



BSI Standards Publication

# Information technology — Data centre facilities and infrastructures

---

Part 1: General concepts

## National foreword

This Published Document is the UK implementation of ISO/IEC TS 22237-1:2018.

The UK participation in its preparation was entrusted to Technical Committee IST/46, Sustainability for, and by IT.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2018  
Published by BSI Standards Limited 2018

ISBN 978 0 580 99297 1

ICS 35.020

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2018.

### Amendments/corrigenda issued since publication

| Date | Text affected |
|------|---------------|
|------|---------------|

---

# TECHNICAL SPECIFICATION

# ISO/IEC TS 22237-1

First edition  
2018-05-01

---

---

## 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*



Reference number  
ISO/IEC TS 22237-1:2018(E)

© ISO/IEC 2018



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2018, Published in Switzerland

All rights reserved. Unless otherwise specified, 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  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
[copyright@iso.org](mailto:copyright@iso.org)  
[www.iso.org](http://www.iso.org)

# Contents

Page

|  |           |
|--|-----------|
| <b>Foreword</b>  | <b>iv</b> |
| <b>Introduction</b>                                    | <b>v</b>  |
| <b>1 Scope</b>   | <b>1</b>  |
| <b>2 Normative references</b>                          | <b>1</b>  |
| <b>3 Terms, definitions and abbreviated terms</b>      | <b>2</b>  |
| 3.1 Terms and definitions                              | 2         |
| 3.2 Abbreviated terms                                  | 5         |
| <b>4 Conformance</b>                                   | <b>6</b>  |
| <b>5 Business risk analysis</b>                        | <b>6</b>  |
| 5.1 General  | 6         |
| 5.2 Downtime cost analysis                             | 6         |
| 5.3 Risk analysis                                      | 7         |
| <b>6 Data centre design overview</b>                   | <b>8</b>  |
| 6.1 General  | 8         |
| 6.2 Spaces and facilities                              | 8         |
| <b>7 Classification system for data centres</b>        | <b>11</b> |
| 7.1 General  | 11        |
| 7.2 Availability                                       | 11        |
| 7.3 Physical security                                  | 13        |
| 7.3.1 General  | 13        |
| 7.3.2 Protection against unauthorised access           | 13        |
| 7.3.3 Protection against environmental events          | 13        |
| 7.4 Energy efficiency enablement                       | 14        |
| 7.4.1 General  | 14        |
| 7.4.2 Power distribution system                        | 15        |
| 7.4.3 Environmental monitoring and control             | 15        |
| <b>Annex A (informative) General design principles</b> | <b>16</b> |
| <b>Bibliography</b>                                    | <b>21</b> |

## 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](http://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](http://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](http://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.

## 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:

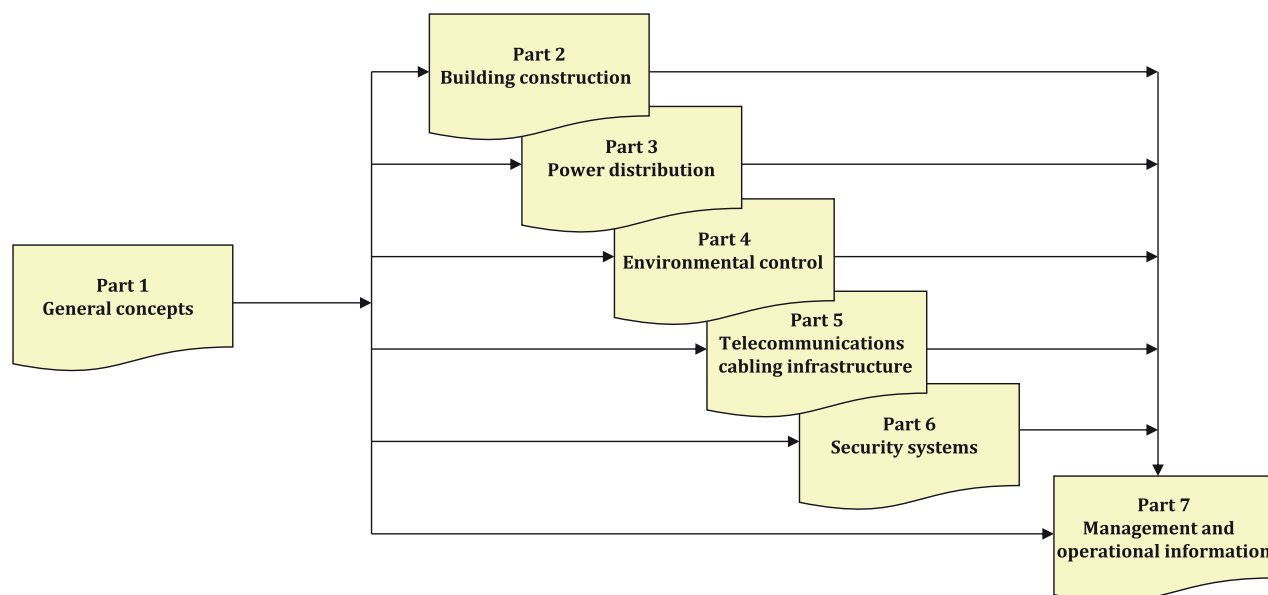
- 1) owners, facility managers, ICT managers, project managers, main contractors;
- 2) consultants, architects, building designers and builders, system and installation designers;
- 3) suppliers of equipment;
- 4) installers, maintainers.

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 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**

This document, 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 TS 22237-2 to ISO/IEC TS 22237-7 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.

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.



# Information technology — Data centre facilities and infrastructures —

## Part 1: General concepts

### 1 Scope

This document:

- a) details the issues to be addressed in a business risk and operating cost analysis enabling application of an appropriate classification of the data centre;
- 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 effective operation of telecommunications within 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) describes the general design principles for data centres upon which the requirements of the ISO/IEC TS 22237 series are based including symbols, labels, coding in drawings, quality assurance and education.

The following topics are outside of the scope of the ISO/IEC TS 22237 series:

- 1) the selection of information technology and network telecommunications equipment, software and associated configuration issues;
- 2) safety and electromagnetic compatibility (EMC) requirements (covered by other standards and regulations). However, information given in the ISO/IEC TS 22237 series may 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 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*