

PD ISO/TR 16730-5:2013



BSI Standards Publication

Fire safety engineering — Assessment, verification and validation of calculation methods

Part 5: Example of an Egress model

bsi.

...making excellence a habit.™

National foreword

This Published Document is the UK implementation of ISO/TR 16730-5:2013.

The UK participation in its preparation was entrusted to Technical Committee FSH/24, Fire safety engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2014. Published by BSI Standards Limited 2014

ISBN 978 0 580 74865 3

ICS 13.220.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 28 February 2014.

Amendments issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

ISO/TR
16730-5

First edition
2013-12-15

Fire safety engineering — Assessment, verification and validation of calculation methods —

Part 5: Example of an Egress model

*Ingénierie de la sécurité incendie — Évaluation, vérification et
validation des méthodes de calcul —*

Partie 5: Exemple d'un modèle d'évacuation



Reference number
ISO/TR 16730-5:2013(E)

© ISO 2013



COPYRIGHT PROTECTED DOCUMENT

© ISO 2013

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
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

	Page
Foreword	iv
Disclaimer	v
1 Scope	1
2 Normative references	1
3 General information on the evacuation model considered	1
4 Methodology used in this part of ISO 16730	2
Annex A (informative) Description of the calculation method	3
Annex B (informative) Complete description of the assessment (verification and validation) of the calculation method	9
Annex C (informative) Worked example (modelling contra flows during building evacuations)	10
Annex D (informative) User's manual	19
Bibliography	43

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 meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 92, *Fire safety*, Subcommittee SC 4, *Fire safety engineering*.

ISO 16730 consists of the following parts, under the general title *Fire safety engineering — Assessment, verification and validation of calculation methods*:

- *Part 3: Example of a CFD model (Technical Report)*
- *Part 5: Example of an Egress model*

The following parts are under preparation:

- *Part 2: Example of a fire zone model (Technical Report)*
- *Part 4: Example of a structural model (Technical Report)*

Disclaimer

Certain commercial entities, equipment, products, or materials are identified in this part of ISO 16730 in order to describe a procedure or concept adequately or to trace the history of the procedures and practices used. Such identification is not intended to imply recommendation, endorsement, or implication that the entities, products, materials, or equipment are necessarily the best available for the purpose. Nor does such identification imply a finding of fault or negligence by the International Standards Organization.

For the particular case of the example application of ISO 16730-1 described in this part of ISO 16730, ISO takes no responsibility for the correctness of the code used or the validity of the verification or the validation statements for this example. By publishing the example, ISO does not endorse the use of the software or the model assumptions described therein, and state that there are other calculation methods available.

Fire safety engineering — Assessment, verification and validation of calculation methods —

Part 5: Example of an Egress model

1 Scope

ISO 16730-1 describes what the contents of a technical documentation and of a user's manual should be for an assessment, if the application of a calculation method as engineering tool to predict real-world scenarios leads to validate results. The purpose of this part of ISO 16730 is to show how ISO 16730-1 is applied to a calculation method, for a specific example. It demonstrates how technical and users' aspects of the method are properly described in order to enable the assessment of the method in view of verification and validation.

The example in this part of ISO 16730 describes the application of procedures given in ISO 16730-1 for an evacuation model (EXIT89).

The main objective of the specific model treated in this part of ISO 16730 is the simulation of the evacuation of a high-rise building with a large occupant population.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16730-1, *Fire safety engineering — Assessment, verification and validation of calculation methods — Part 1: General*

3 General information on the evacuation model considered

The name given to the evacuation model considered in this document is "EXIT89". EXIT89 is a computer model developed to simulate the evacuation of a high-rise building with a large occupant population. Some of the features of the model include

- the presence of disabled occupants throughout a structure,
- random delay times among occupants to simulate the spread of start times that will occur in large groups of people,
- the choice of using shortest paths or directed routes for evacuation so that the user can demonstrate the impact of a trained staff streamlining evacuation vs. the crowded use of familiar paths by an untrained, unassisted population,
- counterflows, either to simulate the impact of the operations of the fire service or to handle merging flows or the presence of obstructions in the travel path,
- a choice of options affecting travel speed, and
- occupant travel up or down stairs.