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**Anti-seismilised seadmed**

Anti-seismic devices

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 15129:2009 sisaldab Euroopa standardi EN 15129:2009 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.12.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

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ICS 91.120.25

English Version

## Anti-seismic devices

Dispositifs anti-sismiques

Erdbebenvorrichtungen

This European Standard was approved by CEN on 19 September 2009.

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## Foreword

This document (EN 15129:2009) has been prepared by Technical Committee CEN/TC 340 "Anti-seismic devices", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by August 2011.

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 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.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This European Standard covers the design of devices that are provided in structures, with the aim of modifying their response to the seismic action. It specifies functional requirements and general design rules for the seismic situation, material characteristics, manufacturing and testing requirements, as well as evaluation of conformity, installation and maintenance requirements. This European Standard covers the types of devices and combinations thereof as defined in 3.4.

NOTE Additional information concerning the scope of this European Standard is given in Annex A.

## 2 Normative references

The following referenced documents are indispensable for the application 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 1090-2, *Execution of steel structures and aluminium structures – Part 2: Technical requirements for steel structures*

EN 1337 (all parts), *Structural bearings*

EN 1990:2002, *Eurocode – Basis of structural design*

EN 1998 (all parts), *Eurocode 8: Design of structures for earthquake resistance*

EN 10025 (all parts), *Hot rolled products of structural steels*

EN 10083 (all parts), *Steels for quenching and tempering*

EN 10088 (all parts), *Stainless steels*

EN 10204:2004, *Metallic products – Types of inspection documents*

EN ISO 4287, *Geometrical product specifications (GPS) – Surface texture: Profile method – Terms, definitions and surface texture parameters (ISO 4287:1997)*

EN ISO 4526, *Metallic coatings – Electroplated coating of nickel for engineering purposes (ISO 4526:2004)*

EN ISO 6158, *Metallic coatings – Electrodeposited coatings of chromium for engineering purposes (ISO 6158:2004)*

ISO 34 (all parts), *Rubber, vulcanized or thermoplastic – Determination of tear strength*

ISO 37, *Rubber, vulcanized or thermoplastic – Determination of tensile stress-strain properties*

ISO 48, *Rubber, vulcanized or thermoplastic – Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 188, *Rubber, vulcanized or thermoplastic – Accelerated ageing and heat resistance tests*

ISO 815 (all parts), *Rubber, vulcanized or thermoplastic – Determination of compression set*

ISO 898 (all parts), *Mechanical properties of fasteners*

ISO 1083, *Spheroidal graphite cast irons – Classification*

ISO 3755, *Cast carbon steels for general engineering purposes*

ISO 4664 (all parts), *Rubber, vulcanized or thermoplastic – Determination of dynamic properties*

### 3 Terms, definitions, symbols and abbreviations

#### 3.1 Terms and definitions

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

NOTE In this European Standard, compressive forces, stresses and strains are positive.

##### 3.1.1 activation velocity

velocity at which a Shock Transmission Unit (STU) reacts with its design force

##### 3.1.2 axial force $N_{Ed}$ acting on a device under the design seismic action

maximum value during the action is denoted  $N_{Ed,max}$  and the minimum value  $N_{Ed,min}$ . The minimum value acting on a device may be tensile

##### 3.1.3 core element

component of a Linear Device (LD) or of a Non Linear Device (NLD) on which the mechanism characterising the device's behaviour is based

NOTE Core elements of a LD or of a NLD are the device's components that provide it with the flexibility and, eventually, with the energy dissipation and/or re-centring capacity or any other mechanical characteristic compatible with the requirements of a LD or of a NLD. Examples of core elements are steel plates or bars, shape memory alloy wires or bars, rubber elements.

##### 3.1.4 design displacement $d_{bd}$ (of a device)

total displacement (due to both translation and rotation about the vertical axis of the isolation system) that a device will undergo when the structural system is subjected to the design seismic action alone according to EN 1998-1

##### 3.1.5 design displacement of an isolation system in a principal direction $d_{cd}$

horizontal displacement at the effective stiffness centre, occurring under the design seismic action alone

##### 3.1.6 (maximum) displacement of a device in a principal direction $d_{Ed}$

for an anti-seismic device in a bridge  $d_{Ed}$  equals  $d_{max}$ , the maximum total horizontal displacement at the location of the device including all actions effects and the application of the reliability factor to  $d_{bd}$ , according to EN 1998-2:2005, 7.6.2 (2)P

For devices in other structures  $d_{Ed}$  equals  $\gamma_x d_{bd}$ , the design displacement increased by the reliability factor.

##### 3.1.7 design force $V_{bd}$ (of a device)

force (or moment) corresponding to  $d_{bd}$