



**SLOVENSKI STANDARD**  
**oSIST prEN 14592:2017**  
**01-september-2017**

---

**Lesene konstrukcije - Paličasta vezna sredstva - Zahteve**

Timber structures - Dowel-type fasteners - Requirements

Holzbauwerke - Stiff förmige Verbindungsmittel - Anforderungen

Structures en bois - Éléments de fixation de type tige - Exigences

**Ta slovenski standard je istoveten z: prEN 14592**

[kSIST FprEN 14592:2018](https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b-831b7432841b/ksist-fpren-14592-2018)

<https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b-831b7432841b/ksist-fpren-14592-2018>

**ICS:**

21.060.01	Vezni elementi na splošno	Fasteners in general
91.080.20	Lesene konstrukcije	Timber structures

**oSIST prEN 14592:2017**

**en,fr,de**

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

[kSIST FprEN 14592:2018](#)

<https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b-831b7432841b/ksist-fpren-14592-2018>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 14592**

June 2017

ICS 21.060.01; 91.080.20

Will supersede EN 14592:2008+A1:2012

English Version

## Timber structures - Dowel-type fasteners - Requirements

Structures en bois - Éléments de fixation de type tige -  
Exigences

Holzbauwerke - Stiftförmige Verbindungsmittel -  
Anforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 124.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

	Page
European foreword.....	4
<b>1 Scope .....</b>	<b>5</b>
<b>2 Normative references .....</b>	<b>5</b>
<b>3 Terms and definitions .....</b>	<b>7</b>
<b>4 Symbols and abbreviations .....</b>	<b>9</b>
<b>5 General requirements for fasteners.....</b>	<b>10</b>
5.1 Dimensions and areas – Method of measurement, accuracy and assessment.....	10
5.2 Corrosion protection.....	10
5.3 Withdrawal parameter for fasteners with Type 3 coating.....	12
5.3.1 Testing.....	13
5.3.2 Correction of the measured withdrawal capacities.....	13
5.3.3 Determination of the characteristic withdrawal capacities.....	13
5.3.4 The load duration effect .....	13
5.4 Withdrawal and head pull-through.....	13
5.5 Seismic performance .....	14
5.6 Reaction to fire.....	15
5.7 Dangerous substances.....	15
<b>6 Specific requirements for fasteners .....</b>	<b>15</b>
6.1 Nails.....	15
6.1.1 General.....	15
6.1.2 Materials.....	15
6.1.3 Geometry.....	16
6.1.4 Mechanical strength and stiffness.....	17
6.1.5 Corrosion protection.....	18
6.2 Staples .....	19
6.2.1 General.....	19
6.2.2 Materials.....	19
6.2.3 Geometry.....	19
6.2.4 Mechanical strength and stiffness.....	20
6.2.5 Corrosion protection.....	21
6.3 Screws.....	21
6.3.1 General.....	21
6.3.2 Materials.....	21
6.3.3 Geometry.....	21
6.3.4 Mechanical strength and stiffness.....	23
6.3.5 Corrosion protection.....	25
6.4 Dowels.....	25
6.4.1 General.....	25
6.4.2 Materials.....	25
6.4.3 Geometry.....	25
6.4.4 Mechanical strength and stiffness.....	25
6.4.5 Corrosion protection.....	26
6.5 Bolts and nuts.....	26
6.5.1 General.....	26
6.5.2 Materials.....	26

6.5.3	Geometry .....	27
6.5.4	Mechanical strength and stiffness .....	27
6.5.5	Corrosion protection .....	27
7	Assessment and Verification of Constancy of Performance (AVCP).....	27
7.1	General .....	27
7.2	Determination of product type.....	28
7.2.1	General .....	28
7.2.2	Sampling, testing and conformity criteria.....	28
7.3	Factory production control (FPC).....	35
7.3.1	General .....	35
7.3.2	Requirements.....	36
8	Marking .....	45
8.1	General .....	45
8.2	Nails .....	45
8.3	Staples.....	46
8.4	Screws .....	46
8.5	Dowels .....	47
8.6	Bolts and nuts.....	47
Annex A (informative) Proving performance equivalence of alternative corrosion protection and selection of corrosion resistance and accelerated testing.....		48
Annex B (informative) Corrosivity of atmospheric environments indoor and outdoor – outside the timber and inside the timber.....		50
Annex C (normative) Proposal for measuring zinc thicknesses.....		53
Annex D (informative) Selection of test specimens – Requirements on wood density .....		54
D.1	Scope .....	54
D.2	Symbols .....	54
D.3	Requirements.....	54
D.4	Corrections to target conditions .....	55
D.4.1	Mean value .....	55
D.4.2	Coefficient of variation .....	56
D.5	Test report .....	56
Annex E (normative) Test to determine seismic performance.....		58
E.1	Scope .....	58
E.2	Test setup .....	58
E.3	Test procedure .....	59
E.4	Test results.....	60
E.5	Test report .....	60
Annex ZA (informative) Relationship of this European Standard with Regulation (EU) No. 305/2011 .....		62
Bibliography .....		70

**prEN 14592:2017 (E)****European foreword**

This document (prEN 14592:2017) has been prepared by Technical Committee CEN/TC 124 “Timber structures”, the secretariat of which is held by AFNOR.

