



Edition 1.0 2021-01

TECHNICAL SPECIFICATION



Mechanical structures for electrical and electronic equipment – Aisle containment for it cabinets – Part 3: Aspects of operational and personal safety

> <u>IEC TS 62966-3:2021</u> https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-02029a62a89e/iec-ts-62966-3-2021





THIS PUBLICATION IS COPYRIGHT PROTECTED Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office 3, rue de Varembé CH-1211 Geneva 20 Switzerland

Tel.: +41 22 919 02 11 info@iec.ch www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore iec ch/csc If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch. IEC TS 62966-3:2021

IEC online collection - oc.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 18 additional languages. Also known as the International Electrotechnical Vocabulary



https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608

02029a62a89e/iec-ts-62966-3-2021





Edition 1.0 2021-01

TECHNICAL SPECIFICATION



Mechanical structures for electrical and electronic equipment – Aisle containment for it cabinets standards.iteh.ai) Part 3: Aspects of operational and personal safety

> <u>IEC TS 62966-3:2021</u> https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-02029a62a89e/iec-ts-62966-3-2021

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 31.240

ISBN 978-2-8322-9318-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	3
INTRODUCTION	5
1 Scope	6
2 Normative references	7
3 Terms and definitions	7
4 Safety requirements of an aisle containment	8
4.1 General safety requirements	8
4.2 Escape routes, emergency exits, escape doors, escape and evacuation plan	8
4.2.1 Recommended dimensions of escape routes and escape doors/emergency exits	8
4.2.2 Functional aspects of escape doors	11
4.2.3 Lighting and signposting of escape routes	11
4.2.4 Escape and evacuation plan	12
4.3 General – Fire protection in an aisle containment	12
4.3.1 Overview	12
4.3.2 Fire prevention	13
4.3.3 Fire and smoke detection	13
4.3.4 Fire fighting device	16
4.3.5 Arrangement of extinguishing nozzles.	17
4.4 Lighting conditions(standards.iteh.ai)	19
Bibliography	20
<u>IEC TS 62966-3:2021</u>	
Figure 1 – Minimum Width of escape routest mansaisle containment 906-8608-	10
Figure 2 – Minimum height of escape routes in an aisle containment	10
Figure 3 – Typical arrangement of an aisle containment representing a walk-in-	
equipment solution	13
Figure 4 – Cold and hot aisle containment (showing air flow and temperature areas)	14
Figure 5 – Arrangement of aspirating smoke detectors (ASDs) in a cold aisle containment with or without raised floor	15
Figure 6 – Arrangement of aspirating smoke detectors (ASDs) in a hot aisle containment	16
Figure 7 – Arrangement of extinguishing nozzles in a cold aisle containment with or without raised floor (showing flow-direction of extinguishing gas)	18

Table 1 – Minimum width of escape routes and maximum reduction of clearance......9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 3: Aspects of operational and personal safety

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. A DARD PRE VIEW
- 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.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a Technical Specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62966-3, which is a Technical Specification, 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 Technical Specification is based on the following documents:

DTS	Report on voting
48D/725/DTS	48D/731/RVDTS

Full information on the voting for the approval of this Technical Specification 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, **iTeh STANDARD PREVIEW**
- withdrawn,

(standards.iteh.ai)

- replaced by a revised edition, or
- amended.

<u>IEC TS 62966-3:2021</u> https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-02029a62a89e/iec-ts-62966-3-2021

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

This Part 3 of IEC 62966 serves as a guide for a consideration from a safety viewpoint of the dimensional and air conditioning aspects of cold and hot aisle containments in data centres described in IEC 62966-1 and IEC 62966-2.

Where aspects of this Technical specification conflict with national regulations and laws of the member states concerned, the provisions of these national regulations shall apply.

Consideration is given to safety-related aspects, such as:

- a) escape and evacuation plans;
- b) escape routes;
- c) emergency exits;
- d) functional aspects of escape doors;
- e) lighting conditions;
- f) lighting and signposting of escape routes;
- g) fire protection;

taking into account the existing stringent requirements placed on the protection of IT equipment and the availability of the data the equipment contains.

iTeh STANDARD PREVIEW (standards.iteh.ai)

<u>IEC TS 62966-3:2021</u> https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-02029a62a89e/iec-ts-62966-3-2021

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

Part 3: Aspects of operational and personal safety

1 Scope

This part of IEC 62966 defines the requirements for operational and personal safety of aisle containments for IT cabinets.

The aim is to provide physical security for the IT equipment installed in the containment using the criteria "availability" and "safety".

The requirements apply to all operational, working and maintenance procedures.

This document does not apply to ordinary persons, when using installations and equipment.

The requirements described herein are also intended to ensure that it is possible for authorized personnel to enter and remain in the containment (as accessible equipment) and to maintain or upgrade the systems installed in the containment without risk. It should also be possible to evacuate the containment quickly and safely at any time, especially in the event of a fire or any other hazardous situation, whilst reducing the health risk to personnel to a minimum.

