
Smoke and heat control systems —

**Part 3:
Specifications for powered smoke and
heat exhaust ventilators**

Systèmes de contrôle de fumée et de chaleur —

*Partie 3: Spécifications pour les ventilateurs mécaniques d'évacuation
des fumées et de la chaleur*



This document is a preview generated by EKO



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols and abbreviated terms	1
4 Requirements	2
4.1 Response delay (response time)	2
4.1.1 Opening under wind load within a given time	2
4.1.2 Opening under snow load within a given time	3
4.2 Operational reliability	3
4.2.1 General	3
4.2.2 Application categories	3
4.2.3 Motor rating	3
4.3 Effectiveness of smoke/hot gas extraction	4
4.3.1 General	4
4.3.2 Gas flow and pressure maintenance during smoke and heat extraction test	4
4.4 Resistance to fire	4
4.5 Ability to open under environmental conditions	4
4.5.1 Opening under wind load within a given time	4
4.5.2 Opening under snow load within a given time	4
4.6 Durability of operational reliability	4
5 Testing, assessment and sampling methods	4
5.1 General	4
5.2 Test of response delay (response time) opening under wind / snow load within a given time	5
5.2.1 Wind load	5
5.2.2 Snow load	6
5.3 Operational reliability	6
5.3.1 Application categories	6
5.3.2 Motor rating	6
5.4 Effectiveness of smoke/hot gas extraction: gas flow and pressure maintenance during smoke and heat extraction test	6
5.5 Resistance to fire	6
5.6 Ability to open under environmental conditions: opening under wind or snow load within a given time	6
5.7 Durability of operational reliability	6
6 Marking, labelling and packaging	7
Annex A (normative) Criteria to determine the family of fans in order to select the sizes to be tested	8
Annex B (normative) Criteria to determine a family of motors in order to select the sizes to be tested	29
Annex C (normative) Test method for the determination of fire resistance of powered smoke and heat control ventilators (fans)	38
Annex D (normative) Test methods for electric motors to determine the impact of the changes on the product characteristics	47
Annex E (normative) Test method for assessing the response delay and ability to open under environmental conditions	52
Annex F (informative) Explanatory notes	53
Annex G (informative) General guidance for installation and maintenance	69

Bibliography	70
---------------------------	-----------

This document is a preview generated by EVS

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 of 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 11, *Smoke and heat control systems and components*.

This second edition cancels and replaces the first edition (ISO 21927-3:2006), which has been technically revised. It also incorporates the Amendment ISO 21927-3:2006/Amd. 1:2010.

The main changes compared to the previous edition are as follows:

- amendment of the test apparatus;

A list of all parts in the ISO 21927 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Smoke and heat exhaust ventilation systems create a smoke-free layer above the floor by removing smoke and, thus, improve the conditions for the safe escape and/or rescue of people and animals and the protection of property and permit the fire to be fought while still in its early stages. They also exhaust hot gases released by a fire in the developing stage.

The use of smoke and heat exhaust ventilation systems to create smoke-free areas beneath a buoyant smoke layer has become widespread. Their value in assisting in the evacuation of people from construction works, reducing fire damage and financial loss by preventing smoke logging, facilitating firefighting, reducing roof temperatures and delaying the lateral spread of fire is firmly established. For these benefits to be obtained, it is essential that smoke and heat exhaust ventilation systems be a scheme of safety equipment intended to perform a positive role in a fire emergency.

Smoke and heat control systems —

Part 3: Specifications for powered smoke and heat exhaust ventilators

1 Scope

This document specifies the product characteristics for powered smoke and heat control ventilators (fans) intended to be used as part of a powered smoke and heat control ventilation system in construction works.

It provides test and assessment methods of the characteristics and the conformance criteria of the test assessment results.

This document applies to the following:

- a) fans for smoke and heat control ventilation;
- b) impulse/jet fans for smoke and heat control ventilation.

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.

ISO 281, *Rolling bearings — Dynamic load ratings and rating life*

ISO 834-1, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 5167 (all parts), *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full*

ISO 5801, *Fans — Performance testing using standardized airways*

IEC 60034-1, *Rotating electrical machines — Part 1: Rating and performance*

IEC 60034-2-1, *Rotating electrical machines — Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)*

IEC 60085, *Electrical insulation — Thermal evaluation and designation*

IEC 60584-1, *Thermocouples — Part 1: EMF specifications and tolerances*

EN 1363-1, *Fire resistance tests — Part 1: General Requirements*

EN 13501-4, *Fire classification of construction products and building elements — Part 4: Classification using data from fire resistance tests on components of smoke control systems*

3 Terms, definitions, symbols and abbreviated terms

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