This document is currently submitted to the Enquiry.

This document will supersede EN 14592:2008+A1:2012.

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.

This new edition of EN 14592 incorporates the following new technical topics:

- new concepts concerning dimensions and tolerances, e.g. target diameter;
- voluntary classes for withdrawal capacity and head pull-through capacity;
- improved classes for corrosion protection;
- new requirements on wood density for testing of connections with mechanical fasteners;
- voluntary classes for seismic performance and related test method;
- informative annex on the determination of the axial slip modulus for screws.

Other EU Directives/Regulations may also apply to construction products.

## 1 Scope

This draft European Standard specifies the requirements for the following types of dowel-type fasteners: nails, staples, screws, dowels, and bolts with nuts.

Only dowel-type fasteners for structural use in load bearing timber structures, and manufactured from steel, are covered by this European Standard. In addition, this draft European Standard covers also the use of screws:

- to fix roof or cladding elements to the timber structure, with or without insulation layers;

and

- as reinforcement inserted in timber or in a glue laminated timber element to improve its resistance to compression perpendicular to the grain.

This draft European Standard specifies also the assessment and verification of constancy of performance (AVCP) procedures and includes requirements for marking of these products.

This draft European Standard covers dowel-type fasteners that may be coated for the following purposes:

- corrosion protection;
- lubrication (to facilitate insertion);
- withdrawal enhancement and/or collation for staples (adhesive and/or resin coatings).

This draft European Standard does not cover fasteners treated with fire retardants to improve their fire performance, nor does it cover glued-in rods.

## 2 Normative references

<https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b-831b7432841b/ksist-pr-en-14592-2018>

The following documents, in whole or in part, are normatively references 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 338, *Structural timber — Strength classes*

EN 409, *Timber structures — Test methods — Determination of the yield moment of dowel type fasteners*

EN 1382, *Timber Structures — Test methods — Withdrawal capacity of timber fasteners*

EN 1383:2016, *Timber structures — Test methods — Pull through resistance of timber fasteners*

EN 1993-1-4:2006<sup>1)</sup>, *Eurocode 3 — Design of steel structures — Part 1-4: General rules — Supplementary rules for stainless steels*

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

EN 10025-2, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*

---

1) This standard is impacted by the stand-alone amendment EN 1993-1-4:2006/A1:2015.

**prEN 14592:2017 (E)**

EN 10025-3, *Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*

EN 10088 (all parts), *Stainless steels*

EN 10149-1, *Hot rolled flat products made of high yield strength steels for cold forming — Part 1: General technical delivery conditions*

EN 10204, *Metallic products — Types of inspection documents*

EN 10218-1, *Steel wire and wire products — General — Part 1: Test methods*

EN 10277-2, *Bright steel products — Technical delivery conditions — Part 2: Steels for general engineering purposes*

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

EN 14081-1, *Timber structures — Strength graded structural timber with rectangular cross section — Part 1: General requirements*

EN 14358, *Timber structures — Calculation and verification of characteristic values*

EN 15737, *Timber Structures — Test methods — Torsional resistance of driving in screws*

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread (ISO 898-1)*

EN ISO 898-2, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread (ISO 898-2)*

EN ISO 1460, *Metallic coatings — Hot dip galvanized coatings on ferrous materials — Gravimetric determination of the mass per unit area (ISO 1460)*

EN ISO 1463, *Metallic and oxide coatings — Measurement of coating thickness — Microscopical method (ISO 1463)*

EN ISO 2081:2008, *Metallic and other inorganic coatings — Electroplated coatings of zinc with supplementary treatments on iron or steel (ISO 2081:2008)*

EN ISO 2178, *Non-magnetic coatings on magnetic substrates — Measurement of coating thickness — Magnetic method (ISO 2178)*

EN ISO 3497, *Metallic coatings — Measurement of coating thickness — X-ray spectrometric methods (ISO 3497)*

EN ISO 3506-1:2009, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 1: Bolts, screws and studs (ISO 3506-1:2009)*

