



SLOVENSKI STANDARD

SIST-TP CLC/TR 50600-99-3:2018

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**Informacijska tehnologija - Naprave in infrastruktura podatkovnih centrov - 99-3.
del: Vodilo za uporabo skupine standardov EN 50600**

Information technology - Data centre facilities and infrastructures - Part 99-3: Guidance to the application of EN 50600 series

Informationstechnik - Einrichtungen und Infrastrukturen von Rechenzentren - Teil 99-3: Anleitung zur Anwendung der Normenreihe EN 50600

Technologies de l'information - Installations et infrastructures des centres de traitement de données - Partie 99-3: Recommandations relatives à l'application de la série EN 50600

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ICS:

35.020	Informacijska tehnika in tehnologija na splošno	Information technology (IT) in general
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**Information technology - Data centre facilities and infrastructures
- Part 99-3: Guidance to the application of EN 50600 series**

Technologies de l'information - Installations et
infrastructures des centres de traitement de données -
Partie 99-3: Recommandations relatives à l'application de la
série EN 50600

Informationstechnik - Einrichtungen und Infrastrukturen von
Rechenzentren - Teil 99-3: Anleitung zur Anwendung der
Normenreihe EN 50600

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (CLC/TR 50600-99-3:2018) has been prepared by CLC/TC 215 “*Electrotechnical aspects of telecommunication equipment*”.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

Regarding the structure of the EN 50600 series, see the Introduction.

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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 economic 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.

This series of documents 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) architects, consultants, 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 Technical Report, EN 50600 series will comprise the following standards and documents:

EN 50600-1, *Information technology — Data centre facilities and infrastructures — Part 1: General concepts*;

EN 50600-2-1, *Information technology — Data centre facilities and infrastructures — Part 2-1: Building construction*;

EN 50600-2-2, *Information technology — Data centre facilities and infrastructures — Part 2-2: Power distribution*;

EN 50600-2-3, *Information technology — Data centre facilities and infrastructures — Part 2-3: Environmental control*;

EN 50600-2-4, *Information technology — Data centre facilities and infrastructures — Part 2-4: Telecommunications cabling infrastructure*;

EN 50600-2-5, *Information technology — Data centre facilities and infrastructures — Part 2-5: Security systems*;

EN 50600-3-1, *Information technology — Data centre facilities and infrastructures — Part 3-1: Management and operational information*.

EN 50600-4-1, *Information technology — Data centre facilities and infrastructures — Part 4-1: Overview of and general requirements for key performance indicators*

EN 50600-4-2, *Information technology — Data centre facilities and infrastructures — Part 4-2: Power Usage Effectiveness*

EN 50600-4-3, *Information technology — Data centre facilities and infrastructures — Part 4-3: Renewable Energy Factor*

CLC/TR 50600-99-1, *Information technology — Data centre facilities and infrastructures — Part 99-1: Recommended practices for energy management*

CLC/TR 50600-99-2, *Information technology — Data centre facilities and infrastructures — Part 99-2: Recommended practices for environmental sustainability*

CLC/TR 50600-99-3, *Information technology — Data centre facilities and infrastructures — Part 99-3: Guidance to the application of EN 50600 series*

The inter-relationship of the documents within the EN 50600 series is shown in Figure 1.

