Irish Standard
I.S. EN 50600-4-7:2020

Information technology - Data centre facilities and infrastructures - Part 4-7: Cooling Efficiency Ratio

I.S. EN 50600-4-7:2020

Incorporating amendments/corrigenda/National Annexes issued since publication:

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This document is based on:	*Published:*
EN 50600-4-7:2020	2020-04-03

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2020-04-29	35.020 35.110 35.160 NOTE: If blank see CEN/CENELEC cover page

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National Foreword

I.S. EN 50600-4-7:2020 is the adopted Irish version of the European Document EN 50600-4-7:2020, Information technology - Data centre facilities and infrastructures - Part 4-7: Cooling Efficiency Ratio

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50600-4-7

April 2020

ICS 35.020; 35.160; 35.110

English Version

Information technology - Data centre facilities and infrastructures - Part 4-7: Cooling Efficiency Ratio

Technologie de l'information - Installation et infrastructures de centres de traitement de données - Partie 4-7: Taux d'efficacité de refroidissement

Informationstechnik - Einrichtungen und Infrastrukturen von Rechenzentren - Teil 4-7: Wirkungsgrad der Kühlung (CER)

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

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Ref. No. EN 50600-4-7:2020 E

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European foreword

This document (EN 50600-4-7:2020) has been prepared by CLC/TC 215 “Electrotechnical aspects of telecommunication equipment”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2021-02-10
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2023-02-10

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

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 European Standards 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 document, the 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 supply and 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*;

— FprEN 50600-4-6, *Information technology — Data centre facilities and infrastructures — Part 4-6: Energy Reuse Factor*

— FprEN 50600-4-7, *Information technology — Data centre facilities and infrastructures — Part 4-7: Cooling Efficiency Ratio;*

— 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 standards within the EN 50600 series is shown in Figure 1.

