Irish Standard
I.S. EN 16481:2014

Timber stairs - Structural design - Calculation methods

I.S. EN 16481:2014

Incorporating amendments/corrigenda/National Annexes issued since publication:

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This document is based on:	*Published:*
EN 16481:2014	2014-06-18

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2014-07-05	91.060.30
	NOTE: If blank see CEN/CENELEC cover page

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Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD **EN 16481**

NORME EUROPÉENNE

EUROPÄISCHE NORM June 2014

ICS 91.060.30

English Version

Timber stairs - Structural design - Calculation methods

Escaliers en bois - Conception de la structure - Méthodes de calcul

Holztreppen - Bauplanung - Berechnungsmethoden

This European Standard was approved by CEN on 17 April 2014.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Contents

Page

Foreword

This document (EN 16481:2014) has been prepared by Technical Committee CEN/TC 175 “Round and sawn timber”, 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of an identical text or by endorsement, at the latest by December 2014, and conflicting national standards shall be withdrawn at the latest by December 2014.

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 takes into account the following standards:

— EN 1990;

— EN 1991-1-1;

— EN 1995-1-1.

This document is addressed for structural designers to design timber stairs from a common European method; it should be useful for SMEs as an alternative to testing where applicable.

This European Standard takes into account the current state of the art regarding safety concept, loading assumptions, determination of stress resultants, as well as dimensioning in the field of wood engineering.

The requirements and verification procedures essential for the verification of mechanical performance characteristics, serviceability and load-bearing capacity of stairs and their components are compiled and described in the following clauses.

The mechanical performance characteristics of stairs may be verified by using the following methods:

— testing of stairs as a whole or in part;

— mathematical verification on the basis of structural analysis following the principles of this European Standard;

— assessment based on experience: conventionally accepted performance (CAP) which should be defined in national documents.

All methods are equally valid.

This document needs to be read in conjunction with EN 15644.

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 constitutes a frame standard for the design of timber stairs as well as wood and wood-based components used in stairs by calculation methods. Some calculation methods can be derived from testing results, for example CEN/TS 15680. This document specifies the design and the requirements for materials and components to be used in these calculation methods. It may be complemented by national application documents based on this European Standard.

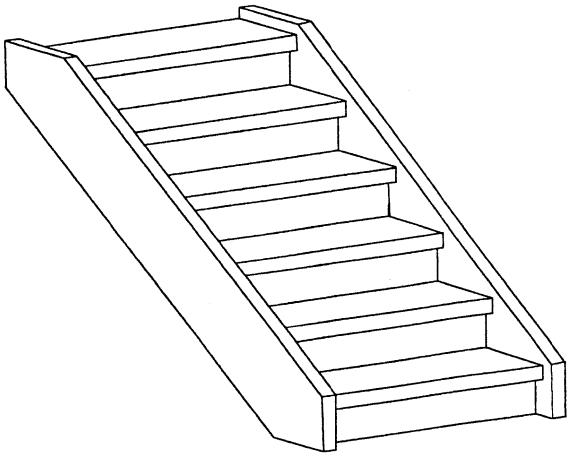
This European Standard applies to coated and uncoated components. This document covers load-bearing components such as strings, treads, risers, posts and guardrails. Requirements for a timber stair are defined in the product standard, EN 15644. This document does not cover stairs that contribute to the overall stability of the works or the strength of the structure.

This European Standard is valid for the verification of mechanical performance characteristics, usability and load-bearing capacity and their related durability. Other requirements, e.g. requirements for acoustic properties, are not covered by this European Standard.

