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Information technology — Data centre facilities and infrastructures —

Part 1:
General concepts

Technologie de l'information — Installation et infrastructures de centres de traitement de données — Partie 1: Concepts généraux

ICS: 35.020

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 39, "*New title*".

A list of all parts in the ISO/IEC 22237 (and the ISO/IEC TS 22237) series can be found on the ISO website.

This document will supersede ISO/IEC TS 22237-1:2018.

The following changes have been made:

a) Clause 7 (Availability) has been revised;

c) the design processes (Clause 8) and design principles (Clause 9) have been moved from an annex to the main body of the document;

d) existing Annex A has been removed;

e) new Annexes A and B have been added;

f) tbd.

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Introduction

The unrestricted access to internet-based information demanded by the information society has led to an exponential growth of both internet traffic and the volume of stored/retrieved data. Data centres are housing and supporting the information technology and network telecommunications equipment for data processing, data storage and data transport. They are required both by network operators (delivering those services to customer premises) and by enterprises within those customer premises.

Data centres need to provide modular, scalable and flexible facilities and infrastructures to easily accommodate the rapidly changing requirements of the market. In addition, energy consumption of data centres has become critical both from an environmental point of view (reduction of carbon footprint) and with respect to economical considerations (cost of energy) for the data centre operator.

The implementation of data centres varies in terms of:

a) purpose (enterprise, co-location, co-hosting or network operator facilities);

b) security level;

c) physical size;

d) accommodation (mobile, temporary and permanent constructions).

Note: Cloud services can be provided by all mentioned data centre types.

The needs of data centres also vary in terms of availability of service, the provision of security and the objectives for energy efficiency. These needs and objectives influence the design of data centres in terms of building construction, power distribution, environmental control, telecommunications cabling and physical security. Effective management and operational information is required to monitor achievement of the defined needs and objectives.

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The ISO/IEC 22237 series specifies requirements and recommendations to support the various parties involved in the design, planning, procurement, integration, installation, operation and maintenance of facilities and infrastructures within data centres. These parties include:

1) owners, operators, facility managers, ICT managers, project managers, main contractors;

2) consultants, architects, building designers and builders, system/installation designers, auditors, test and commissioning agents;

3) suppliers of equipment;

4) installers, maintainers.

At the time of publication of this document, the ISO/IEC 22237 series will comprise the following documents:

— ISO/IEC 22237-1, *Information technology — Data centre facilities and infrastructures — Part 1: General concepts*;

— ISO/IEC 22237-2, *Information technology — Data centre facilities and infrastructures — Part 2: Building construction*;

— ISO/IEC 22237-3, *Information technology — Data centre facilities and infrastructures — Part 3: Power distribution*;

— ISO/IEC 22237-4, *Information technology — Data centre facilities and infrastructures — Part 4: Environmental control*;

— ISO/IEC 22237-5, *Information technology — Data centre facilities and infrastructures — Part 5: Telecommunications cabling infrastructure*;

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— ISO/IEC 22237-6, *Information technology — Data centre facilities and infrastructures — Part 6: Security systems*;

— ISO/IEC 22237-7: *Information technology — Data centre facilities and infrastructures — Part 7: Management and operational information*.

The inter-relationship of the specifications within the ISO/IEC 22237 series is shown in Figure 1.

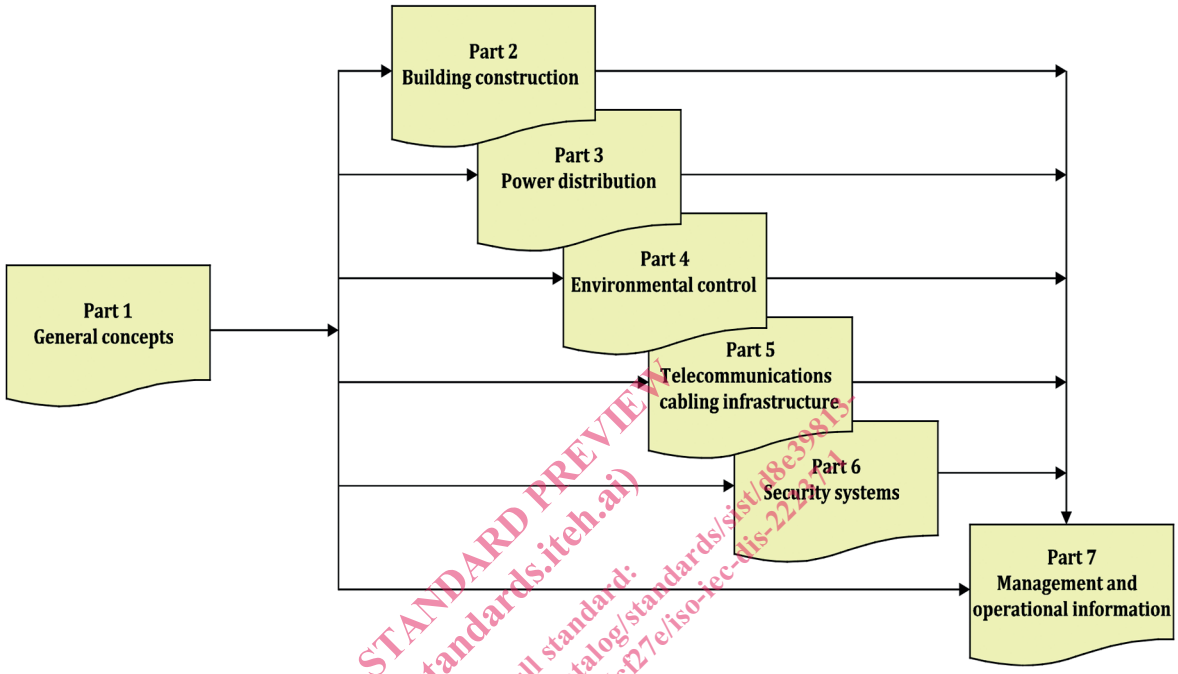

Figure 1 — Schematic relationship between the ISO/IEC 22237 series of documents

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This document, ISO/IEC 22237-1, defines the general concepts for the design and operation of data centres. This includes a business risk and operational cost analysis as well as a classification system for data centres with respect to “availability”, “physical security” and “energy efficiency enablement”.

