poles with 5 % or less ovality;

b) minimum diameter for poles with greater than 5 % ovality

3.24
ovality
difference between the maximum and minimum diameter at a cross section expressed as a percentage of the minimum diameter

3.25
pith
innermost part of the pole

3.26
pole
long round timber for use in a free standing application

3.27
pole butt
lowermost point of the thicker end of the pole

3.28
pole tip
uppermost point of the narrow end of the pole

3.29
population
group of poles defined by having the same species, source and grade

3.30
rind gall
surface wound that has been partially enclosed by the growth of a tree

3.31
ring shake
fissure following the line of a growth ring

3.32
sample
one or more poles taken from a single population

3.33
sampling unit
single preservative-treated pole taken from a charge

3.34
scribe
cranked rod with a swivel handle and a needle at the tip, set to a slight trailing angle

NOTE Used as a grain detector by pressing the needle into the timber and drawing it across the surface in the apparent direction of the grain.

3.35
section of maximum stress
section of pole where the diameter equals 1,5 × diameter at point of application of load, if this section is above ground line or otherwise the actual ground line section

3.36
short crook (local deflection)
natural deviation of the axis of the pole occurring on a length less than 1,5 m

3.37
single sweep
sweep characterised by one bend only

3.38
slope of grain
divergence of the direction of the fibres from the longitudinal axis of the piece

3.39
standard size pole
pole of a size 8 m to 10 m long and 180 mm to 220 mm diameter at 1,5 m from the butt end, used for the determination of characteristic values

3.40
star shake
two or more heart shakes

3.41
sweep
deviation of the longitudinal axis of round timber from a straight line

3.42
taper
gradual reduction in diameter of a stem along its height or round timber along its length

3.43
theoretical diameter
diameter of a circle with the same circumference as the actual circumference at the section of measurement

4 Symbols and abbreviations

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 N/mm^4

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, in millimetres

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 C.1)

E_{mean} mean value of modulus of elasticity parallel to grain, in newtons per square millimetre

$f_{m,k}$ characteristic value of bending strength, in newtons per square millimetre

$f_{m,05}$ sample fifth percentile of bending strength, in newtons per square millimetre

k	statistical factor
m	mean value (the variable is given in parentheses), in newtons per square millimetre
$m(E)$	sample mean values of modulus of elasticity, in newtons per square millimetre
$m(f_m)$	sample mean value of bending strength, in newtons per square millimetre
$m(f_{m,05})$	mean of $f_{m,05}$ values, in newtons per square millimetre
n	number of test poles in a sample
s	standard deviation (the variable is given in parentheses), in newtons per square millimetre
$s(E)$	sample standard deviation of modulus of elasticity, in newtons per square millimetre
$s(f_m)$	sample standard deviation of bending strength, in newtons per square millimetre

5 General requirements

5.1 Species

The species used for wood poles shall be declared. The species commonly used with their names and marking codes are listed in Table 1.

Where other species than those given in Table 1 are used they shall also conform to this European Standard and shall be marked with the code, which consists of the first letter of species name and as many letters of the second word of species name as are necessary to avoid confusion.

NOTE Common names of the species are different depending upon language version.

Table 1 — Species commonly used for wood poles and their marking codes

Botanical species	Common name	Marking code
Abies alba	Fir	AA
Abies pectinata	Fir	AP
Larix species	Larch	LE
Picea abies	Spruce	PA
Picea sitchensis	Sitka spruce	SS
Pinus laricio	Corsican pine	PL
Pinus nigra	Corsican / Austrian pine / Black pine	PN
Pinus pinaster	Maritime pine	PP
Pinus sylvestris	Scots pine / Redwood	PS
Pinus uncinata	Mountain pine	PU
Pseudotsuga menziesii	Douglas fir	PM