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Smoke and heat control systems —

Part 3:

Specification 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*



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Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	1
4 Design requirements	4
4.1 Application classes	4
4.2 Motor rating	4
4.3 Motor specification	4
4.4 Hot-gas fan	4
5 General testing procedures	4
6 Performance requirements and classification.....	5
6.1 Temperature/time classification	5
6.2 Flow and pressure	5
6.3 Outer surface temperature and cooling air temperature of insulated ventilators	5
6.4 Wind load	6
6.5 Snow load	6
6.6 Operation at low temperature.....	6
6.7 Reliability	6
6.8 Performance data of ventilators	7
7 Marking	7
8 Evaluation of conformity.....	7
8.1 General.....	7
8.2 Initial type testing	7
8.3 Factory production control.....	8
Annex A (normative) Type approval schedule for a range of ventilators	9
Annex B (normative) Type approval schedule for a product range of motors	16
Annex C (normative) Test method for performance of powered ventilators at high temperature	17
Annex D (normative) Test method for resistance to temperature of electric motors for use in powered ventilators	23
Annex E (normative) Test method for operation under load	27
Annex F (normative) Direct field of application for powered smoke- and heat-exhaust ventilators	28
Bibliography	29

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 21927-3 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*

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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 fire fighting, reducing roof temperatures and retarding the lateral spread of fire is firmly established. For these benefits to be obtained, it is essential that smoke- and heat-exhaust ventilators operate fully and reliably whenever called upon to do so during their installed life. A heat- and smoke-exhaust ventilation system is a scheme of safety equipment intended to perform a positive role in a fire emergency.

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

Smoke- and heat-exhaust ventilation systems 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,
- reduce thermal effects on structural components during a fire,
- reduce damage caused by thermal decomposition products and hot gases.

Depending on the design of the system and the ventilator, powered or natural smoke and heat ventilators can be used in a smoke- and heat-control system. Powered smoke- and heat-exhaust ventilators can be installed in the roof or upper part of walls of buildings or in a ducted system with the ventilator inside or outside the smoke reservoir or in a plant room.

It is important that powered smoke- and heat-exhaust ventilation systems operate based on powered ventilators. The performance of a powered smoke- and heat-exhaust system depends on

- the temperature of the smoke,
- size, number and location of the exhaust openings,
- the wind influence,
- size, geometry and location of the inlet air openings,
- the time of actuation,
- the location and conditions of the system (for example arrangements and dimensions of the building).

Smoke- and heat-exhaust ventilation systems are used in buildings or construction works where the particular (large) dimensions, shape or configuration make smoke control necessary.

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Typical examples are

- single and multi-storey shopping malls,
- single and multi-storey industrial buildings and warehouses,
- atria and complex buildings,
- enclosed car parks,
- stairways,
- tunnels,
- theatres.

Depending on differing circumstances and the situation of the building or construction works that can affect their performance, powered or natural smoke- and heat-exhaust ventilation systems can be used.

It is important that powered and natural exhaust ventilators not be used to extract smoke and hot gases from the same smoke reservoir.

Special conditions apply where gas extinguishing systems (e.g. in accordance with ISO 14520-1) are used.