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**Lesene konstrukcije - Razvrščanje konstrukcijskega lesa pravokotnega prečnega prereza po trdnosti - 3. del: Strojno razvrščanje - Dodatne zahteve za kontrolo proizvodnje v obratu**

Timber structures - Strength graded structural timber with rectangular cross section - Part 3: Machine grading; additional requirements for factory production control

Holzbauwerke - Nach Festigkeit sortiertes Bauholz für tragende Zwecke mit rechteckigem Querschnitt - Teil 3: Maschinelle Sortierung, zusätzliche Anforderungen an die werkseigene Produktionskontrolle

Structures en bois - Bois de structure à section rectangulaire classé pour sa résistance - Partie 3 : Classement mécanique - exigences complémentaires relatives au contrôle de la production en usine

**Ta slovenski standard je istoveten z: prEN 14081-3**

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**ICS:**

79.040	Les, hlodovina in žagan les	Wood, sawlogs and sawn timber
91.080.20	Lesene konstrukcije	Timber structures

**oSIST prEN 14081-3:2020**

**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**DRAFT**  
**prEN 14081-3**

November 2019

ICS 79.040

Will supersede EN 14081-3:2012+A1:2018

English Version

## Timber structures - Strength graded structural timber with rectangular cross section - Part 3: Machine grading; additional requirements for factory production control

Structures en bois - Bois de structure à section  
rectangulaire classé pour sa résistance - Partie 3 :  
Classement mécanique ; exigences complémentaires  
relatives au contrôle de la production en usine

Holzbauwerke - Nach Festigkeit sortiertes Bauholz für  
tragende Zwecke mit rechteckigem Querschnitt - Teil  
3: Maschinelle Sortierung, zusätzliche Anforderungen  
an die werkseigene Produktionskontrolle

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.

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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.

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

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

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## European foreword

This document (prEN 14081-3:2019) 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 CEN Enquiry.

This document will supersede EN 14081-3:2012+A1:2018.

The other parts of the EN 14081 series are:

- EN 14081-1, *Timber structures — Strength graded structural timber with rectangular cross section — Part 1: General requirements*;
- EN 14081-2, *Timber structures — Strength graded structural timber with rectangular cross section — Part 2: Machine grading; additional requirements for type testing*.

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## Introduction

Machine grading is in common use in a number of countries. The countries use two basic systems, referred to as 'output controlled' and 'machine controlled'. Both systems require a visual override inspection to cater for strength-reducing characteristics that are not automatically sensed by the machine.

The output-controlled 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 nonidentical performance.

The machine controlled 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 remain constant for all machines of the same type.

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.

The requirements in this document 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.

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## 1 Scope

This document specifies requirements additional to those given in EN 14081-1 for factory production control of machine graded structural timber with rectangular cross-sections shaped by sawing, planing or other methods, and having deviations from the target sizes corresponding to EN 336.

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

EN 14081-2:2018, *Timber structures — Strength graded structural timber with rectangular cross section — Part 2: Machine grading; additional requirements for type testing*

## 3 Terms and definitions

For the purpose of this document, the terms and definitions given in EN 14081-1 and the following apply.

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

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

### 3.1

#### **production batch**

one production run where the timber of one source, grade or grade combination, species or species combination and size is graded using the same settings

## 4 Requirements for the operation, calibration and maintenance of a grading machine

**4.1** No modifications that are in conflict with the machine manufacturer's specification shall be made to the machine.

**4.2** Access to all machine adjustments shall be limited to personnel authorized to operate or set up the machine.

**4.3** The strength grading machine shall be regularly calibrated in accordance with the manufacturer's specification.

**4.4** A strength grading machine shall only be fitted with spare parts equivalent to, or improving upon, the performance of those fitted at the time the machine was assessed by initial type testing. If spare parts are fitted that are not identical to those fitted at the time the machine was assessed by initial type testing, the machine shall be reassessed to establish their effect on grading accuracy.

**prEN 14081-3:2019 (E)**

**4.5** The results of routine service and maintenance to the strength-grading machine and ancillary equipment shall be recorded together with the results of calibration checks.

**5 Additional requirements for factory production control for machine controlled systems****5.1 General**

When grading structural timber in a machine controlled system, grading accuracy shall be monitored, A grading machine's dynamic performance shall be controlled by the use of control planks using the procedures given in Annex A.

**5.2 Requirements for bending strength classes with a characteristic bending strength level above 30 N/mm<sup>2</sup> and for tension strength classes with a characteristic tension strength level above 21 N/mm<sup>2</sup>**

These requirements only apply to softwoods. For hardwoods, specific requirements shall be established within the factory production control.

