



SLOVENSKI STANDARD

SIST-TP CEN/TR 12101-4:2009

01-april-2009

Nadomešča:

SIST-TP CEN/TR 12101-4:2007

Sistemi za nadzor dima in toplote - 4. del: Vgrajeni sistemi »SHEVS« za odvod dima in toplote s prezračevanjem

Smoke and heat control systems - Part 4: Installed SHEVS systems for smoke and heat ventilation

Rauch- und Wärmefreihaltung - Teil 4: Anlagen zur Rauch- und Wärmefreihaltung im eingebauten Zustand

Systèmes pour le contrôle des fumées et de la chaleur - Partie 4 : Systèmes SEFCV installés pour l'évacuation de fumées et de chaleur par ventilation

Ta slovenski standard je istoveten z: CEN/TR 12101-4:2009

ICS:

13.220.20	Požarna zaščita	Fire protection
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning

SIST-TP CEN/TR 12101-4:2009 en,fr

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST-TP CEN/TR 12101-4:2009

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffdf666118/sist-tp-cen-tr-12101-4-2009>

ICS 13.220.99

English Version

Smoke and heat control systems - Part 4: Installed SHEVS systems for smoke and heat ventilation

Systèmes pour le contrôle des fumées et de la chaleur -
Partie 4 : Systèmes SEFCV installés pour l'évacuation de
fumées et de chaleur par ventilation

Rauch- und Wärmefreihaltung - Teil 4: Anlagen zur Rauch-
und Wärmefreihaltung im eingebauten Zustand

This Technical Report was approved by CEN on 9 September 2008. It has been drawn up by the Technical Committee CEN/TC 191.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST-TP CEN/TR 12101-4:2009](https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffdf666118/sist-tp-cen-tr-12101-4-2009)

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffdf666118/sist-tp-cen-tr-12101-4-2009>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Page

Foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Description of the principles of operation for smoke and heat control systems	11
4.1 Smoke and heat control systems which rely on the principle of the creation of a smoke layer.....	11
4.1.1 Smoke layers exhausted by natural vents	11
4.1.2 Layers of smoke exhausted by powered vents	11
4.2 Smoke free areas by differential pressure systems.....	11
4.3 Air renewal of the room with fresh air by dilution of smoke	11
5 Description of the combination of products for construction of SHEVS	12
5.1 General.....	12
5.2 General requirements.....	12
5.3 Requirements for smoke layer systems with natural ventilators	13
5.4 Requirements for smoke layer systems with powered ventilators	13
5.4.1 Requirements for power supplies for powered smoke and heat exhaust ventilation systems.....	13
5.4.2 Requirements for powered smoke and heat exhaust systems	14
5.5 Requirements for smoke free area systems by differential pressure	14
5.6 Requirements for smoke control by air renewal of the room with fresh air by dilution of smoke.....	14
6 Air Inlet.....	14
6.1 General requirements.....	14
6.2 Fire behaviour requirements	15
6.2.1 Performance parameters under fire conditions	15
6.2.2 Reaction to fire.....	15
6.2.3 Resistance to fire	15
6.3 Geometric areas for natural air inlets	15
7 Tubes, cables and accessories	16
7.1 General requirements.....	16
7.2 Fire behaviour requirements	16
7.2.1 Performance parameters under fire conditions	16
7.2.2 Reaction to fire of cables and tubes	17
7.2.3 Resistance to fire of cables and tubes	17
7.3.2 Requirements for electrical supplies.....	17
7.3.3 Isolators and switches on power lines	17
7.3.4 Enclosures for electrical components.....	17
7.3.5 Extra low voltage operated components	17
7.3.6 Sizing of electrical cables and related equipment	17
7.4 Requirements for pneumatic supplies	18
7.4.1 Requirements for pneumatic supplies using compressors	18
7.4.2 Requirements for pneumatic lines.....	18
7.4.3 Mechanical cables	18
8 Requirements for installation.....	18
8.1 General requirements for installation.....	18

8.2	Requirements for installation of a SHEVS	18
8.3	Requirements for installation of power supplies	19
8.4	Requirements for installation of controls	19
8.5	Access to components	19
8.6	Requirements for installation of powered SHEVS	20
8.7	Requirements for installation of air inlets	20
8.8	General requirements for installation of smoke barriers	20
8.8.1	Fastenings and adjacent surfaces	20
8.8.2	Maximum gaps	20
8.8.3	Response time	21
8.9	Functional test	21
9	Handing-over and commissioning	21
9.1	Requirements for commissioning of the system	21
9.2	Requirements for acceptance report of the system	22
9.3	Technical information report	22
9.4	Specific requirements for powered smoke ventilation systems	22
10	Routine checking	23
11	Maintenance	23
11.1	General	23
11.2	Scope of maintenance	23
11.3	Functional test	23
11.4	Maintenance operations	23
11.5	Availability	23
Annex A	(normative) Pneumatic system leakage testing	25
Annex B	(normative) Air flow measurements	26
B.1	Air flow requirements in powered ventilation systems	26
B.2	Measurement of air flow for ducted systems	26
B.2.1	Selection of measurement method	26
B.2.2	Selection of cross section	26
B.2.3	Measurement of air flow	26
Annex C	(informative) Drawings of example systems	27
Annex D	(informative) Detailed engineering plan	38
D.1	Detailed engineering plan for smoke flow and pressure control within the premises	38
D.1.1	General	38
D.1.2	Requirements for SHEVS intended to form a smoke layer	38
D.1.3	Requirements for natural smoke and heat exhaust ventilation systems	38
D.1.4	Requirements for powered smoke exhaust systems	39
D.1.5	Functioning and requirements for differential pressure systems	39
D.1.6	Requirements for differential pressure systems	39
D.2	Requirements for assembly, commissioning, inspection, testing and maintenance of natural smoke exhaust systems	40
Annex E	(informative) Requirements specific to powered smoke exhaust systems (powered fans, dampers, ducts etc) – Mounting and testing	41
E.1	Requirements for mounting and commissioning	41
E.1.1	General	41
E.1.2	Mounting of powered smoke and heat exhaust systems	41
E.1.3	Mounting of the operating devices	43
E.1.4	Mounting of control devices and circuits	43
E.1.5	Mounting of components of powered smoke exhaust systems	45
E.2	Requirements for acceptance and testing	46
E.2.1	General	46
E.2.2	Acceptance and testing of powered smoke and heat exhaust system	47
E.3	Requirements for routine checking	49
E.4	Requirements for maintenance	50
E.4.1	General	50

