SVENSK STANDARD SS-EN IEC 62966-1

Fastställd	Utgåva	Sida	Ansvarig kommitté
2019-12-11	1	1 (1+21)	SEK Elektro-tekniska rådet

Mekaniska byggsätt för elektronikutrustning – Slutna gångar för skåp med IT-utrustning – Del 1: Mått och mekaniska fordringar

Mechanical structures for electrical and electronic equipment – Aisle containment for IT cabinets – Part 1: Dimensions and mechanical requirements

Som svensk standard gäller europastandarden EN IEC 62966-1:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 62966-1:2019.

Nationellt förord

Europastandarden EN IEC 62966-1:2019

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 62966-1, First edition, 2019 - Mechanical structures for electrical and electronic equipment - Aisle containment for IT cabinets - Part 1: Dimensions and mechanical requirements**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 31.240.00

Denna standard är fastställd av SEK Svensk Elstandard,
som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62966-1

April 2019

ICS 31.240

English Version

Mechanical structures for electrical and electronic equipment - Aisle containment for IT cabinets - Part 1: Dimensions and mechanical requirements (IEC 62966-1:2019)

Structures mécaniques pour équipements électriques et électroniques - Confinement d'allées pour les baies informatiques - Partie 1: Dimensions et exigences mécaniques
(IEC 62966-1:2019)

Mechanische Bauweisen für elektrische und elektronische Einrichtungen - Gangeinhausung für IT-Schränke - Teil 1: Maße und mechanische Anforderungen
(IEC 62966-1:2019)

This European Standard was approved by CENELEC on 2019-04-12. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN IEC 62966-1:2019 E

SEK Svensk Elstandard SS-EN IEC 62966-1, utg 1:2019

European foreword

The text of document 48D/691/FDIS, future edition 1 of IEC 62966-1, prepared by SC 48D "Mechanical structures for electrical and electronic equipment" of IEC/TC 48 "Electrical connectors and mechanical structures for electrical and electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62966-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-01-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-04-12

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.

Endorsement notice

The text of the International Standard IEC 62966-1:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60297-3-100	NOTE	Harmonized as EN 60297-3-100
IEC 60297-3-101	NOTE	Harmonized as EN 60297-3-101
IEC 60297-3-102	NOTE	Harmonized as EN 60297-3-102
IEC 60297-3-103	NOTE	Harmonized as EN 60297-3-103
IEC 60297-3-104	NOTE	Harmonized as EN 60297-3-104
IEC 60297-3-105	NOTE	Harmonized as EN 60297-3-105
IEC 60297-3-106	NOTE	Harmonized as EN 60297-3-106
IEC 60297-3-107	NOTE	Harmonized as EN 60297-3-107
IEC 60297-3-108	NOTE	Harmonized as EN 60297-3-108
IEC 60297-3-109	NOTE	Harmonized as EN 60297-3-109
IEC 60917-1	NOTE	Harmonized as EN 60917-1
IEC 60917-2	NOTE	Harmonized as EN 60917-2
IEC 60917-2-1	NOTE	Harmonized as EN 60917-2-1
IEC 60917-2-2	NOTE	Harmonized as EN 60917-2-2
IEC 60917-2-3	NOTE	Harmonized as EN 60917-2-3
IEC 60917-2-4	NOTE	Harmonized as EN 60917-2-4
IEC 60917-2-5	NOTE	Harmonized as EN 60917-2-5
IEC 62610-2	NOTE	Harmonized as EN IEC 62610-2

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61587-1	-	Mechanical structures for electronic equipment - Tests for IEC 60917 and IEC 60297 series - Part 1: Environmental requirements, test set-up and safety aspects for cabinets, racks, subracks and chassis under indoor condition use and transportation	EN 61587-1	-
IEC 61587-2	-	Mechanical structures for electronic equipment - Tests for IEC 60917 and 60297 - Part 2: Seismic tests for cabinets and racks	EN 61587-2	-
IEC 62966-2[1]	-	Mechanical structures for electrical and electronic equipment - Aisle containment for IT cabinets - Part 2: Details of air flow, air separation and air cooling requirements	-	-

[1] Under preparation. Stage at time of publication: CCDV.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

MECHANICAL STRUCTURES FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – AISLE CONTAINMENT FOR IT CABINETS –

Part 1: Dimensions and mechanical requirements

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62966-1 has been prepared by subcommittee 48D: Mechanical structures for electrical and electronic equipment, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
48D/691/FDIS	48D/698/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62966 series, published under the general title *Mechanical structures for electrical and electronic equipment – Aisle containment for IT cabinets*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Cabinets of the IEC 60297 and IEC 60917 standard series are used as enclosures of electronical and electric equipment in many different fields of application. A wide field of application is represented by enclosures equipped with electronic information technology (IT) equipment. They are frequently set up in large numbers in server rooms and data centres. During their operation, the electronic equipment installed generates a considerable amount of heat that must be dissipated from the equipment by means of cooling air. Precise adjustment of the supply air temperature and a sufficient cooling air flow are indispensable prerequisites for the fail-safe operation of equipment in information technology.