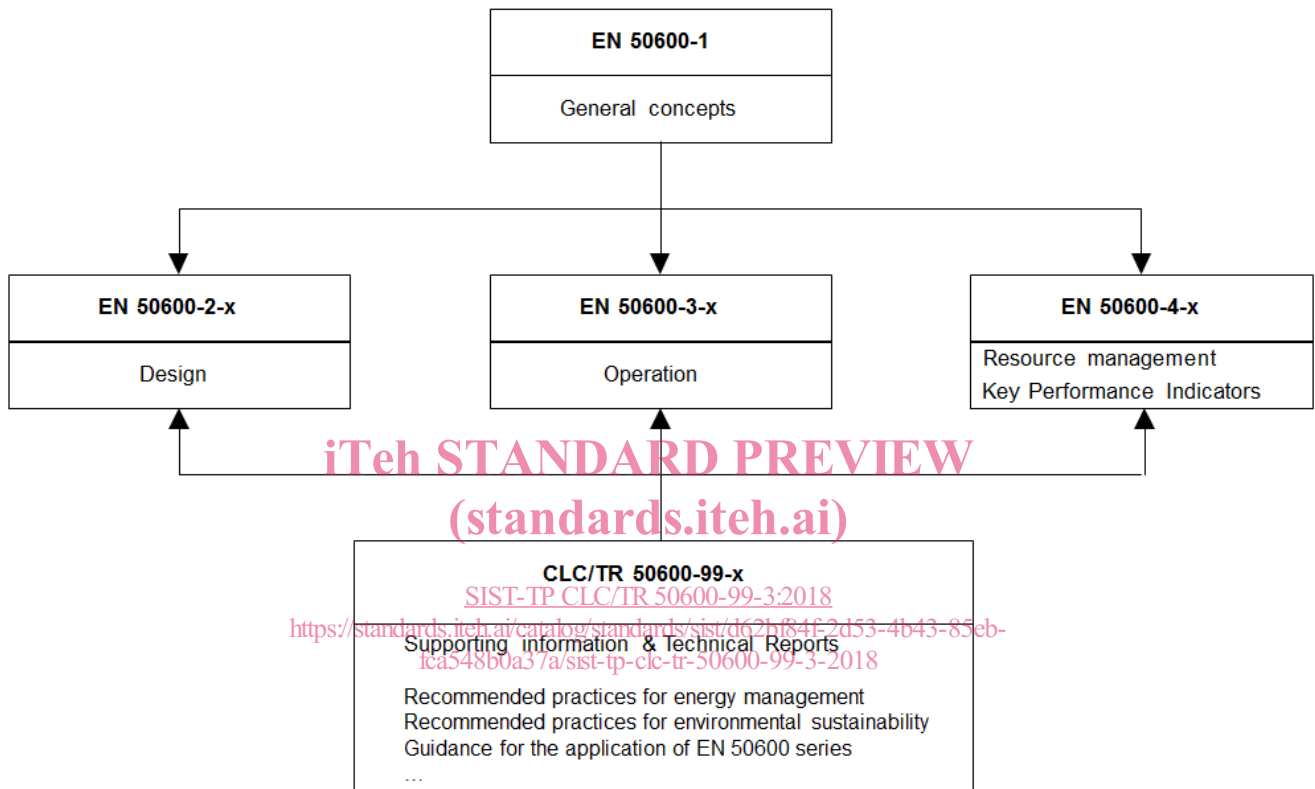


Figure 1 — Schematic relationship between the EN 50600 series of documents

EN 50600-2-X documents specify requirements and recommendations for particular facilities and infrastructures to support the relevant classification for “availability”, “physical security” and “energy efficiency enablement” selected from EN 50600-1.

EN 50600-3-X documents specify requirements and recommendations for data centre operations, processes and management.

EN 50600-4-X documents specify requirements and recommendations for key performance indicators (KPIs) used to assess and improve the resource usage efficiency and effectiveness, respectively, of a data centre.

This Technical Report provides readers with an introduction into the EN 50600 series and the interdependencies between the various standards in order to ease the correct application by all parties concerned.

1 Scope

This document offers users additional information on the background of the requirements and recommendations in the EN 50600 series. In addition it constitutes a guideline for the correct application and interpretation of these standards.

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.

EN 50600 (all parts), *Information technology - Data centres facilities and infrastructures*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions of series EN 50600 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 <http://www.iso.org/obp>

3.1.1

black building test

test to check resilience measures for availability of energy supply and distribution by switching off the main supplies

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3.1.2

distribution element

technical system to distribute air or cooling fluid within the environmental control system

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3.2 Abbreviations

For the purposes of this document, the abbreviations of EN 50600 series and the following apply.