ISO/IEC 22237-2 to ISO/IEC 22237-6 specify requirements and recommendations for particular facilities and infrastructures to support the relevant classification for “availability”, “physical security” and “energy efficiency enablement” selected from ISO/IEC 22237-1.

ISO/IEC 22237-7 addresses the operational and management information (in accordance with the requirements of ISO/IEC 22237-1).

This document is intended for use by and collaboration between architects, building designers and builders, system and installation designers.

The ISO/IEC 22237 series does not address the selection of information technology and network telecommunications equipment, software and associated configuration issues.

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Information technology — Data centre facilities and infrastructures —

Part 1: General concepts

1 Scope

This document:

a) describes the general principles for data centres upon which the requirements of the ISO/IEC 22237 series are based;

b) defines the common aspects of data centres including terminology, parameters and reference models (functional elements and their accommodation) addressing both the size and complexity of their intended purpose;

c) describes general aspects of the facilities and infrastructures required to support data centres;

d) specifies a classification system, based upon the key criteria of "availability", "security" and "energy-efficiency" over the planned lifetime of the data centre, for the provision of effective facilities and infrastructure;

e) details the issues to be addressed in a business risk and operating cost analysis enabling application of the classification of the data centre;

f) provides reference to operation and management of data centres.

The following topics are outside of the scope of this series of International Standards:

1) the selection of information technology and network telecommunications equipment, software and associated configuration issues are outside the scope of this International Standard;

2) quantitative analysis of overall service availability resulting from multi-site data centres;

3) safety and electromagnetic compatibility (EMC) requirements (covered by other standards and regulations. However, information given in this International Standard can be of assistance in meeting these standards and regulations).

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/IEC/TS 22237-2, *Information technology — Data centre facilities and infrastructures — Part 2: Building construction*

ISO/IEC 22237-3, *Information technology — Data centre facilities and infrastructures — Part 3: Power distribution*

ISO/IEC 22237-4, *Information technology — Data centre facilities and infrastructures — Part 4: Environmental control*

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ISO/IEC/TS 22237-5, *Information technology — Data centre facilities and infrastructures — Part 5: Telecommunications cabling infrastructure*

ISO/IEC/TS 22237-6, *Information technology — Data centre facilities and infrastructures — Part 6: Security systems*

3 Terms, definitions and abbreviations

3.1 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:

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

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

3.1.1
availability
ability of an item to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval, assuming that the required external resources are provided

[SOURCE: IEC 60050-191:1990, 191-02-05]

3.1.2
building entrance facility
facility that provides all necessary services, and which complies with all relevant regulations, for the entry of specific infrastructures or services into a building

3.1.3
building security
facilities and systems necessary to provide the required levels of security at the entrance to and within the building containing the data centre

3.1.4
cabinet
enclosed construction for housing closures and other information technology equipment

[SOURCE: ISO/IEC 14763-2:2019, 3.1.6 – modified: removed the word "intended" and replaced "telecommunications components and" with "information"]

3.1.5
co-hosting data centre
data centre in which multiple customers are provided with access to network(s), servers and storage equipment on which they operate their own services/applications

Note 1 to entry: Both the information technology equipment and the support infrastructure of the building are provided as a service by the data centre operator.

3.1.6
co-location data centre
data centre in which multiple customers locate their own network(s), servers and storage equipment

Note 1 to entry: The support infrastructure of the building (such as power distribution and environmental control) is provided as a service by the data centre operator.

3.1.7
computer room space
area within the data centre that accommodates the data processing, data storage and telecommunication equipment that provides the primary function of the data centre

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3.1.8
control room space
area within the data centre used to control the operation of the data centre and to act as a central point for all control and monitoring functions

3.1.9
data centre
a structure, or group of structures, dedicated to the centralised accommodation, interconnection and operation of information technology and network telecommunications 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 and security required to provide the desired service availability

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

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

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

3.1.10
data centre security
necessary facilities and systems that provide the required levels of security at the entrance to and within the data centre

3.1.11
demarcation point
point where the operational control or ownership changes

3.1.12
electrical distribution space
area used for housing facilities to distribute electrical power between the transformer space and electrical spaces within the data centre or elsewhere within the premises or individual buildings within the premises

3.1.13
electrical space
area within the data centre used for housing facilities to deliver and control electrical power to the data centre spaces (including switchboards, batteries, uninterruptible power systems (UPS) etc.)

3.1.14
enterprise data centre
data centre that is operated by an enterprise which has the sole purpose of the delivery and management of services to its employees and customers

3.1.15
external premises security
facilities and systems that provide the required levels of security for the area between the building and the boundary of the premises

3.1.16
energy efficiency enablement
ability to measure the energy consumption and to allow calculation and reporting of energy efficiency of the various facilities and infrastructures

3.1.17
facility
spaces and pathways that accommodate a specific infrastructure

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