Currently, it is common use in data centres and server rooms to set up cabinets in rows. The server cabinets along the rows are usually arranged in such a way that surfaces with cold supply air inlets face each other across an aisle, and surfaces with hot exhaust air outlets also face each other across an aisle. This row configuration is generally known as hot aisle/cold aisle configuration. Moreover, air is supplied and discharged exclusively via the front and rear panels of the server cabinets, which are frequently perforated doors. It is assumed that inside the IT equipment, the cooling air is moved in horizontal direction, taking it in at the front and discharging it at the rear.

The required cooling air is provided by room air or row air conditioners. Warm exhaust air is moved by fans usually through a fluid/air heat exchanger that cools it.

In the arrangement described, considerable quantities of cooling air pass by the IT equipment, especially servers, which it is expected to cool, without having any cooling effect. Concurrently, recirculation within and outside the cabinet causes hot exhaust air to be absorbed as cooling air, which results in faulty operation. In order to minimize such recirculation, more cooling air than required needs to be supplied, this adversely affects the energy efficiency of the data centre.

The separation of air flows into enclosed air volumes consisting of either cold supply air or hot exhaust air precludes recirculation to the largest possible extent (see Figure 1). Such separation reduces the required cooling air flow because re-circulations are ruled out. Air flow separation can reduce power consumption by the fans in the cooling units once fan speed control fans are used.

Separation of the cold supply air from the hot exhaust air is achieved by covering the aisles of the same temperature level with top cover elements, adding doors or similar design elements to the end of the aisles, and all openings inside the cabinets at the front 482,6mm (19”) rails shall be closed.

The installations of aisle containments in data centres and IT rooms shall not restrict the air intake demands for the correct usage and operation of servers or other IT equipment. Especially the required supply air temperature and the cooling air flow rate needed shall not be affected by the aisle containment. This can improve the energy efficiency as most of the cooling infrastructure has a higher efficiency with a higher difference between the air intake and the air exhaust temperature.

The temperature difference between supply and exhaust air rises due to the reduced cooling air volume. As the supply air temperature of the cooling air is usually specified, thus being kept constant, an increase in the temperature difference results in an increase of the temperature of the warm exhaust air. This has a positive impact on the temperature difference to the temperature of ambient air, as the energy efficiency of the cooling of the building and infrastructure is improved by the raised temperature gradient.

The period during which system cooling is required to be supported by a mechanical cooling machine is reduced. Both the reduction of the cooling air flow and the reduction of times of mechanical cooling lead to considerable reduction in the consumption of electrical power. This effects significant savings in operating costs for data centres and server rooms. This results in

an environmentally-friendly use of resources, thereby relieving stress on the environment and slowing down global warming by reduced CO_2 emission.

Part 1 of the standard series defines geometric dimensions and mechanical properties ensuring undisturbed, energy-efficient and user-friendly operation of the data centre.

Part 2 defines characteristics and requirements of air separation, especially the air leakage rate, and determines the air leakage rate. Besides, operational parameters are determined, especially temperatures at which IT equipment in aisle containment are operated.

Part 3 deals with aspects of safely operating IT equipment in aisle containment, discussing special fire-protection and fire-fighting issues. It also provides required specifications of the doors for access to the aisle containment and possible access control.

In the past years, widely varying forms of aisle containment have been installed in server rooms and data centres. This document is intended to provide confidence by reflecting and structuring the currently most widely used solutions and catering for the energy-efficient operation of IT equipment. This document is also expected to solve probable uncertainties and problems concerning the containment technology