CHP	combined heat and power
EMC	electromagnetic compatibility
MP	measurement point
N/A	not applicable

4 Principles

4.1 General

The EN 50600 series addresses the following aspects of data centre design and operation:

- construction;
- availability;
- physical security;

- d) resource efficiency;
- e) management and operation;
- f) key performance indicators.

The EN 50600-2 series and its individual parts contain important requirements and recommendations for data centres, namely their setup, structure and technical equipment. However, detailed mandatory requirements for their application and the technical equipment are only partially contained in the individual parts of the series. Instead, such detailed requirements are the result of the business and risk analysis carried out in accordance with EN 50600-1.

The EN 50600-3 series deals with the management and operations; it introduces a number of processes required for data centre operations and management as well as KPIs.

The EN 50600-4 series defines key performance indicators for data centres, including those for energy efficiency.

If used consistently, the EN 50600 series provide a basis for the assessment of conformance to relevant aspects of the design and operation of the facilities and infrastructures of a data centre.

It is probable that, in the coming years, an increasing number of organisations will seek an assessment of their data centres against the conformance requirements of EN 50600 series of standards. To support the standards-based approach, this Technical Report provides guidance to the application of the complete set of standards in the EN 50600 series.

4.2 Assessment of data centre design and operation using the EN 50600 series

This clause makes transparent to those desiring “certification”, what options they have and what those standards offer regarding “certification” - and what they do not.

However, standards bodies are not in a position to judge whether or not an organization offering certification meets the underlying requirements - that is the role of accreditation specialists.

One of the objectives of standardization is to enable the determination of whether or not a product, process or system meets a set of minimum requirements. The demonstration of that compliance (conformity assessment) can be ascertained by one of three procedures described as:

- a) 1st Party (carried out by the manufacturer or supplier),
- b) 2nd Party (carried out by the user or operator) and
- c) 3rd Party (carried out by a neutral and independent body).

The EN 50600 series are written without preference to one of these procedures, leaving the decision to bilateral contracts or even national or regional legislation.

There is nothing to stop a 3rd party from assessing aspects of a data centre against conformance to EN 50600 series. The same is true for the owner or operator of a data centre. The lack of any true certification system for data centres renders both approaches, and any assessment against alternative 3rd party schemes, as being of equal technical status.

EN 50600 series was developed to support the wide variety of business models associated with data centres. Self-assessment or self-declaration of conformance against the requirements outlined above is comparatively simple and can be attractive to company owners, whereas a 3rd Party assessment against those same requirements might be more appropriate for owner/operators of data centres that market their services to others. Self-declaration, rather than formal “certification”, is all that is available. The application of a European Norm as the basis for that assessment is clearly a step forward, but the choice of self-assessment or 3rd party assessment has to be based on the apparent and perceived value and application of the resulting assessment versus the cost of the process to be employed.

Accredited assessment to one or more documents of the EN 50600 series may be viable/possible as part of one of the schemes of EN ISO 9001, EN ISO 50001, EN ISO 14001 or the EN ISO/IEC 27000 series.

4.3 Availability class of a data centre

EN 50600-2-2, EN 50600-2-3 and EN 50600-2-4 provide design solutions for power supply and distribution, environmental control and telecommunications cabling facilities and infrastructures respectively. The design solutions are based on four Availability Classes (1 to 4).

The appropriate Availability Class within each of these standards is determined by application of the business risk analysis of EN 50600-1.

The overall Availability Class of the data centre is defined as that of the lowest Availability Class selected across the three facilities and infrastructures

In combination, EN 50600-1, EN 50600-2-2, EN 50600-2-3 and EN 50600-2-4 provide a comprehensive framework for the assessment of the design availability of a data centre.

They are supported by EN 50600-2-1, EN 50600-2-5 and EN 50600-3-1 for the building construction, physical security systems and operation respectively, but these are considered as subordinate to availability objectives.

