TECHNICAL SPECIFICATION

ISO/IEC TS 22237-2

First edition
2018-05

Information technology — Data centre facilities and infrastructures —

Part 2: Building construction

Technologie de l'information — Installation et infrastructures de centres de traitement de données —

Partie 2: Construction des bâtiments

Reference number
ISO/IEC TS 22237-2:2018(E)

© ISO/IEC 2018



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **vi**
Introduction ..... **vii**
1 Scope **1**
2 Normative references **1**
3 Terms, definitions and abbreviated terms **2**
3.1 Terms and definitions 2
3.2 Abbreviated terms 3
4 Conformance **3**
5 Location **3**
5.1 Assessment of location 3
5.1.1 Requirements 3
5.1.2 Recommendations 4
5.2 Geographical location 4
5.2.1 Requirements 4
5.2.2 Recommendations 4
5.3 Natural environment 4
5.3.1 Requirements 4
5.3.2 Recommendations 4
5.4 Adjacencies 4
5.4.1 Requirements 4
5.4.2 Recommendations 5
5.5 Infrastructural factors 5
5.5.1 Requirements 5
5.5.2 Recommendations 5
6 Site configuration **5**
6.1 General 5
6.2 Site selection 6
6.2.1 Requirements 6
6.2.2 Recommendations 7
6.3 Assessment of existing premises 7
6.3.1 Requirements 7
6.3.2 Recommendations 7
6.4 Utilities 7
6.4.1 Requirements 7
6.4.2 Recommendations 7
6.5 Access routes 7
6.5.1 Requirements 7
6.5.2 Recommendations 7
6.6 Deliveries 8
6.6.1 Requirements 8
6.6.2 Recommendations 8
6.7 Parking 8
6.7.1 Requirements 8
6.7.2 Recommendations 8
6.8 Exterior installations 8
6.8.1 Underground facilities 8
6.8.2 Telecommunications cabling 8
6.9 Perimeter 9
6.9.1 Requirements 9
6.9.2 Recommendations 9
7 Building construction **9**
7.1 Building structure 9

© ISO/IEC 2018 – All rights reserved

7.1.1 General 9
7.1.2 Load-bearing structure 9
7.1.3 Building materials and finishes 9
7.2 Foundations 10
7.2.1 Requirements 10
7.2.2 Recommendations 10
7.3 Exterior walls 10
7.3.1 Requirements 10
7.3.2 Recommendations 11
7.4 Interior walls providing boundaries of Protection Class 11
7.4.1 Requirements 11
7.4.2 Recommendations 11
7.5 Roofs 11
7.5.1 General 11
7.6 Rain water drainage 12
7.6.1 Requirements 12
7.6.2 Recommendations 12
7.7 Floors and ceilings 12
7.7.1 General 12
7.7.2 Access floors 12
7.8 Corridors and doors 13
7.8.1 Requirements 13
7.8.2 Recommendations 13

8 Data centre spaces and access routes 13
8.1 Accommodation 13
8.1.1 General 13
8.1.2 Requirements 13
8.1.3 Recommendations 13
8.1.4 Data centre spaces 14
8.2 Protection 15
8.2.1 Requirements 15
8.2.2 Recommendations 15
8.3 Floors 15
8.3.1 General 15
8.3.2 Access floors 16
8.4 Ceilings 16
8.4.1 Requirements 16
8.4.2 Recommendations 16
8.5 Access to data centre spaces 17
8.5.1 Requirements 17
8.5.2 Recommendations 17
8.6 Vapour density 17
8.6.1 General 17
8.6.2 Requirements 17
8.6.3 Recommendations 17

9 Fire compartments, fire barriers and fire suppression systems 17
9.1 General 17
9.1.1 Requirements 17
9.1.2 Recommendations 18
9.2 Fire barriers 18
9.2.1 Requirements 18
9.2.2 Recommendations 18
9.3 Fire compartments for gaseous extinguishing systems 18
9.3.1 Inert gaseous extinguishing systems 18
9.3.2 Oxygen reduction systems 19
9.4 Fire suppression 19
9.4.1 Requirements 19

