



SLOVENSKI STANDARD
OSIST prEN 12101-8:2004

01-julij-2004

Sistemi za nadzor dima in toplote – 8. del: Specifikacija za lopute za nadzor dima

Smoke and heat control systems - Part 8: Specification for smoke control dampers

Rauch- und Wärmefreihaltung - Teil 8: Festlegungen für Entrauchungsklappen

Systemes pour le contrôle des fumées et de la chaleur - Partie 8 - Volets de désenfumage

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ICS

English version

Smoke and heat control systems - Part 8: Specification for smoke control dampers

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 191.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Foreword

This document (prEN 12101-8:2004) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

EN 12101 ‘Smoke and heat control systems’ consists of the following:

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,

Part 4: Fire and smoke control installations – Kits,

Part 6: Pressure differential systems – Kits,

Part 7: Smoke ducts,

Part 8: Smoke control dampers,

Part 9: Control panels and emergency control panels,

Part 10: Power supplies.

EN 12101 is included in a series of European Standards planned to cover also:

- Gas extinguishing systems (EN 12094 and EN ISO 14520),
- Sprinkler systems (EN 12259),
- Powder systems (EN 12416),
- Explosion protection systems (EN 26184),
- Foam systems (EN 13565),
- Hose systems (EN 671),
- Water spray systems.

Introduction

This standard contains the basic performance and requirements for smoke control dampers, that are to be used in conjunction with pressure differential systems, smoke and heat control systems and inerting gas fire suppression systems.

Where other standards or other appropriate design guides allow the use of smoke control dampers or leakage rated fire dampers to limit the quantity of polluted air or combustion products released, reference to these standards or design guides should be made.

Particular reference is required to prEN 1366-10, which defines the furnace testing associated with these products.

In addition to the prevention of transmission of smoke and combustion products from a fire zone, smoke control dampers are utilised to contain the spillage of otherwise harmful and toxic gases from the affected area, and for the control of pressurising and excess air relief within pressurisation systems.

Smoke and heat exhaust ventilation systems (SHEVS) 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 SHEVS 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 system components 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.

Components for smoke and heat exhaust systems should be installed as part of a properly designed smoke and heat control 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,
- reduce thermal effects on structural components during a fire,
- reduce damage caused by thermal decomposition products and hot gases.

Powered SHEVS should operate based on powered system components. The performance of the powered smoke and heat exhaust system depends on:

- the temperature of the smoke,
- the size, number and location of the exhaust openings,
- the wind influence,
- the 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).

SHEVS are used in buildings or construction works where the particular (large) dimensions, shape or configuration make smoke control necessary. 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.

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Depending on differing circumstances and the situation of the building or construction works that can affect their performance, powered or natural smoke and heat control systems or pressure differential systems may be used.

It is specified in Parts 4 and 6 of this European Standard that powered and natural components shall not be used to extract smoke and hot gases from the same smoke reservoir.

Special conditions apply where gas extinguishing systems (e.g. according to EN 12094 or EN ISO 14520) are used (see Parts 4 and 6 of this standard).

A number of different system designs are commonly in use to fulfil this function and separate into three distinct groups. These are:

- i) natural dedicated smoke and/or heat control systems,
- ii) powered dedicated smoke and/or heat control systems,
- iii) powered smoke and/or heat control systems that are used during the day to day running of the building or construction works and otherwise provide an environmental air provision function.

Each can then be separated further into smoke and/or heat control systems that serve a single fire compartment and those that, by the provision of smoke dampers, serve a number of fire compartments.

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The areas for which products supplied to this standard are considered applicable include for example:

- a) commercial premises,
- b) shopping and retail centres,
- c) hospitals,
- d) multi-residential buildings.

Smoke control dampers are intended for use in the following types of systems, including:

- a) pressurisation,
- b) pressure relief,
- c) extraction systems,
- d) ductwork systems,
- e) inerting fire suppression systems.

