

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Mechanical structures for electrical and electronic equipment – Aisle
containment for it cabinets –
Part 2: Details of air flow, air separation and air cooling requirements**

**Structures mécaniques pour équipements électriques et électroniques –
Confinement d'allées pour les baies informatiques –
Partie 2: Détails des exigences relatives au flux d'air, à la séparation des flux
d'air et au refroidissement par air**



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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.240

ISBN 978-2-8322-8510-7

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2: Details of air flow, air separation and air cooling requirements

FOREWORD

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International Standard IEC 62966-2 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/722/FDIS	48D/727/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- withdrawn,
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INTRODUCTION

Cabinets of the IEC 60297 and IEC 60917 standard series are used as enclosures of electronic and electrical 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 will be removed 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.

It is a common practice 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 a horizontal direction, taking it in at the front and discharging it at the rear.

This part of IEC 62966 specifies the quantification of the air separation, in particular the air leak rate that describes the content of the volumetric flow not used for cooling in the aisle containment for information technology (IT) cabinets. 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 server rooms.

The fan pressurization method (overpressure at the system and elements) is used to categorize the air tightness of the aisle containment. In doing so, it is used to quantify the air tightness, in order to compare aisle containments with regard to the air tightness. It is also useful for finding leaks, or to determine the improvement due to improving the air tightness. The fan pressurization method cannot measure the air leak rate, but serves as a basis for determining the air leak rate by calculation. The method can be used to determine air leak rates of the aisle containment at low-pressure and overpressure on the inside compared with the surroundings. Thus, this allows a categorization of the elements of an aisle containment – the enclosure – to be determined.

For this purpose, aisle containment is dismantled into typical individual elements, for example enclosures, doors and roof covers. The corresponding characteristic curves of these components are recorded separately and added to the system characteristic curve of the aisle containment.

The quality of the resulting aisle containment is then classified using a differential pressure measurement.

The IEC 62966 series, *Mechanical structures for electrical and electronic equipment – Aisle containment for IT cabinets*, is subdivided into the following parts:

- IEC 62966-1: *Dimensions and mechanical requirements*
- IEC 62966-2: *Details of air flow, air separation and air cooling requirements*
- IEC 62966-3: *Aspects of operational safety of IT equipment and users of aisle containment*

IEC 62966-1 defines geometric dimensions and mechanical properties ensuring undisturbed, energy-efficient and user-friendly operation of the data centre.

IEC 62966-2 provides the methods and process to get the aisle containment air leakage and define the classification (evaluation) system on the aisle containment air leakage, for designers and users of aisle containments for IT cabinets based on the IEC 60297 and IEC 60917 series.

IEC 62966-3 deals with aspects of safely operating IT equipment in aisle containment, with respect to special fire-protection and fire-fighting issues. It also describes the nature of the doors for access to the aisle containment and possible access control.

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 Scope

This part of IEC 62966, dedicated to aisle containment techniques for information technology (IT) equipment typically used in data centres, describes the quantification of its air tightness, in particular the air loss ratio that describes the content of the volumetric flow not used for cooling the IT equipment. This ratio provides an index of efficiency, being inversely proportional to efficiency (the lower this ratio, the higher the efficiency). This document provides methods to measure an aisle containment air leakage rate and defines a classification system for aisle containment leakage.

This document defines:

- a) the measurement of the air leakage of the individual components of an aisle containment;
- b) a method for calculating the air leakage of an aisle containment based on its individual components;
- c) a method for calculating the air leakage rate of an aisle containment in relation to the utilised IT equipment;
- d) a classification system for aisle containment leakage.

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 62966-1, *Mechanical structures for electrical and electronic equipment – Aisle containment for IT equipment – Part 1: Dimensions and mechanical requirements*

ISO 9972, *Thermal performance of buildings – Determination of air permeability of buildings – Fan pressurization method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

air leak rate

ratio of the volumetric air flow not used for cooling to the total volumetric air flow