 © ISO/IEC 2018 – All rights reserved

9.4.2 Recommendations 19

10 Building configurations 19

10.1 Design phase 19

10.1.1 Requirements 19

10.1.2 Recommendations 19

10.1.3 Areas, compartments 19

10.1.4 Modularity and flexibility 20

10.2 Inter-relationship of functional spaces 20

10.2.1 General 20

10.2.2 Space usage 20

10.2.3 Computer room space 20

10.2.4 Telecommunications space 21

Annex A (normative) **Additional requirements and recommendations 22**

Annex B (informative) **Physical protection against external hazards 23**

Bibliography 25

© ISO/IEC 2018 – All rights reserved

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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, *Sustainability for and by Information Technology.*

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

© ISO/IEC 2018 – All rights reserved

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).

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 and physical security. Effective management and operational information is required to monitor achievement of the defined needs and objectives.

The ISO/IEC TS 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, facility managers, ICT managers, project managers, main contractors;

2) consultants, architects, building designers and builders, system and installation designers;

3) facility and infrastructure integrators, suppliers of equipment;

4) installers, maintainers.

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

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

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

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

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

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*;

© ISO/IEC 2018 – All rights reserved

ISO/IEC TS 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 TS 22237 series is shown in Figure 1.

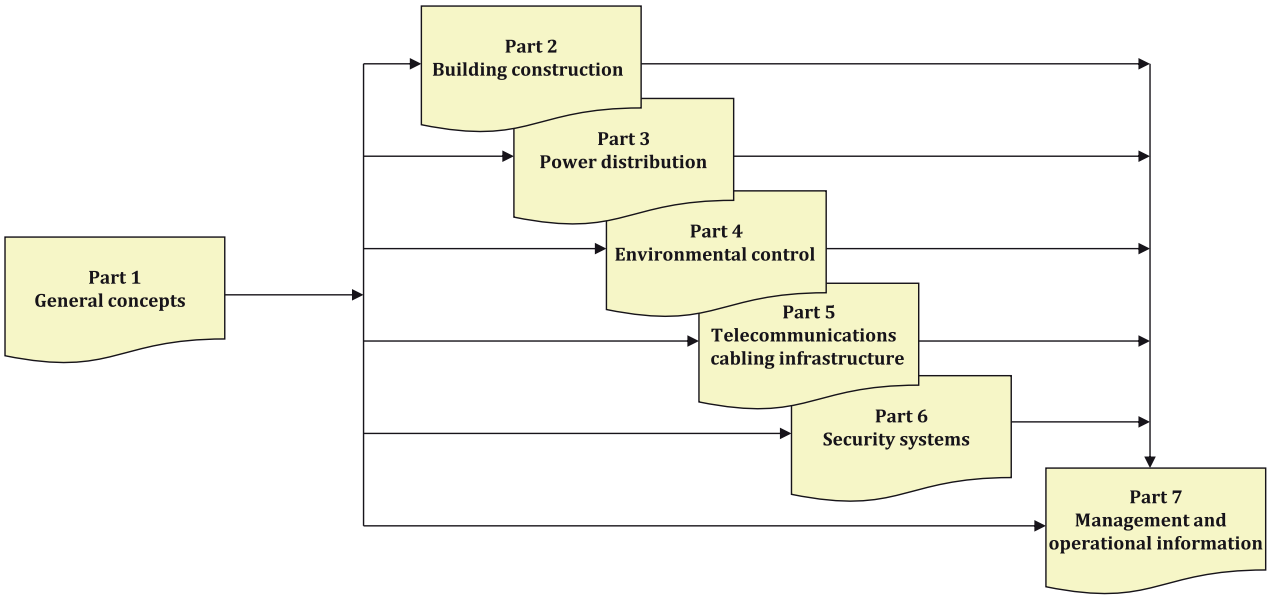


Figure 1 — Schematic relationship between the ISO/IEC TS 22237 series of documents

ISO/IEC TS 22237-2 to ISO/IEC TS 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 TS 22237–1.

