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Timber structures - Strength graded structural timber  
with rectangular cross section - Part 2: Machine  
grading; additional requirements for type testing

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

|                                                                                                                     |                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| See Eesti standard EVS-EN 14081-2:2019 sisaldab Euroopa standardi EN 14081-2:2018 ingliskeelset teksti.             | This Estonian standard EVS-EN 14081-2:2019 consists of the English text of the European standard EN 14081-2:2018.                  |
| Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.                                                  | This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. |
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English Version

**Timber structures - Strength graded structural timber  
with rectangular cross section - Part 2: Machine grading;  
additional requirements for type testing**

Structures en bois - Bois de structure à section  
rectangulaire classé pour sa résistance - Partie 2 :  
Classement mécanique par machine; exigences  
supplémentaires concernant les essais de type

Holzbauwerke - Nach Festigkeit sortiertes Bauholz für  
tragende Zwecke mit rechteckigem Querschnitt - Teil  
2: Maschinelle Sortierung; zusätzliche Anforderungen  
an die Erstprüfung

This European Standard was approved by CEN on 13 August 2018.

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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-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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## European foreword

This document (EN 14081-2:2018) 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 2019, and conflicting national standards shall be withdrawn at the latest by April 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document will supersede EN 14081-2:2010+A1:2012.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

Compared to EN 14081-2:2010+A1:2012, the following main modifications have been made:

- new definitions added in Clause 3;
- new requirements for sampling, settings areas and minimum cross-section area;
- introduction of standardized areas;
- method for deriving settings is no longer normative, since several methods may be used; an example of a method is given in Annex B;
- new method for verification of settings;
- cost matrix requirements are changed, to better allow settings that aim for reduced reject rather than yield in the highest grade;
- new method for output control systems;
- introduction of adaptive settings;
- introduction of fixed settings.

This standard is part of a series of standards on *Timber structures — Strength graded structural timber with rectangular cross section* ("EN 14081") that includes:

- *Part 1: General requirements;*
- *Part 2: Machine grading; additional requirements for type testing;*
- *Part 3: Machine grading; additional requirements for factory production control.*

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

Machine grading is in common use in a number of countries. There are two basic systems, referred to as “output control” and “machine control”. Both systems require a visual override inspection to cater for performance reducing characteristics that are not automatically sensed by the machine.

The output control system is suitable for use where the grading machines are situated in sawmills grading limited sizes, species and grades in repeated production runs of around one working shift or more. This enables the system to be controlled by testing timber specimens from the daily output. These tests together with statistical procedures are used to monitor and adjust the machine settings to maintain the required strength properties for each strength class. With this system it is permissible for machine approval requirements to be less demanding and for machines of the same type to have non-identical performance.

The machine control system was developed in Europe. Because of the large number of sizes, species and grades used it was not possible to carry out quality-control tests on timber specimens drawn from production. The system relies therefore on the machines being strictly assessed and controlled, and on considerable research effort to derive the machines settings, which, under basic machine control operation, remain constant for all machines of the same type.

Additional factory production control requirements are given in EN 14081-3.

This standard provides a new approach, applicable to both machine control and output control systems, which permits fine adjustment of settings on a grading machine based on continuous monitoring of Indicating Property (IP) data during grading. This approach is called “adaptive settings”.

The acceptability of grading machines and the derivation of settings rely on statistical procedures and the results will therefore depend on the method used. For this reason this document gives appropriate statistical procedures.

Grading assignments to strength classes are based on grading reports. When these grading reports are evaluated and approved by CEN/TC 124 /WG 2 /TG 1, they become Approved Grading Reports (AGR).

The requirements in this European Standard are based on machines in current use and on future types of machines as far as these can be foreseen. It is recognized that additional clauses or standards may be required if unforeseen developments take place.

Since the previous version of this European Standard (EN 14081-2:2010+A1:2012), grading settings work, and research data, have provided more information about the variation in wood properties. Several new rules were created by CEN/TC 124 /WG 2 to update the procedures and ensure safety of grading – particularly of settings covering many countries, and are referenced in the guidance paper (see Annex A). This new version of the standard updates the procedures according to the guidance paper.

## 1 Scope

This document specifies requirements, additional to those of EN 14081-1, for type testing of machine graded structural timber with rectangular cross-sections shaped by sawing, planning or other methods, and having deviations from the target sizes corresponding to EN 336. This includes requirements for strength grading machines.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 384, *Structural timber — Determination of characteristic values of mechanical properties and density*

EN 408, *Timber structures — Structural timber and glued laminated timber — Determination of some physical and mechanical properties*

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

EN 13556, *Round and sawn timber — Nomenclature of timbers used in Europe*

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

## 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### **assigned grade**

grade to which a piece of timber is assigned when using the appropriate setting for that specific grade

### 3.2

#### **characteristic value**

representative value of a material property used for design, which is based either on 5-percentile values (e.g. strength properties and density) or on a mean value (e.g. modulus of elasticity)

### 3.3

#### **critical feed speed**

speed, within the intended usable range, at which the grading machine is least accurate in measuring its indicating property

### 3.4

#### **depth**

in the case of bending, the cross sectional dimension parallel to the direction of loading, and in the case of tension, the width