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Smoke and heat control systems — Part 1: Specification for smoke barriers

*Systèmes pour le contrôle des fumées et de la chaleur —
Partie 1: Spécifications des écrans de fumée*



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Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols	4
5 Product requirements	5
5.1 General.....	5
5.2 Barrier types.....	5
5.3 Auxiliary power supply	6
5.4 Smoke (fire effluent) leakage.....	6
5.5 Reliability	7
5.6 Response time	7
6 Performance requirements and classifications.....	7
6.1 General.....	7
6.2 Temperature/time classification.....	7
6.3 Reliability and durability of smoke barriers.....	8
6.4 Response time of active smoke barriers.....	9
6.5 Smoke leakage (containment efficiency)	9
7 Conformity assessment	15
7.1 General.....	15
7.2 Initial type testing	16
7.3 Factory production control (FPC)	16
8 Installation	17
9 Maintenance	18
10 Marking and labelling	18
Annex A (normative) General testing requirements.....	19
Annex B (normative) Reliability and response time tests.....	21
Annex C (normative) Permeability of materials to smoke	23
Annex D (normative) Temperature/time resistance tests	24
Annex E (informative) Deflection of smoke barriers.....	29
Annex F (normative) Special classification categories at 300 °C	36
Bibliography	37

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 21927-1 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*.

ISO 21927 consists of the following parts, under the general title *Smoke and heat control systems*:

- *Part 1: Specification for smoke barriers*
- *Part 2: Specification for natural smoke and heat exhaust ventilators*
- *Part 3: Specification for powered smoke and heat exhaust ventilators*

A Part 4, dealing with specifications for smoke ducts, a Part 5, dealing with specifications for smoke dampers, a Part 6, dealing with specifications for control panels and a part 7, dealing with specifications or guidelines for power supplies are planned.

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Introduction

General

Smoke and heat exhaust ventilation systems (SHEVS) create a smoke-free layer above the floor by removing smoke and heat 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.

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 fire fighting, reducing roof temperatures and retarding the lateral spread of fire is firmly established. To obtain these benefits, it is essential that SHEVS operate fully and reliably whenever called upon to do so during their installed life. A SHEVS is a scheme of safety equipment intended to perform a positive role in a fire emergency.

It is important that the components for smoke and heat exhaust systems be installed as part of a properly designed smoke and heat exhaust system.

SHEVS help to

- keep the escape and access routes free from smoke,
- facilitate fire fighting operations by creating a smoke-free layer,
- delay and/or prevent flashover and thus full development of the fire,
- protect equipment and furnishings and contents,
- reduce thermal effects on structural components during a fire,
- reduce damage caused by thermal decomposition products and hot gases.

For the purpose of this part of ISO 21927, a smoke barrier is deemed to be any form of barrier to the movement of fire effluent.

Smoke barriers control the movement of fire effluent within a construction works in the event of fire. Smoke barriers, when used within a smoke and heat control system, become a critical element of that system. If smoke barriers are not in their fire-operational position, the system does not perform as designed. However, even in the event that other elements of the SHEVS do not function, smoke barriers in the fire operational position provide essential smoke containment and channelling.

This part of ISO 21927 applies to smoke barriers used within smoke and heat control systems, which include other equipment, e. g. natural smoke and heat exhaust ventilators (ISO 21927-2) and powered smoke and heat exhaust ventilators (ISO 21927-3). Smoke barriers perform within specific time/temperature ranges.

Function of smoke barriers

The function of smoke barriers is to control the movement of fire effluent within construction works by forming a barrier. The functions of active or manually deployed smoke barriers are identical to those of static smoke barriers, but they also can be retracted and concealed when not in use.

Typical functions of smoke barriers are to

- create a smoke reservoir by containing and limiting the travel of the smoke;

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- channel smoke in a pre-determined direction;
- prevent or retard smoke entry to another area or void.

Applications of smoke barriers

The primary applications of smoke barriers are listed below. However, as their application becomes more widespread, it is inevitable they will be put to a wider variety of uses. It is important to note that, within the scope of this part of ISO 21927, smoke barriers can contain smoke and gases in excess of 600 °C but are not intended to perform the same function as fire doors and shutters tested in accordance with ISO 3008 or smoke-control doors tested in accordance with ISO 5925-1.

Typical applications for smoke barriers are as

- smoke reservoir boundaries,
- channelling screens,
- void edge screens,
- void sealing screens,
- corridor containment,
- shop unit containment,
- escalator containment,
- stairwell containment,
- elevator well containment.

Types of smoke barrier

Construction-works elements can be used to create static smoke barriers and they can be augmented by smoke barriers covered by this part of ISO 21927.

This part of ISO 21927 applies to the following types of smoke barriers:

- **static smoke barriers** (SSB),
- **active smoke barriers** (ASB).

A wide range of different materials can be used to create smoke barriers. Typical materials used for static smoke barriers include fabric, glass, metal, fire-resisting board, fibreglass and mineral wool or any impermeable material capable of resisting smoke at temperatures required by the design.

Typical examples of active smoke barriers include roller, pleated, folding, hinged or sliding, using the types of material as described for static smoke barriers.

Static and active smoke barriers are categorized by type and performance in Clause 5.

In addition, an ASB product is deemed to include all controlling equipment, etc. This does not include external controls, for example a fire alarm or a sprinkler flow switch.