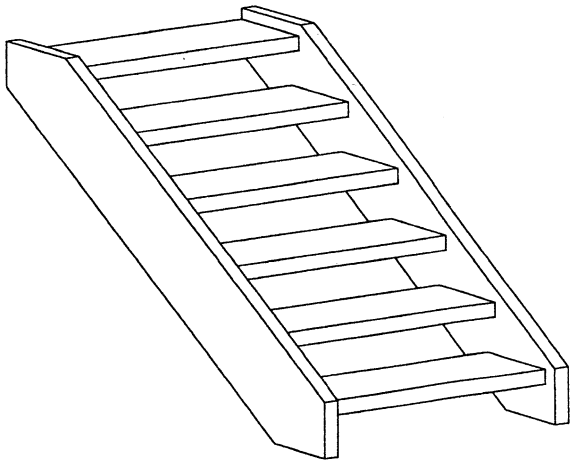
For the design, calculation and determination of not solely resting actions, additional requirements need to be taken into account (to be checked).

For the dimensioning with special reference to resistance to fire and earthquake/seismic action, additional requirements may be taken into account.

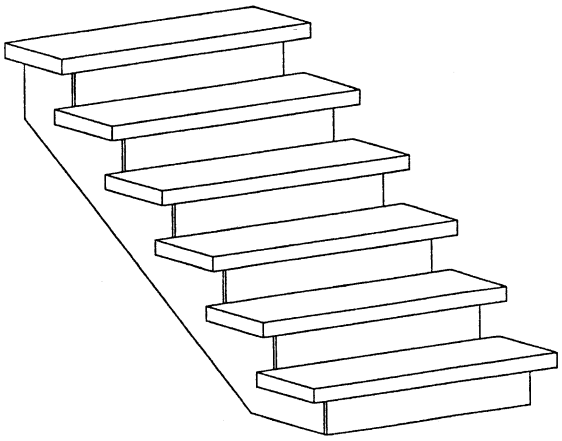
Without further verification, the methods in this European Standard are valid for different types of stair structures and their components, as illustrated in Figure 1:



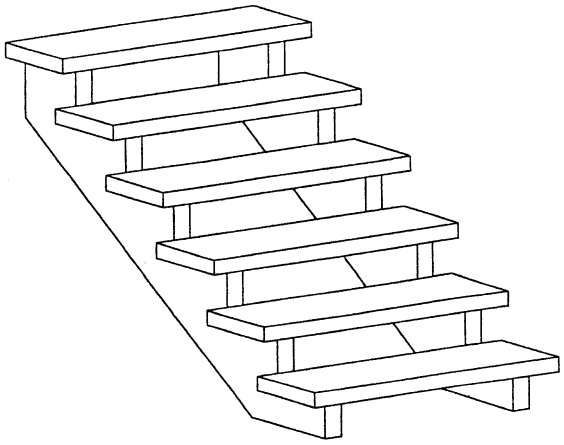
a) Stair with closed string and riser



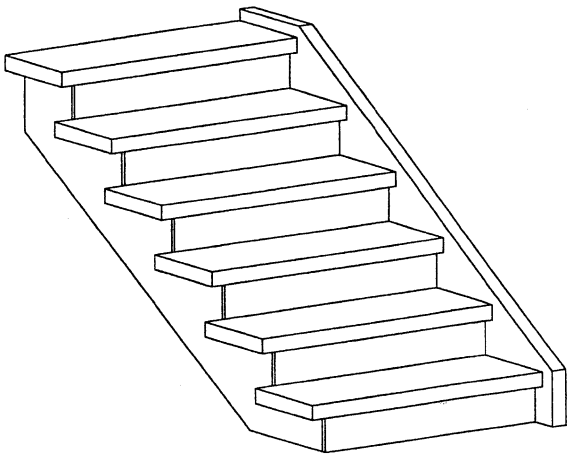
b) Stair with closed string without riser



c) Stair with cut strings and riser



d) Stair with cut strings without riser



e) Combination of stairs with closed string and cut string with or without riser

Figure 1 — Types of stair structures and their components

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 338, *Structural timber — Strength classes*

EN 1990, *Eurocode — Basis of structural design*

EN 1991-1-1:2002, *Eurocode 1: Actions on structures — Part 1-1: General actions — Densities, self-weight, imposed loads for buildings*

EN 1993-1-1, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*