EN ISO 3506-2, *Mechanical properties of corrosion-resistant stainless steel fasteners — Part 2: Nuts (ISO 3506-2)*

EN ISO 4014, *Hexagon head bolts — Product grades A and B (ISO 4014)*

EN ISO 4016, *Hexagon head bolts — Product grade C (ISO 4016)*



EN ISO 4017, *Fasteners — Hexagon head screws — Product grades A and B (ISO 4017)*

EN ISO 4018, *Hexagon head screws — Product grade C (ISO 4018)*

EN ISO 4032, *Hexagon regular nuts (style 1) — Product grades A and B (ISO 4032)*

EN ISO 4034, *Hexagon regular nuts (style 1) — Product grade C (ISO 4034)*

EN ISO 4042:1999, *Fasteners — Electroplated coatings (ISO 4042:1999)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

EN ISO 9223, *Corrosion of metals and alloys — Corrosivity of atmospheres — Classification, determination and estimation (ISO 9223)*

EN ISO 9224, *Corrosion of metals and alloys — Corrosivity of atmospheres — Guiding values for the corrosivity categories (ISO 9224)*

EN ISO 10666:1999, *Drilling screws with tapping screw thread — Mechanical and functional properties (ISO 10666:1999)*

EN ISO 16120 (all parts), *Non-alloy steel wire rod for conversion to wire (ISO 16120, all parts)*

EN ISO 21968, *Non-magnetic metallic coatings on metallic and non-metallic basis materials — Measurement of coating thickness (Phase sensitive eddy current method) (ISO 21968)*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1995-1-1 and the following apply.

#### 3.1

##### **smooth shank nail**

nail that has a constant cross-section along its entire length, e.g. round, square or grooved

#### 3.2

##### **ring shank nail**

nail that has a profiled shank along a part of its length, e.g. ringed or twisted; the profiled length  $l_g$  is defined in Figure 1

#### 3.3

##### **staple crown width**

distance between the outer edges of the staple legs

#### 3.4

##### **dowel**

cylindrical metal fastener that does not contain an integral head

#### 3.5

##### **bolt**

cylindrical metal fastener consisting of a screw part and a nut part

**prEN 14592:2017 (E)****3.6****withdrawal parameter**

parameter measuring the resistance of a timber test piece to the withdrawal of a timber fastener

**3.7****head pull-through parameter**

parameter measuring the resistance of a timber test piece to the pulling through of the head of a timber fastener or the crown of a staple

**3.8****tensile yield stress**

stress at which yielding takes place

**3.9****nominal diameter**

cross sectional dimension of a fastener for the determination of a load-carrying capacity:

- nails: for smooth shank nails, spiral rolled nails or annular ring shank nails,  $d$  is the outer cross-sectional diameter of the round nail wire, or the side length dimension of the cross-section for a square nail, for all other profiled nails,  $d$  is the cross-sectional diameter of the original wire rod, from which the profiled nail has been produced;
- staples:  $d$  is the diameter of a round rod with the same area as that of the cross-sectional area of the staple;
- screws:  $d$  is the outer thread diameter;
- dowels:  $d$  is the diameter;
- bolts:  $d$  is the diameter of the smooth shank of the screw part

iTeh STANDARD PREVIEW

(standards.iteh.ai)

[kSIST prEN 14592:2018](https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b-)<https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b-><https://standards.iteh.ai/catalog/standards/sist/c55b73e0-96a8-4ac9-9f7b->**3.10****target diameter**

diameter used to declare the nominal diameter of screws intended for use in load bearing timber structures

Note 1 to entry: For the purpose of both production requirements and applicability, screws may only be produced allowing some tolerances. Thus for production purposes these tolerances are measured on the target diameter,  $d_t$ .

**3.11****thread root diameter**

inner diameter of the thread of a screw

Note 1 to entry: The inner diameter is used in EN 1995-1-1 to determine the effective diameter for laterally loaded screws.