This document addresses the building design of data centres; it addresses security issues from a constructional point of view, whereas ISO/IEC TS 22237-6 specifies the pertinent security system requirements of those facilities and infrastructures (in accordance with the requirements of ISO/IEC TS 22237–1).

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

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

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

© ISO/IEC 2018 – All rights reserved

Information technology — Data centre facilities and infrastructures —

Part 2: Building construction

1 Scope

This document addresses the construction of buildings and other structures which provide accommodation for data centres based upon the criteria and classification for "physical security" within ISO/IEC TS 22237-1 in support of availability.

This document specifies requirements and recommendations for the following:

a) location and site selection;

b) building construction;

c) building configuration;

d) fire protection;

e) quality construction measures.

Safety and electromagnetic compatibility (EMC) requirements are outside the scope of this document and are covered by other standards and regulations. However, information given in this document may be of assistance in meeting these standards and regulations.

Conformance of data centres to the present document is covered in Clause 4.

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 14520-1, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 1: General requirements*

ISO/IEC 14763-2, *Information technology — Implementation and operation of customer premises cabling — Part 2: Planning and installation*

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

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

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

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

© ISO/IEC 2018 – All rights reserved

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

ISO/IEC 30129, *Information technology — Telecommunications bonding networks for buildings and other structures*

IEC 62305 (all parts), *Protection against lightning*

EN 12825:2001, *Raised access floors*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions in ISO/IEC TS 22237-1 and the following 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
access floor
system consisting of completely removable and interchangeable floor panels that are supported on adjustable pedestals connected by stringers to allow the area beneath the floor to be used by building services

3.1.2
access provider
operator of any facility that is used to convey telecommunications signals to and from a customer premises

3.1.3
building entrance facility
facility that provides all necessary mechanical and electrical services for the entry of telecommunications cables into a building and which may allow for transition from external to internal cable

[SOURCE: ISO/IEC TS 22237-1:2018, 3.1.2]

3.1.4
modular construction
method which uses standardized prefabricated construction elements with the possibility to add extra elements when more space is required

3.1.5
pathway
defined route for different media between identified points

Note 1 to entry: Examples for media are bus bars, cables, conduits, ducts, pipes.

3.1.6
plenum
compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system

© ISO/IEC 2018 – All rights reserved

3.1.7
room in room
construction method to have a physically independent chamber (walls and ceiling) in a new or existing building

Note 1 to entry: Room in room can provide high level fire rating, water tightness, smoke tightness and intrusion protection required for IT environments.

3.2 Abbreviated terms

For the purposes of this document the following abbreviated terms apply:

DC Direct Current

HVAC Heating, Ventilation, Air Conditioning

IT Information Technology

4 Conformance

For a data centre to conform to this document:

a) its location shall have been selected following a site assessment as required in Clause 5;

b) it shall comply with the site requirements of Clause 6;

c) it shall meet the building construction requirements of Clause 7 where the data centre spaces are within buildings;

d) it shall meet the building configuration requirements detailed in Clause 8;

e) it shall meet the fire protection requirements of Clause 9;

f) it shall meet the quality construction measures of Clause 10;

g) local regulations, including safety, shall be met.

5 Location

5.1 Assessment of location

5.1.1 Requirements

The location of a site for a data centre can be assessed either for a “green field” construction of a new data centre or the evaluation of an existing site. The location shall be assessed against the following criteria:

a) geographical location (see 5.2);

b) natural environment (see 5.3);

c) adjacencies (see 5.4);

d) infrastructural factors (see 5.5);

e) budgetary factors such as site costs and cost to bring utilities to the site;

f) local regulation issues.

Personnel factors (operational personnel, security personnel) are not covered in this clause.

© ISO/IEC 2018 – All rights reserved