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Test methods - Timber floors - Determination of vibration properties

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This standard includes the English version of the European Standard.

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English Version

Test methods - Timber floors - Determination of vibration properties

Méthodes d'essais - Planchers en bois - Détermination des propriétés vibratoires

Prüfverfahren - Holzdecken - Bestimmung der Schwingungseigenschaften

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European foreword

This document (EN 16929:2018) 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of an identical text or by endorsement, at the latest by June 2019 and conflicting national standards shall be withdrawn at the latest by June 2019.

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Introduction

The serviceability requirements of timber floors are becoming more decisive in design because of factors including longer spans, the use of lightweight materials, higher loadings and more demanding performance requirements. Beside deflection requirements for static loads, given in appropriate design codes, the dynamic aspects has to be considered, especially for lightweight and long span timber floors where a pedestrian body mass is quite influential. Human footfall is a significant source of vibration and if its effects are not assessed accurately during the design of a floor structure it may be rendered uncomfortable for occupants.

Vibrations induced by footsteps in floors can annoy occupants or disturb the operation of sensitive equipment and processes, if the vibrations are not properly controlled. Proper controlling relies on a good understanding of the nature of floor vibrations induced by footsteps. The magnitude and type of floor vibrations induced by footsteps from normal walking are mainly controlled by the inherent dynamic properties of the floor: stiffness, mass and its capacity to dissipate vibration energy (damping). These properties are in turn determined by floor materials, design and construction.

When assessing the response of a floor to pedestrian induced vibration, only frequencies below 40 Hz to 50 Hz are of interest. Floors with a fundamental frequency below 8 Hz are labelled as a low-frequency floor and will have to deal with resonance effects caused by walking action. Vibrations with frequencies over 40 Hz to 50 Hz are no longer perceivable by occupants. Several vibration modes below this limit may occur.

The wide range of floor construction types, support and loading conditions, make it impossible to specify simple procedures that work in all circumstances. It is therefore important that the procedures described in this standard are carried out by persons with sufficient competence in structural dynamics, testing procedures and evaluation of results.

1 Scope

This document specifies test methods for the determination of natural frequencies, damping, unit point load deflection and acceleration of floors composed of sawn timber, engineered wood products, and mass timber beams or slabs (e.g. cross laminated timber CLT, glued laminated timber GL, nail laminated timber), with or without concrete screeds, as well as for timber-concrete composite floors.

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 13183 (all parts), *Moisture content of a piece of sawn timber*

EN 322, *Wood-based panels — Determination of moisture content*

ISO 2631-1, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*