4.4 Business risk analysis within EN 50600-1

EN 50600-1 requires a business risk analysis to be undertaken at the earliest stages of the planning process which considers all relevant input variables or risk factors. The business risk analysis allows the appropriate decisions to be made regarding:

- a) the location and construction of the data centre using types of risk detailed in EN 50600-2-1;
- b) the Availability Class for the power supply and distribution, environmental control and telecommunications cabling facilities and infrastructures thereby defining the overall Availability Class for the data centre.

In order to comply with EN 50600-1, the risk analysis shall include an evaluation of all relevant input variables or risk factors. The evaluation of business risk can give a summary assessment of the individual events or of their influence as a group and assess them as a whole.

Attention is drawn to the fact that the EN 50600 series does not provide a set of fixed requirements or recommendations on how to counteract a particular event or risk. The decision, which of the potential measures are appropriate, can only be the result of the risk analysis. This approach is described in the following example concerning the selection of a data centre site in the proximity of surface and/or underground waters.

Business risk assessment example:

EN 50600 series does not define the distance required between a data centre site and a lake or river, as a variety of factors needs to be taken into account to formulate the level of risk, including e.g.:

- a) Is the water flowing or static?
- b) What is the probability of flooding?
- c) In relation to the high water line, where is the planned data centre or technical installation?
- d) What are the topographic conditions around the data centre?
- e) Is the area a designated flood plain?

This list of factors can be extended as necessary and only serves to show that, depending on the project, the particular risk parameters differ. For this reason risk factors have to be assessed individually for each project. The specific input parameters of the risk to be examined can be selected as appropriate. In the above example, they consist of at least items a) to e). The consequences and likelihood of occurrence (see EN 50600-1:2012, Clause 4) can then be qualified in the risk matrix.

Each type of risk should be analysed with increasing granularity until a result is reached which determines that either the risk is acceptable or not. If the outcome of this analysis is that the risk is not acceptable then appropriate measures (either constructional or technical) have to be considered in order to reduce the risk to an acceptable level. There are five types of measures to mitigate risks for a selected location:

- 1) changes of location to protect the data centre against the threat – this is considered in the planning and design phase;

- 2) constructional measures to enhance its resistance against external environmental threats;
- 3) technical solutions to minimize the impact of a threat and meeting the appropriate Availability Class for power supply and distribution, environmental control and telecommunications cabling facilities and infrastructures;
- 4) technical solutions to minimize the impact of a threat and meeting the appropriate Protection Class for the spaces of the data centre;

and, where none of the above are viable:

- 5) organisational measures (but these are considered to be the weakest solution).

Once the appropriate measures have been implemented the documents of the EN 50600-2 series and EN 50600-3-1 can be used to assess design or operational conformance (see Figure 2).

In the wider context of business risk mitigation, the business can adopt the following approaches to reduce and manage the business risk as a result of the risk assessment, thus ensuring the risk mitigation actions reduce the native risk to within the operational business appetite for risk:

MITIGATE

Controls are applied to the risk, whether logical, physical, or procedural to reduce the risk to an acceptable level and within the business risk appetite.

TRANSFER

The risk is transferred to a third party.

TOLERATE

The identified business risk is tolerated and accepted by the business operations.

TERMINATE

The activities which give rise to the risk are terminated, as even with the application of risk mitigation controls, the level of risk exceeds the business appetite for risk.

Risk appetite is the overall amount of risk judged to be acceptable by the business as agreed by members of the board.

Addressing business risk analysis at the planning phase allows the widest range of, and most successful, mitigation actions. The use of organisational actions to mitigate risk will generally be less effective and increase operational costs.