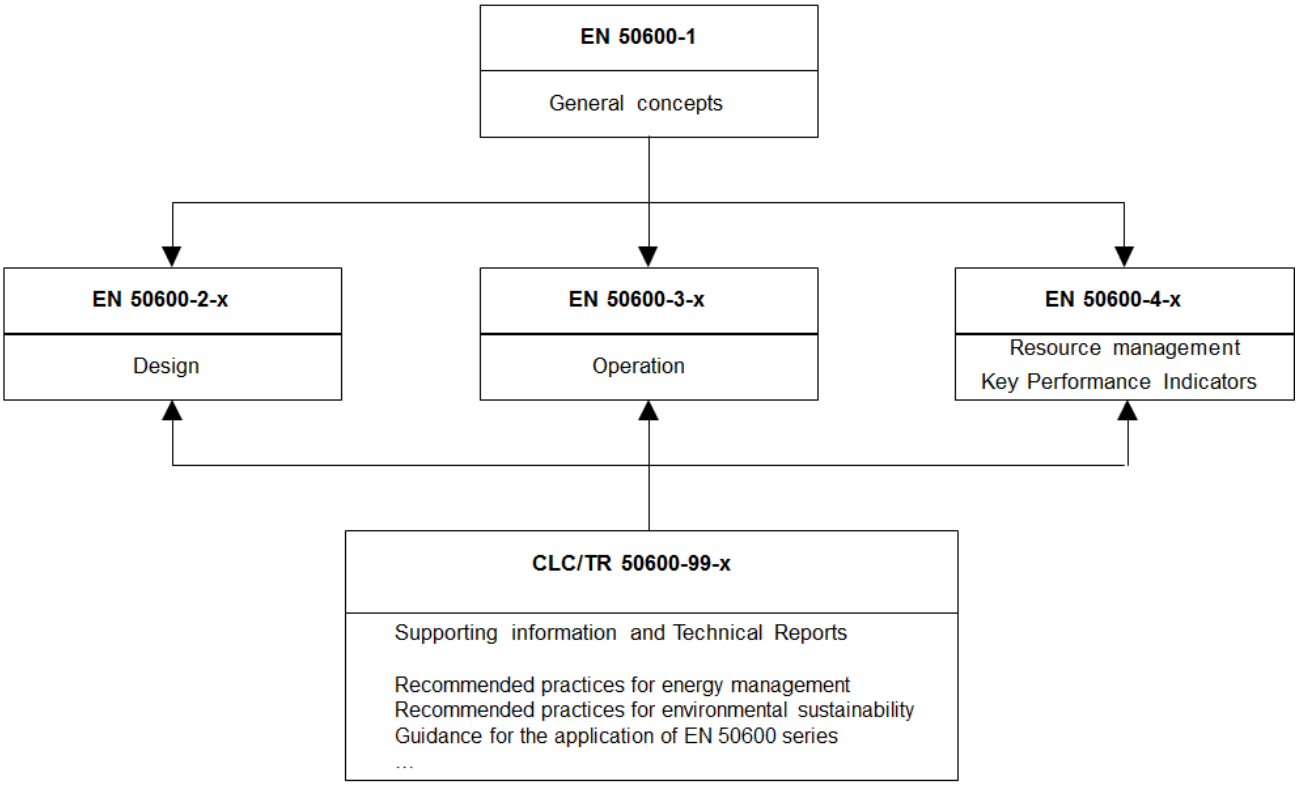

Figure 1 — Schematic relationship between the EN 50600 series of documents

EN 50600-2-X standards 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.

In today's digital society data centre growth, and power consumption in particular, is an inevitable consequence and that growth will demand increasing power consumption despite the most stringent energy efficiency strategies. This makes the need for key performance indicators that cover the effective use of resources (including but not limited to energy) and the reduction of CO_2 emissions essential.

NOTE Within the EN 50600-4-X series, the term "resource usage effectiveness" is more generally used for KPIs in preference to "resource usage efficiency", which is restricted to situations where the input and output parameters used to define the KPI have the same units.

In order to enable the optimum resource effectiveness of data centres a suite of effective KPIs is needed to measure and report on resources consumed in order to develop an improvement roadmap.

These standards are intended to accelerate the provision of operational infrastructures with improved resource usage effectiveness.

This document specifies Cooling Efficiency Ratio to determine the efficient utilization of energy resources to provide the temperature control required by spaces of the data centre.

Additional standards in the EN 50600-4-X series will be developed, each describing a specific KPI for resource usage effectiveness or efficiency.

The EN 50600-4-X series does not specify limits or targets for any KPI and does not describe or imply, unless specifically stated, any form of aggregation of individual KPIs into a combined nor an overall KPI for data centre resource usage effectiveness or efficiency.

This document is intended for use by and collaboration between data centre managers, facility managers, ICT managers, and main contractors.

This series of European Standards does not address the selection of information technology and network telecommunications equipment, software and associated configuration issues.

1 Scope

This document specifies the Cooling Efficiency Ratio (CER) as a Key Performance Indicator (KPI) to quantify the efficient use of energy to control the temperature of the spaces within the data centre.

This document:

a) defines the Cooling Efficiency Ratio (CER) of a data centre;

b) describes the relationship of this KPI to a data centre's infrastructure, information technology equipment and information technology operations;

c) defines the measurement, the calculation and the reporting of the parameter;

d) provides information on the correct interpretation of the CER.

Annex A describes the correlation of CER and other KPIs.

Annex B provides examples of the application of CER.

Annex C introduces the parameters that affect CER.

Annex D describes requirements and recommendations for derivatives of KPIs associated with CER.

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

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

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50600-1 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 http://www.iso.org/obp

3.1.1
Cooling Efficiency Ratio
ratio of total heat removed and electrical energy used by a cooling system

3.1.2
Cooling Performance Ratio
ratio of actual heat load and electrical power used by a cooling system

3.2 Abbreviations

For the purposes of this document, the abbreviations given in EN 50600-1, EN 50600-4-1 and the following apply.

CEF Cooling Efficiency Factor

CER Cooling Efficiency Ratio