It is realised that all the above systems do not address smoke directly, but similar properties are required of such smoke control dampers to limit leakage in a fire and smoke control situation.

It has been assumed in the preparation of this standard that the execution of its provisions are entrusted to appropriately qualified and experienced people.

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1 Scope

This European Standard applies to smoke control dampers operating as part of a smoke and heat control system placed on the market. This standard specifies requirements and gives reference to the test methods defined for smoke control dampers, which are intended to be installed in smoke and heat control systems in buildings.

To avoid duplication, reference is made to a variety of other standards. To this end this standard is to be read in conjunction with prEN 1366-10, EN 1366-2, EN 1363-1 and EN 1363-2 for details of the furnace testing.

Smoke control dampers covered by this standard can be installed into or onto smoke control system ducts or into or onto the surface of a wall, floor or ceiling/roof. This standard has not considered in detail the detrimental and/or corrosive effects that may be caused by process chemicals present in the atmosphere which are drawn through the system intentionally or inadvertently.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

EN 1363-2, *Fire resistance tests — Part 2: Alternative and additional procedures*

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EN 1366-2, *Fire resistance tests for service installations — Part 2: Fire dampers*

prEN 1366-8, *Fire resistance tests for service installations — Part 8: Smoke extraction ducts*

prEN 1366-9, *Fire resistance tests for service installations — Part 9: Smoke compartment smoke extraction ducts*

prEN 1366-10, *Fire resistance tests for service installations — Part 10: Smoke control dampers*

EN 1751, *Ventilation for buildings – Air terminal devices – Aerodynamic testing of dampers and valves*

EN 12101-2, *Smoke and heat control systems — Part 3: Specification for natural smoke and heat exhaust ventilators*

EN 12101-3, *Smoke and heat control systems — Part 4: Specification for powered smoke and heat exhaust ventilators*

prEN 12101-4, *Smoke and heat control systems — Part 4: Fire and smoke installations – Kits*

prEN 12101-6, *Smoke and heat control systems — Part 6: Pressure differential systems – Kits*

prEN 12101-7, *Smoke and heat control systems — Part 7: Smoke ducts*

prEN 12101-8, *Smoke and heat control systems — Part 8: Smoke control dampers*

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prEN 12101-9, *Smoke and heat control systems — Part 9: Control panels and emergency control panels*

prEN 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*

EN 60068-2-52, *Environmental testing — Part 2: Tests Test Kb: Salt mist cyclic (sodium chloride solution)*

EN ISO 5167-1, *Measurement of fluid flow by means of orifice plates, nozzles and venturi tubes inserted in circular cross section conduits running full*

EN ISO 9001:2000, *Quality management systems — Requirements*

EN ISO 13943, *Fire safety - Vocabulary*

ISO 5221, *Air distribution and air diffusion – Rules to methods of measuring airflow rate in an air handling duct*

3 Terms and definitions

Where not covered by EN ISO 13943, the following definitions apply:

3.1**air inlet**

device connected to outside air to allow the inlet of air from outside the construction work

3.2**attended control room**

a room with people, who have the duty to control the smoke exhaust system permanently (24 hours per day, seven days per week), monitor the incoming signals from the smoke control systems and put the smoke control system into operation in case of smoke alarm. This ensures that the smoke control system is running and items such as dampers are in position within the system response time

3.3**back-up power supply**

a power supply to operate the system when the normal power supply has failed

3.4**commissioning**

the act of ensuring that all components and the system are installed and operating in accordance with this standard

3.5**elevated temperature**

temperatures in excess of normal ambient air, below those necessary for fire resistance testing, to which smoke and heat exhaust ducts for single compartments are tested

3.6**fire compartment**

an enclosed space, comprising one or more separate spaces, bounded by elements of construction having a specified fire resistance and intended to prevent the spread of fire (in either direction) for a given period of time

NOTE Fire compartment often has regulatory connotations. The term should not be confused with "room of origin" or "fire cell".

