
**Fire safety engineering —
Performance of structure in fire —**

**Part 2:
Example of an airport terminal**

*Ingénierie de la sécurité incendie — Performance des structures en
situation d'incendie —*

Partie 2: Exemple d'un terminal d'aéroport



This document is a preview generated by EBS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms, definitions and symbols	1
4 Design strategy for fire safety of structures	3
5 Quantification of the performance of structures in fire	3
5.1 Step 1: Scope of the project for fire safety of structures	3
5.1.1 Built environment characteristics	3
5.1.2 Fuel loads	4
5.1.3 Mechanical actions	5
5.2 Step 2: Identify objectives, functional requirements and performance criteria for fire safety of structures	6
5.3 Step 3: Trial design plan for fire safety of structures	7
5.4 Step 4: Design fire scenarios and design fires	9
5.4.1 Design fire scenarios	10
5.4.2 Design fires (thermal actions)	11
5.5 Step 5: Thermal response of the structure	17
5.5.1 Smoke temperature from FDS simulation	17
5.5.2 Calculating steel temperature exposed to smoke	19
5.6 Step 6: Mechanical response of the structure	20
5.6.1 Deformation analysis of the structure	21
5.6.2 Strength analysis of the main span under fire exposure	22
5.7 Step 7: Assessment against the fire safety objectives	26
5.8 Step 8: Documentation of the design for fire safety of structures	27
5.9 Factors and influences to be considered in the quantification process	28
5.9.1 Material properties	28
5.9.2 Effect of continuity and restraint (interaction between elements and materials)	30
5.9.3 Use of test results	30
5.9.4 Fire spread routes	30
6 Guidance on use of engineering methods	31
Annex A (informative) Views and plans of the airport terminal	32
Bibliography	34

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 4, *Fire safety engineering*.

A list of all parts in the ISO 24679 series can be found on the ISO website.

Introduction

This document is an example of the application of ISO 24679-1. It preserves the numbering of subclauses in ISO 24679-1 and so omits numbered subclauses for which there is no text or information for this example. Therefore, the following two points should be kept in mind.

- a) This document is not intended to provide uniform technical provisions for the user, but rather demonstrate how ISO 24679-1 is applied in compliance with the related standards of China.
- b) Fire service intervention has been considered when defining the maximum heat release rate of the design fire in this case because the fire brigade is dedicated and is approximately 1 km away from the airport terminal. It is completely legal in China to consider the fire service intervention, which may not be the case in other countries. Therefore, when taking any reference from this document, attention should be paid to the requirements of the related national standards.

It should be noted that this example does not follow every step described in ISO 24679-1, but rather follows its principles as applicable to the building regulatory in China.

Fire safety engineering — Performance of structure in fire —

Part 2: Example of an airport terminal

1 Scope

This document provides a fire engineering application relative to fire resistance assessment of an airport terminal structure according to the methodology given in ISO 24679-1. It follows step by step the procedure given by ISO 24679-1. Some requirements relative to Chinese building regulation are taken into account concerning the fire scenarios.

The fire safety engineering applied to an airport terminal takes into account the real fire data based in fire tests. It is important to note that the intervention of fire service brigade dedicated to this airport, located approximately 1 km away, has been taken into account in definition of fire scenarios. For the fire modelling, both fire extinguishing system and the smoke extraction are not considered but the fire fighter intervention has been taken into account 10 min after the starting of fire.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24679-1 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>

3.2 Symbols

S_m	design value of combination of action effect
S_{Gk}	nominal value of permanent load effect
S_{Tk}	temperature effect of fire on structure
S_{Qk}	nominal value of floor or roof live load effect
S_{Wk}	nominal value of wind load effect
Ψ_f	frequency coefficient of floor or roof live load
Ψ_q	quasi-permanent coefficient of floor or roof live load