During each working shift, two pieces of timber from each grade produced shall be randomly selected and tested according to the strength class definition and EN 408. The fifth percentile value, determined by ranking, of the last 100 strength values from 50 consecutive shifts shall meet the required strength (as given in EN 14081-2).

A strength property other than the grade determining strength property may be used for factory production control as an alternative, provided the relation between the two properties is verified from test data.

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**6 Additional factory production control requirements for output controlled systems**

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**6.1 General**

When grading structural timber in an output controlled system, grading accuracy shall be monitored by testing samples drawn from production and analysing the results using the procedure described as follows.

**6.2 Grading**

Timber shall be graded by the machine using settings that have been verified for this grade, grade combination, species or species combination, size and timber source. The moisture content at grading shall be measured.

During grading, the settings can be adapted to the quality of timber in production in accordance with EN 14081-2:2018, Clause 9.

**6.3 Sampling**

To verify the grading of each production batch, sufficient timber shall be sampled to allow testing of at least 0,1 % of the graded timber, with a minimum of 10 specimens per grade. These specimens shall be randomly sampled at approximately equal intervals from each production batch.

**NOTE** The purpose of random sampling is to reflect as far as possible the variability of timber within a production batch.



When at least 150 specimens for a grade, grade combination, species or species combination, size and timber source, representing at least 5 batches, has been tested the sampling rate can be reduced to 0,05 % of the graded timber, with a minimum of 10 specimens per grade.

#### 6.4 Destructive testing and calculation of characteristic values

Testing shall be carried out in accordance with EN 384 and EN 408 for bending or tension strength, modulus of elasticity in bending or tension, density and moisture content in accordance with the definition of the strength class (e.g. edgewise or flatwise bending tests, tension tests parallel to grain).

The testing equipment shall be capable of breaking at least 95 % of the tested pieces. Tested pieces that do not fail shall be taken into account in the analysis with the maximum stress that they sustained being taken as the stress at failure. Tested pieces shall not be used as structural timber.

In testing the following exceptions can be made:

- a) conditioning of test specimens to the reference moisture content is not necessary;
- b) the moisture content can be determined in accordance with EN 13183-2 or EN 13183-3;
- c) the density can be determined from the mass and volume of the full size specimen. The tolerance of this measurement shall be less than 5 %. The density may also be taken from the machine readings, when the machine is properly calibrated to give density with equivalent accuracy. For softwood, the result shall be adjusted to the density of small defect-free prisms by dividing by 1,05. For hardwood, no adjustment is necessary;
- d) the deflection and load transducers shall be accurate to within 3 % of the actual measurement. The loading rate in bending and tension tests can be increased to reach the ultimate load on average, in no less than 60 s.

The characteristic values of bending or tension strength, mean modulus of elasticity in bending or tension and density shall be determined in accordance with EN 384 using the frame of initial type testing. The distribution (parametric or non-parametric) of strength, modulus of elasticity and density shall be the same as used for verification of machine settings, EN 14081-2:2018, 8.3.3. If the number of specimens is less than 40 within a grade the parametric calculation method shall be used.

#### 6.5 Batch verification

The grading is verified if the calculated characteristic values of bending or tension strength, mean modulus of elasticity in bending or tension and density are equal to or exceed the declared values. The verification shall separately be carried out for each batch, grade of each grade combination, species or species combination and size.

If the grading is verified the batch can be marked with the intended strength class.

The grading is conditionally verified if the characteristic values of bending or tension strength and density are equal to or exceed 90 % of the declared values and the mean modulus of elasticity in bending or tension exceed 95 % of the declared value.

If the grading is conditionally verified and at least five previous batches of the same grade combination, species or species combination, size and timber source have been verified the conditionally verified batch can be marked with the intended strength class.

If the verification or conditional verification fails, the failed grades of that batch shall not be marked with the intended strength class. Each failed grade may be re-graded to the same grade after readjustment of the settings provided the verification requirements are met. No piece of timber shall be re-graded to a different grade than the original. If the verification fails a second time, the timber in the failed grade shall be rejected.

**prEN 14081-3:2019 (E)****6.6 Recording**

For each batch, grade of each grade combination, species or species combination and size, the following information shall be recorded:

- a) name of person responsible for the output controlled system (machine grading, testing and analysis);
- b) identification of the grading machine;
- c) details of grading (date, machine operator, grades, settings, indicating property if possible, feed speed, moisture content, yield, etc.);
- d) details of testing (date, person who carries out testing, method, remarks, etc.);
- e) individual test results (indicating property if possible, strength, modulus of elasticity, density and moisture content);
- f) mean and coefficient of variation of test results;
- g) calculated characteristic values (strength, modulus of elasticity and density);
- h) information if grading is verified or not;
- i) actions taken, including re-grading, if verification of grading is failed.

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