**3.12****stiffness**

force for a unit deformation

**3.13****coating type**

purpose of a coating:

- coating type 1: corrosion protection
- coating type 2: lubricant to facilitate insertion
- coating type 3: adhesive coating for improving withdrawal strength and/or for collation of staples

#### 4 Symbols and abbreviations

For the purposes of this standard, the symbols and abbreviations given in EN 1995-1-1 and the following apply:

$A_{80}$	percentage elongation (%)
$A_h$	nail head area (mm <sup>2</sup> )
$A_s$	staple leg cross-sectional area (mm <sup>2</sup> )
$b_R$	staple crown width (mm)
$d$	nominal diameter (mm)
$d_h$	head diameter (mm)
$d_s$	diameter of the smooth shank of a screw
$d_t$	target diameter (mm)
$d_1$	inner thread diameter; inner diameter of fluting (mm)
$f_{ax,k}$	characteristic withdrawal parameter (N/mm <sup>2</sup> )
$f_{head,k}$	characteristic head pull-through parameter (N/mm <sup>2</sup> )
$F_{tens,k}$	characteristic tensile capacity (head pull-off or shank tensile capacity) (kN)
$M_{tor,Rk}$	characteristic torsional moment capacity (Nmm)
$f_u$	tensile strength of the wire (N/mm <sup>2</sup> )
$h_t$	nail head thickness (mm)
$l$	overall fastener length (mm)
$l_g$	length of profiling/threading (mm)
$l_p$	length of the nail point (mm)
$M_{y,Rk}$	characteristic yield moment (Nmm)
$M_{tor,Em}$	mean value for torsional resistance to insertion into timber (Nmm)
$\alpha$	bend angle (°)
$\alpha_c$	bend angle under cyclic loading (°)
$\rho_k$	characteristic timber density when conditioned to constant mass at 20 °C and 65 % relative humidity (kg/m <sup>3</sup> )
$\omega$	moisture content

**prEN 14592:2017 (E)****5 General requirements for fasteners****5.1 Dimensions and areas – Method of measurement, accuracy and assessment**

Dimensions shall be taken on the fastener using a calibrated device capable of achieving an accuracy of  $\pm 1\%$  of the measurement.

If a dimension or an area has been assigned a tolerance, then the mean measured values of the dimensions and areas of the fasteners shall be within the range of the declared values  $\pm$  tolerances. If no tolerance has been assigned, then the requirement shall be greater than or equal to the declared value.

**5.2 Corrosion protection**

The materials or coating specifications used to achieve corrosion protection shall be in accordance with Table 1 or Table 2. The corrosion protection stated in these tables is assumed to secure an intended lifetime of 50 years.

NOTE 1 Standards for galvanized and electroplated coatings express mass/unit area of coatings with respect to the surface area, and standards for hot-dip coated sheet express mass/unit area with respect to the area of the sheet, i.e. the area of a sheet represents half the area of its surface.

The zinc thickness of Table 1 and Table 2 may be reduced if a passivation layer is applied or an alloy is added. For C2 atmospheres a CrIII passivation reduces the zinc thickness by 25 % and a CrVI passivation reduces the zinc thickness by 50 %.

NOTE 2 The improvement is lower in C3 and C4 atmospheres.

Measuring methods for the thickness of a zinc coating shall be taken from Annex C.

NOTE 3 Metal fasteners in load-bearing timber connections are generally in contact both directly with the atmosphere and in contact with timber. To what extent moisture and harmful substances have an impact depends on the predominant climate and air pollution surrounding the connections. The main corrosive factor for timber is its moisture content because solid material phases do not generally affect metal.

Preservative treatments applied to the timber influence the corrosion rate. The treatments in Table 1 are assumed to contain copper or salts as chlorides applied by pressure impregnation or by dipping. Fire retardants shall be considered as harmful treatments as well. If no corrosive effect for moisture content  $16 < \omega \leq 20\%$  is confirmed by the treatment manufacturer, timber class T3 instead of T4 may be declared.

NOTE 4 Cement based products may have a corrosive impact on fasteners when used in class T3 to T5 in Table 1.

All metal fasteners of stainless steel or zinc coated carbon steel shall be declared according to Table 1 and Table 2, giving the fastener a declared class for both timber and atmosphere:

Example: T3/C3

In the case of stainless steel, the grade of stainless steel shall be declared:

Example: T3/C3 (K2)

Stainless steel grade may alternatively be declared according to the steel number (EN 10088-1) or steel qualities (EN ISO 3506-1:2009, Table 1) or by the stainless steel grade K2 to K5 listed in Table 3.

Examples: T3/C3 (A2); T3/C3 (1.4567)

**Table 1 — Classes for corrosion resistant materials and zinc coatings for fasteners in the timber — Minimum requirements**

Timber class	T1	T2	T3	T4	T5
Moisture content	$\omega < 10\%$ <sup>a</sup>	$10\% \leq \omega \leq 16\%$ <sup>a</sup>	$16 < \omega \leq 20\%$ <sup>a</sup>		Permanent $\omega > 20\%$
Treatment/acidity of timber	–	–	Untreated and pH > 4	Treated <sup>b</sup> or pH ≤ 4	–
Minimum zinc thickness on carbon steel	– <sup>c</sup>	10 μm	20 μm	55 μm	n/a
Stainless steel grade	–	–	K2	K2 / K3 <sup>d</sup>	K3

<sup>a</sup> Short periods with higher moisture content may be disregarded.  
<sup>b</sup> Treatment containing copper or salts (e.g. chlorides) and fire retardants that may influence corrosion rate.  
<sup>c</sup> The appearance may change without a protective coating.  
<sup>d</sup> Class of stainless steel depends on the type of treatment applied to the timber.