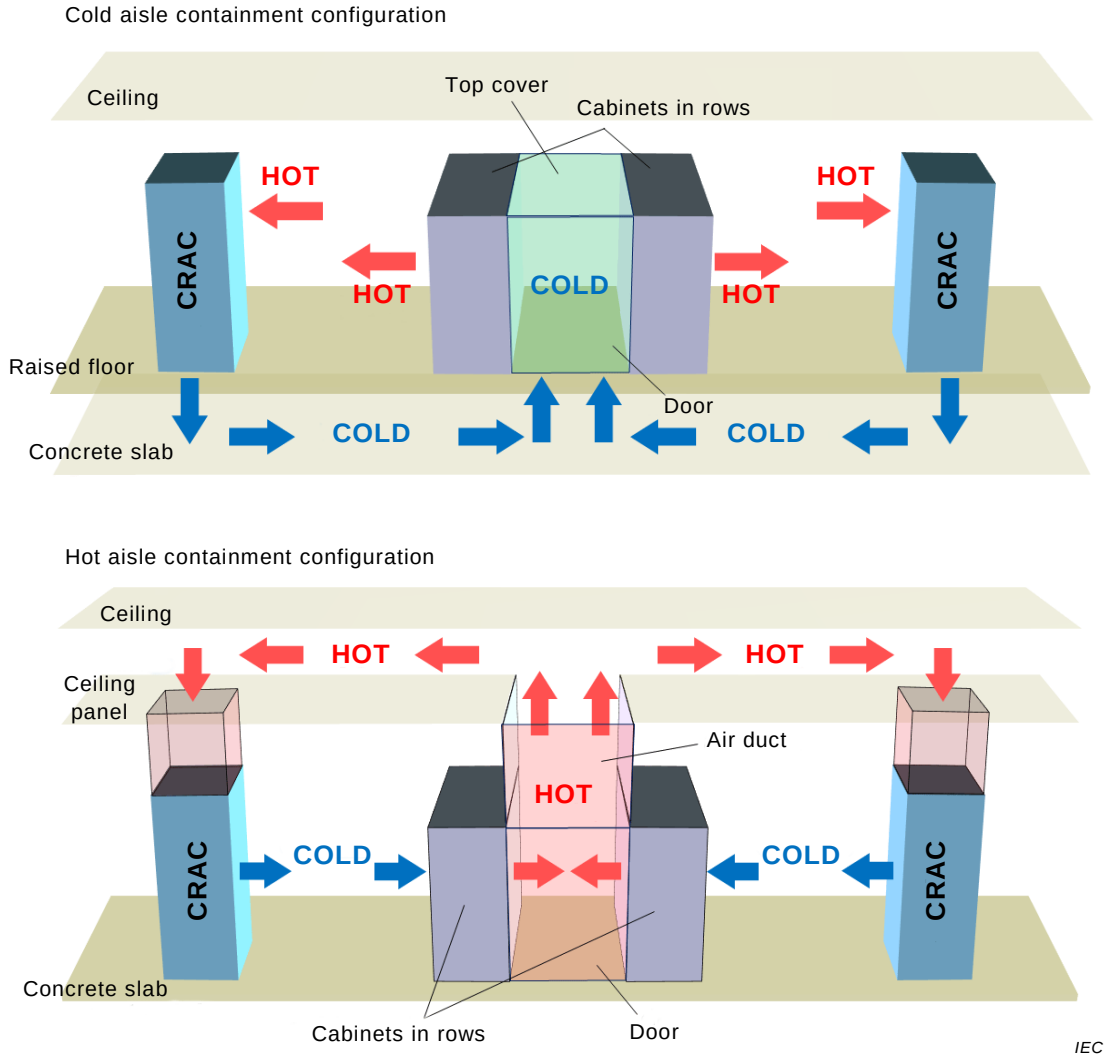

Figure 1 – Examples of an aisle containment

MECHANICAL STRUCTURES FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – AISLE CONTAINMENT FOR IT CABINETS –

Part 1: Dimensions and mechanical requirements

1 Scope

This part of IEC 62966 defines the dimensions and mechanical requirements of aisle containment for information technology (IT) cabinets. The cabinets concerned are dealt with in the standard series IEC 60297 and IEC 60917. The objective of this document is to stipulate properties and requirements of aisle containment ensuring cost effective installation, energy-efficient and user-friendly operation of IT equipment in data centres and server rooms.

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.

IEC 61587-1, *Mechanical structures for electronic equipment – Tests for IEC 60917 and IEC 60297 series – Part 1: Environmental requirements, test set-up and safety aspects for cabinets, racks, subracks and chassis under indoor condition use and transportation*

IEC 61587-2, *Mechanical structures for electronic equipment – Tests for IEC 60917 and 60297 – Part 2: Seismic tests for cabinets and racks*

IEC 62966-2: *Mechanical structures for electrical and electronic equipment – Aisle containment for IT cabinets – Part 2: Details of air flow, air separation and air cooling requirements* (to be published)