3.7**interface control unit**

a device which controls the operation of the actuator located at the damper or within the same fire zone as the damper

3.8**modulating actuator**

a damper control mechanism which can control the damper to be in a position or number of positions between fully open and fully closed

3.9**multi compartment fire resisting smoke control dampers**

smoke control dampers for use in multi compartment areas, which may be associated with smoke control duct tested to prEN 1366-8 and/or may be installed in a fire compartment structure

3.10**multi compartment fire resisting smoke control system ducts**

fire resisting ducts for use in multi compartment application and that have been tested and met the requirements of prEN 1366-8

3.11**natural smoke and heat control system**

a smoke and heat ventilation system which uses natural ventilation. Natural ventilation is caused by buoyancy forces due to differences in density of the gases because of temperature differences

3.12**penetration seal**

the product used between the smoke control system duct/damper and the fire compartment structure to maintain the fire resistance, when tested and having met the requirements of prEN 1366-8, at the position where a smoke control system duct passes through the element, or a damper is mounted in the element

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3.13**powered smoke and heat exhaust system**

a smoke and heat ventilation system, which utilises a number of hot gas fans that are suitable for handling hot gases for a limited period of time, which causes the positive displacement of gases

3.14**pressure differential system**

a system of fans, ducts, vents and other features provided for the purposes of creating a lower pressure in the fire zone than in the protected space – see prEN 12101-6

3.15**remote signalling**

a device located away from the damper which will indicate the damper position, open or closed

3.16**safety position**

position (open or closed) into which specific projects may require certain dampers to move, depending upon the fire location within the building. Smoke control dampers do not have a designated safety position, unlike fire dampers which are closed in their safety position

3.17**single compartment smoke control dampers**

smoke control dampers for use in single compartment areas, which may be associated with smoke control duct tested to prEN 1366-9, and/or may be installed in an external wall, floor or roof

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3.18

single compartment smoke control system ducts

ducts for use within single fire compartment application and that have been tested and met the requirements of prEN 1366-9

3.19

smoke and heat exhaust ventilation system (SHEVS)

system consisting of components jointly selected to exhaust smoke and heat. The components form a system which complies with the requirements of prEN 12101-4 in order to establish a buoyant layer of warm gases above cooler cleaner air

3.20

smoke and heat exhaust ventilator (SHEV)

device specially designed to move smoke and hot gases out of a construction work under conditions of fire

3.21

smoke barrier

a barrier to restrict the spread of smoke and hot gases from a fire, forming part of the boundary of a smoke reservoir or used as a channelling screen, or used as a void edge boundary

3.22

smoke control damper for systems with automatic activation

a smoke control damper that is applicable to the systems defined in 3.26

3.23

smoke control damper for systems with manual intervention

a smoke control damper that is applicable to the systems defined in 3.27 and 3.28

3.24

smoke control system damper

a device automatically or manually activated, which may be open or closed in its operational position, to control the flow of smoke and hot gases into, from or within a duct

3.25

smoke control system duct

a duct used in a system to control the movement and/or containment of smoke and heat

3.26

smoke control system with automatic activation

a smoke control system (smoke and heat exhaust ventilation type or pressure differential type), that operates automatically on receipt of a smoke or fire alarm without any manual action/intervention. A system with an attended control room can also be accepted as an automatic system. Once initiated the system will not allow the damper position to be changed

3.27

smoke control system with automatic activation and with manual override

a smoke control system (smoke and heat exhaust ventilation type or pressure differential type), that can be put into operation as 3.26 on receipt of a smoke or fire alarm, but once initiated the system will allow the damper position to be changed by external input or fireman's override

3.28

smoke control system with manual initiation

a smoke control system (smoke and heat exhaust ventilation type or pressurization type), that has to be put into operation, on detection of smoke or fire, by human intervention (e.g. by pressing a button, or pulling a handle), leading to a sequence of automatic actions in the operation of the smoke control system. Once initiated, the system may allow the damper position to be changed by external input or fireman's override