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Part 30: Earthquake risk and impact analysis



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 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 or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 39, *Sustainability, IT and data centres*.

A list of all parts in the ISO/IEC 22237 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

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Introduction

Parts 1, 3, 4 and 5 of the ISO/IEC 22237 series specify requirements and recommendations for the design of data centres to meet a given Availability Class. Parts 2 and 6 of the ISO/IEC 22237 series specify requirements and recommendations for the building construction and security systems for data centres.

Determination of the risk and scale of seismic activity should be included as part of the overall risk assessment approach found in ISO/IEC 22237-1. ISO/IEC TS 22237-2 requires a geographical risk analysis which includes seismic activity and relevant mitigation actions, but does not identify the specific actions to be applied. ISO/IEC TS 22237-6 addresses external environmental events but does not explicitly list earthquakes or seismic activity within that group of events (other than general vibration) or indicate the specific measures required.

Taking these points into consideration, this document provides requirements and recommendations for the type of risk assessment to be employed in the context of seismic activity and earthquakes in relation to data centres. It also describes design concepts that can be employed as mitigation actions within the construction, and other design elements, of data centres.

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Information technology — Data centre facilities and infrastructures —

Part 30: Earthquake risk and impact analysis

1 Scope

This document specifies requirements and recommendations for the type of risk assessment to be employed concerning seismic activity and earthquakes in relation to data centres. In addition, it describes design concepts that can be employed as mitigation actions within the construction and other design elements of data centres.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

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

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

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

3.1.1
availability
ability to be in a state to perform as required

[SOURCE: IEC 60050-192:2015, 192-01-23, modified — Note 1 to entry and Note 2 to entry deleted.]

3.1.2
computer room space
area within the *data centre* (3.1.3) that accommodates the data processing, data storage and telecommunication equipment that provides the primary function of the data centre

[SOURCE: ISO/IEC 22237-1:2021, 3.1.6]

3.1.3
data centre
structure, or group of structures, dedicated to the centralized accommodation, interconnection and operation of information technology and network telecommunications (NT) equipment providing data storage, processing and transport services together with all the facilities and infrastructures for power distribution and environmental control together with the necessary levels of *resilience* (3.1.8) and security required to provide the desired service *availability* (3.1.1)

Note 1 to entry: A structure can consist of multiple buildings and/or spaces with specific functions to support the primary function.

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Note 2 to entry: The boundaries of the structure or space considered the data centre which includes the *information and communication technology equipment* (3.1.4) and supporting environmental controls can be defined within a larger structure or building.

[SOURCE: ISO/IEC 30134-1:2016, 3.1.4]

3.1.4
information and communication technology equipment
equipment providing data storage, processing and transport services

Note 1 to entry: This represents the "critical load" of the *data centre* (3.1.3).

3.1.5
peak ground acceleration
maximum ground acceleration occurring during earthquake shaking at a location

Note 1 to entry: Peak ground acceleration (PGA) is equal to the amplitude of the largest absolute acceleration recorded on an accelerogram at a site during a particular earthquake.

Note 2 to entry: Earthquake shaking generally occurs in all directions. Therefore, PGA is often split into horizontal and vertical components. Horizontal PGAs are generally larger than those in the vertical direction, but this is not always true, especially close to large earthquakes.

Note 3 to entry: The design basis earthquake ground motion (DBEGM) is often defined in terms of PGA.

3.1.6
probable maximum loss
ratio (expressed as a percentage) of the *restoration cost* (3.1.9) to the *re-procurement cost* (3.1.7) taking into account the degree of earthquake risk, the stability of ground, the earthquake resistance of the building and the earthquake resistance of the facilities

3.1.7
re-procurement cost
total cost required to reconstruct the assets damaged at the time of evaluation

3.1.8
resilience
capacity to withstand failure in one or more of the information and communication technology (ICT) equipment or *data centre* (3.1.3) infrastructures

3.1.9
restoration cost
cost required to recover the damage caused by seismic activity (earthquake)

3.2 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

DBEGM	design basis earthquake ground motion
FL	liquefaction index
ICT	information and communication technology
IT	information technology
LPI	liquefaction potential index
NT	network telecommunications
PGA	peak ground acceleration

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