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Elastomeric seismic-protection isolators — Part 3: Applications for buildings — Specifications

Appareils d'appuis structuraux en élastomère pour protection sismique — Partie 3: Applications pour bâtiments — Spécifications

FDIS stage

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO ~~documents~~document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT~~) see www.iso.org/iso/foreword.html~~), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

This fourth edition cancels and replaces the third edition (ISO 22762~~-3:2018) without technical changes~~-3:2018), of which it constitutes a minor revision.

The ~~main~~ changes ~~compared to the previous edition~~ are as follows:

— ~~—~~the relation of this document to ~~Part~~ ISO 22762-5 and ~~Part~~ ISO 22762-6 have been added in Introduction;

— ~~—~~the use of the terms "elastomeric isolators" and "seismic isolators have been made consistent throughout the document;

— the term "fracture" has been replaced by "break" throughout the document.

— the definition of some symbols in ~~Table 1~~Table 1 have been changed to make use of terms consistent;

— ~~—~~the information in the ~~Table 5~~Table 5 has been changed to be kept consistent with ~~Table 4;~~Table 4;

— ~~—~~reference to ~~Annex B~~Annex B has been added in ~~7.1;~~7.1;

— ~~—~~information in ~~B.1~~B.1 has been changed to be kept consistent with ~~Table 4;~~Table 4;

— ~~—~~the information in Table D.1 has been updated;

— the information in E.1 has been updated;

— the reference in Bibliography has been updated~~;~~.

~~— the information in Table D.1 has been updated;~~

~~— the information in E.1 has been updated;~~

A list of all parts in the ISO 22762 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The ISO 22762 series includes two parts related to specifications for elastomeric isolators, i.e. ISO 22762-2 for bridges and ISO 22762-3 for buildings. This is because the elastomeric isolator requirements for bridges and buildings are quite different, although the basic concept of the two products is similar. Therefore, ISO 22762-2 and the relevant clauses in ISO 22762-1 are used when ISO 22762 (all parts) is applied to the design of bridge isolators whereas ISO 22762-3 and the relevant clauses of ISO 22762-1 are used when it is applied to building isolators.

The main differences to be noted between elastomeric isolators for bridges and elastomeric isolators for buildings are the following.

a) ~~a)~~ Elastomeric isolators for bridges are mainly square in shape and those for buildings are circular in shape.

b) ~~b)~~ Elastomeric isolators for bridges are designed to be used for both rotation and horizontal displacement, while elastomeric isolators for buildings are designed for horizontal displacement only.

c) ~~c)~~ Elastomeric isolators for bridges are designed to perform on a daily basis to accommodate length changes of bridges caused by temperature changes as well as during earthquakes, while elastomeric isolators for buildings are designed to perform only during earthquakes.

d) ~~d)~~ Elastomeric isolators for bridges are designed to withstand dynamic loads caused by vehicles on a daily basis as well as earthquakes, while elastomeric isolators for buildings are mainly designed to withstand dynamic loads caused by earthquakes only.

For structures other than buildings and bridges (e.g. tanks), the structural engineer uses either ISO 22762-2 or ISO 22762-3, depending on the requirements of the structure.

ISO/TS 22762-4 is the guidance for use of ISO 22762-3. ISO 22762-5 applies to specifications and test methods for sliding seismic-protection isolators which are not specified as elastomeric isolators. ISO 22762-6 applies to specifications and test methods for high-durability and high-performance elastomeric isolators. Three grades of requirements for each test item are introduced in ISO 22762-6.

Elastomeric seismic-protection isolators— —

Part 3:
Applications for buildings- — Specifications

1 Scope

This document specifies minimum requirements and test methods for elastomeric seismic elastomeric isolators used for buildings and the rubber material used in the manufacture of such elastomeric isolators.

It is applicable to elastomeric seismic elastomeric isolators used to provide buildings with protection from earthquake damage. The elastomeric isolators covered consist of alternate elastomeric layers and reinforcing steel plates. They are placed between a superstructure and its substructure to provide both flexibility for decoupling structural systems from ground motion, and damping capability to reduce deflection at the isolation interface and the transmission of energy from the ground into the structure at the isolation frequency.

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.

ISO 630 (all parts), *Structural steels*

ISO 22762-1:20182024, *Elastomeric seismic-protection isolators- — Part- 1: Test methods*

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:

— ISO Online browsing platform: available at http://www.iso.org/obp/https://www.iso.org/obp/

— IEC Electropedia: available at http://www.electropedia.org/https://www.electropedia.org/

3.1
breaking
rupture of *elastomeric isolator* (3.8)(3.8) due to compression- (or tension-) shear loading

3.2
buckling
state when *elastomeric isolator* (3.8)(3.8) lose their stability under compression-shear loading

3.3
compressive properties
K_v
compressive stiffness for all types of elastomeric isolator

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3.4
cover rubber
rubber wrapped around the outside of inner rubber and reinforcing steel plates before or after curing of elastomeric isolators for the purposes of protecting the inner rubber from deterioration due to oxygen, ozone and other natural elements and protecting the reinforcing plates from corrosion

3.5
design compressive stress
long-term compressive force on the *elastomeric isolator* ~~(3.8)~~(3.8) imposed by the structure

3.6
effective loaded area
area sustaining vertical load in *elastomeric isolator* ~~(3.8),~~(3.8), which corresponds to the area of reinforcing steel plates

3.7
effective width
<rectangular elastomeric isolator> the smaller of the two side lengths of inner rubber to which direction shear displacement is not restricted

3.8
elastomeric isolator
rubber bearing, for seismic isolation of buildings, bridges and other structures, which consists of multi-layered vulcanized rubber sheets and reinforcing steel plates

EXAMPLE ~~high~~High-damping rubber bearings, linear natural rubber bearings and lead rubber bearings.

3.9
first shape factor
ratio of effectively loaded area to free deformation area of one inner rubber layer between steel plates

3.10
high-damping rubber bearing
HDR
elastomeric isolator with relatively high damping properties obtained by special compounding of the rubber and the use of additives

3.11
inner rubber
rubber between multi-layered steel plates inside an *elastomeric isolator* ~~(3.8)~~(3.8)

3.12
lead rubber bearing
LRB
elastomeric isolator ~~(3.8)~~(3.8) whose *inner rubber* ~~(3.11)~~(3.11) with a lead plug or lead plugs press fitted into a hole or holes of the elastomeric isolator body to achieve damping properties

3.13
linear natural rubber bearing
LNR
elastomeric isolator ~~(3.8)~~(3.8) with linear shear force-displacement characteristics and relatively low damping properties, fabricated using natural rubber