**Table 2 — Classes for corrosion resistant materials and coatings in atmospheres according to EN ISO 9223 based on maximum mean zinc corrosion rates according to EN ISO 9224 — Minimum requirements**

Atmosphere	C1	C2nw not weathered	C2w weathered	C3	C4 <sup>c</sup>	C5
Minimum zinc thickness on carbon steel	– <sup>a</sup>	10 μm <sup>b</sup>	20 μm	55 μm	110 μm	–
Stainless steel grade	–	K2	K2	K2/K3 <sup>d</sup>	K3/K4 <sup>d</sup>	K4/K5 <sup>d</sup>

<sup>a</sup> The appearance may change without a protective coating.  
<sup>b</sup> EN ISO 9224 provides no information. Based on experience, zinc has about a two times higher corrosion rate for weathered connectors compared to not weathered.  
<sup>c</sup> Real C3 and C4 atmospheres are rare in Europe and only to be found where industrial areas meet coastal areas or near the splash zone of roads treated with de-icing salt.  
<sup>d</sup> In case of a cleaning regime or exposure to washing by rain, the lower stainless steel grade may be used.

Table 3 — Stainless steel grade K2 to K5<sup>a</sup>

Stainless steel grade	Steel number according to EN 10088-1	EN ISO 3506-1:2009, Table 1
K2	1.4301	A2
	1.4307	A2
	1.4567	A2
	1.4541	A3
	1.4318	-
K3	1.4401	A4
	1.4404	A4
	1.4578	A4
	1.4571	A5
	1.4362	-
	1.4062	-
	1.4162	-
	1.4662	-
K4	1.4439	-
	1.4462	-
	1.4539	-
K5 <sup>b</sup>	1.4565	-
	1.4529	-
	1.4547	-

<sup>a</sup> Use of stainless steel grades K2-K5 is derived from EN 1993-1-4:2006, Annex A.

<sup>b</sup> Steel grades in contact with indoor swimming pool atmospheres to prevent stress corrosion cracking.

Alternative materials or coatings shall have at least the same corrosion protection performance. See Annex A.

Annex B deals with corrosivity of atmospheric environments indoor and outdoor – outside the timber and inside the timber. This annex may be used to select appropriate fasteners for given exposure conditions.

The mean value of the coating thickness as per Annex C shall be greater than or equal to the declared thickness.

### 5.3 Withdrawal parameter for fasteners with Type 3 coating

NOTE Type 3 coating is applicable to nails and staples.

### 5.3.1 Testing

Short-term tests in accordance with EN 1382 shall be conducted at two temperature levels, 20 °C and 60 °C. Test specimens shall be selected according to the provisions of Annex D, replacing those of EN 1382.

The test specimens for the tests at 60 °C shall be produced and conditioned as described by EN 1382. After this conditioning the test specimens shall be kept in a chamber at a temperature of 60 °C for a period of approximately 24 h just before the testing.

### 5.3.2 Correction of the measured withdrawal capacities

If necessary, the measured withdrawal capacities shall be corrected for the wood densities in accordance with Annex D of this standard.

NOTE Annex D will later be substituted by a standard covering the same scope as Annex D.

### 5.3.3 Determination of the characteristic withdrawal capacities

The characteristic values shall be calculated in accordance with EN 14358 using the corrected withdrawal capacities.

Characteristic values from short-term tests shall be calculated for both temperature levels, 20 °C and 60 °C.

The characteristic value shall be the smaller of the two values.

### 5.3.4 The load duration effect

For service class 1 and 2 as defined in EN 1995-1-1, the following  $k_{\text{mod}}$  values apply, unless the manufacturer has test evidence to justify a better value:

- instantaneous load 1,1;
- short-term load 0,9;
- medium, long term and permanent load 0,1.

## 5.4 Withdrawal and head pull-through

For nails, staples and screws the values of the characteristic withdrawal and head pull-through parameter may be assigned to one of the classes given in Table 4.

The fastener may be assigned to one of the classes provided that the characteristic values of the parameter is at least that of the class. The value shall be determined for a characteristic wood density of 350 kg/m<sup>3</sup>.