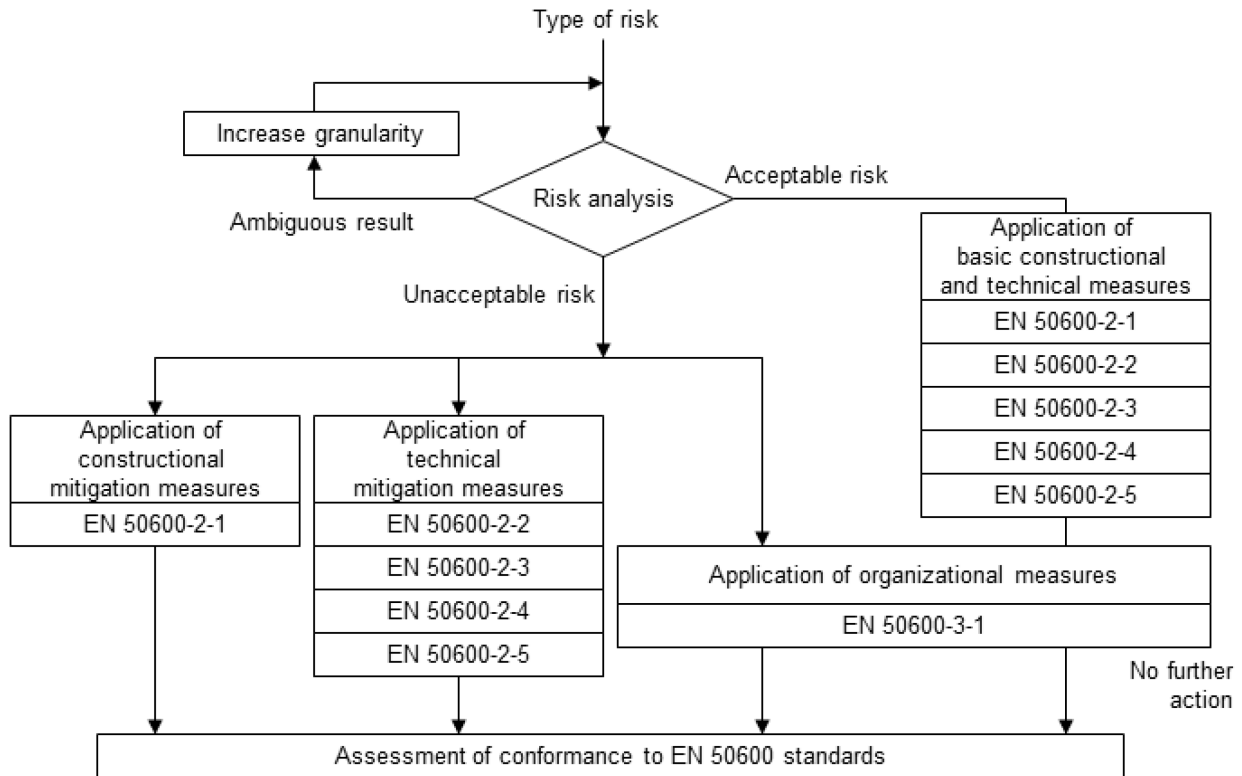


Figure 2 – Process of risk analysis according to EN 50600-1

Besides the technical aspects, the result of a risk analysis normally also affects the economic aspects of the project. In the example above, the preferred site for the data centre near a river or lake can have the effect that the cost of implementing the structural and technical measures required for achieving a desired availability class are not deemed acceptable, and that the site is rejected as inappropriate.

In conclusion, the business risk analysis according to EN 50600-1 has a number of objectives, namely:

- 1) the basis against which to assess the conformance of a data centre to EN 50600-X;
- 2) facilitating a balanced approach between the availability demands of the data centre and the cost of infrastructural measures;
- 3) the resulting Availability Class requirements for a specific project enable the assessment of conformance of the design of the power supply and distribution, environmental control and telecommunications cabling facilities and infrastructures.

It is a unique characteristic of the EN 50600 series that they provide a correlation between the availability and the resulting structural or operational cost for a data centre.

5 Assessment of data centre design using the EN 50600-2 series

5.1 General

There are two possibilities for assessing a data centre design using EN 50600-2 series as described below.

- a) Assessment of the design of one or more of the facilities or infrastructures of the data centre against the requirements of the relevant aspects of the EN 50600-2 series. This allows the facility or infrastructure to be designated as having a certain Availability Class in accordance with the relevant standard.

NOTE 1: Some EN 50600-2 documents are inter-related.