IEC TS 62966-3:2021

https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-Aspects relating to computing, data_processing_ts_data_storage, building protection or the data centre itself do not fall within the scope of this document. Only those additional aspects arising from the integration of an aisle containment are considered.

The design and positioning of an aisle containment, which is integrated in the data centre, has influence on the following different aspects of operational safety:

- a) escape and evacuation plans;
- b) escape routes;
- c) emergency exits;
- d) functional aspects of escape doors;
- e) lighting conditions
- f) lighting and signposting of escape routes;
- g) fire protection.

In this document, these operational safety requirements and recommendations are considered.

To achieve the highest effectiveness, all these requirements are considered as much as possible during the design of an aisle containment.

This document applies to normal operations, not to the initial installation of the containment.

IEC TS 62966-3:2021 © IEC 2021 - 7 -

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 60695-11-10, Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods

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

escape route

intended route to a place of safety

3.2

(standards.iteh.ai)

emergency exit exit which is part of an escape route and leads directly to the outside or to a safe area IEC TS 62966-3:2021

https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-

3.3 https://standards.iten.av/catalog/standards/sist/db2/3548-94 escape and evacuation plan 02029a62a89e/iec-ts-62966-3-2021

straightforward and comprehensible document that provides information relating to escape routes and fire fighting equipment

3.4

escape door

every door in an escape route is an escape door

3.5

hold time

time during which a concentration of fire extinguishant shall be maintained at an effective level within the space being protected. The predicted hold time shall be determined by the door fan test or a full discharge test.

3.6

extinguishing gas

electrically non-conducting gaseous extinguishing agent, that, upon evaporation, does not leave a residue

3.7

fire detector

part of a fire alarm system containing at least one sensor that continually or at intervals monitors at least one appropriate physical and/or chemical characteristic (fire characteristic) that occurs in the event of a fire, and that also transmits at least one corresponding signal to the control and indicating equipment

3.8

lead time

time between the alarm signal and the release of the extinguishing medium

3.9

aspirating smoke detector

ASD

high-sensitivity detector, which consists of a central detection unit, that draws air through a system of pipes to detect smoke

- 8 -

Note 1 to entry: The sampling chamber is based on a nephelometer, that detects the presence of smoke particles suspended in air by detecting the light scatterd by them in the chamber. In most cases aspirating smoke detectors require a fan unit to draw in a sample of air from the monitored area through its system of pipes.

3.10

delay device

device that is part of a fire-fighting installation designed to ensure that flooding does not take place until the fire alarm devices have been activated and the specified lead time has expired

3.11

extinguishing gas concentration

value for the concentration of extinguishing gas present in the atmosphere of the area being flooded expressed as % vol

3.12 iTeh STANDARD PREVIEW

defined as a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his/her ability to solve or resolve problems relating to the subject matter, the work, or the project $\frac{1862966-32021}{1862966-32021}$

https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-02029a62a89e/iec-ts-62966-3-2021

3.13

hazard area

containment area plus any adjacent areas that will be flooded with the extinguishing gas

4 Safety requirements of an aisle containment

4.1 General safety requirements

The mechanical design of an aisle containment, consisting of cabinets, cover panels, doors and roof panels shall have adequate design considerations to prevent hazards to people.

The mechanical parts of the aisle containment shall be free of sharp edges, burrs, etc., that could present a safety hazard to personnel involved in their assembly, installation, use or maintenance.

The aisle containment roof panels cannot be walked on, therefore their design and appearance shall make this obvious to personnel working in the data centre.

4.2 Escape routes, emergency exits, escape doors, escape and evacuation plan

4.2.1 Recommended dimensions of escape routes and escape doors/emergency exits

A cold or hot aisle containment that in an emergency represents the only escape route should be dimensioned so that any personnel within it when a particular hazard occurs (e.g. a fire) are able to evacuate it as rapidly as possible. It shall not be permitted to obstruct or lock the escape routes. The recommended minimum width of an escape route is determined by the maximum number of personnel using the escape route in an emergency. This is shown in Table 1.

Table 1 – Minimum width of escape routes and maximum reduction of clearance

Number of persons (in aisle containment)	Recommended minimum width of escape routes	Maximum reduction of clearance (in the area of doors)
	mm	mm
up to 5	875	75
up to 20	1 000	150

The minimum width of the escape route shall not be constricted by fixed structures or equipment or by the opening of doors in the escape direction. A reduction of the minimum width of corridors by a maximum of 75 mm or 150 mm in the area of doors is not significant in this case (see Figure 1).

However, the clearance in the area of doors shall at no point be less than 800 mm.

The clearance in the area of doors shall at no point be less than 850 mm if there are normally up to 20 people in the hazard area. ANDARD PREVIEW

National regulations and safety directives that deviate from these dimensions are to be observed.

<u>IEC TS 62966-3:2021</u> https://standards.iteh.ai/catalog/standards/sist/db273548-94ca-4906-8608-02029a62a89e/iec-ts-62966-3-2021