CEN/TR 12101-4:2009 (E)

E.4.2	Scope of maintenance	50
E.4.3	Functional test	50
E.4.4	Maintenance operations	50
E.4.5	Availability	50
	Bibliography	51

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TP CEN/TR 12101-4:2009](https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffd1f666118/sist-tp-cen-tr-12101-4-2009)

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffd1f666118/sist-tp-cen-tr-12101-4-2009>

Foreword

This document (CEN/TR 12101-4:2009) has been prepared by Technical Committee CEN/TC 191 "Fixed firefighting systems", the secretariat of which is held by BSI.

This European document (Technical Report) has the general title "*Smoke and heat control systems*" and consists of the following separate parts:

- *Part 1: Specifications 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: Installed SHEVS systems for smoke and heat ventilation*
- *Part 5: Guidelines on functional recommendations and calculation methods for smoke and heat exhaust ventilation systems (published as CEN/TR 12101-5)*
- *Part 6: Specification for pressure differential systems - Kits*
- *Part 7: Smoke control ducts*
- *Part 8: Smoke control dampers*
- *Part 9: Control panels*
- *Part 10: Power supplies*

iteh STANDARD PREVIEW
(standards.iteh.ai)

[SIST-TP CEN/TR 12101-4:2009](#)

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffd666118/sist-tp-cen-tr-12101-4-2009>

CEN/TR 12101-4:2009 (E)

Introduction

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. It contributes to the protection of property and permits 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.

Components for smoke and heat exhaust ventilation systems should be installed as part of a properly designed smoke and heat exhaust ventilation 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 damages caused by thermal decomposition products and hot gases.

iTech STANDARD PREVIEW
(standards.iteh.ai)
SIST-TP CEN/TR 12101-4:2009
<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-3f8866d18181/sist-tp-cen-tr-12101-4-2009>

A powered smoke exhaust system can also be used for the realisation of the following purposes:

- creation of a negative pressure differential facing the direction of escape for the prevention of the spread of smoke;
- local dilution of smoke within occupied zones.

Natural smoke and heat exhaust ventilators are devices fitted into the roof and/or upper walls of a construction works to allow smoke and fire gases to be exhausted from the construction works when driven by thermal buoyancy inherent in those gases. It is essential that they are able to open, and/or to remain open in the event of a fire and to fulfil their function even when climatic and weather conditions are unfavourable.

Depending on the building geometry and siting of the building with regard to neighbouring buildings, and design criteria, natural smoke and heat exhaust ventilators can be used instead of powered smoke and heat ventilators.

This Technical Report sets down the testing requirements for the system when installed to ensure that it operates in a safe and reliable manner. Commissioning, periodic maintenance and servicing requirements are stated as well as the users' responsibilities for ensuring that the system is always for use in case of fire.

Components of the SHEVS should be designed or chosen to meet the specific performance requirement of the system.

Without proper installation of all of its components, the SHEVS could not operate correctly nor meet the performance targets for which it has been designed.

Commissioning is necessary to check the SHEVS operates in accordance with its design. The system has to be permanently available for operation. This can only be achieved when checked and maintained.

1 Scope

This Technical Report applies to SHEVS when installed in a building. This Technical Report specifies the ability of the system to meet the required performances of the SHEVS as specified by the design of the system. This Technical Report is to help to translate the detailed engineering plan into an installed system, but it does not state how the design is made. This Technical Report also covers requirements for components and compatibility between components to ensure that the requirements on the installed system will be met. This Technical report includes requirements for the assembly, installation, commissioning, function testing, maintenance, periodic servicing and routine testing of SHEVS.

2 Normative references

The following referenced documents are indispensable for the application 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.

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

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

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

EN 12101-1, *Smoke and heat control systems — Part 1: Specification for smoke barriers*

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

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

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffd8666118/sist-tp-cen-tr-12101-4-2009>

EN 12101-6, *Smoke and heat control systems — Part 6: Specification for pressure differential systems — Kits*

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

EN 12101-10, *Smoke and heat control systems — Part 10: Power supplies*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using test data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements — Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 13501-3, *Fire classification of construction products and building elements — Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers*

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*

EN 60529, *Degrees of protection provided by enclosures (IP code)* (IEC 60529:1989)

EN ISO 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements* (ISO 5167-1:2003)

ISO 2408, *Steel wire ropes for general purposes — Minimum requirements*

CEN/TR 12101-4:2009 (E)

ISO 5168, *Measurement of fluid flow — Procedures for the evaluation of uncertainties*

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

ISO 5801, *Industrial fans — Performance testing using standardized airways*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply (see also Annex C).

- 3.1 access level**
level of restriction for qualified persons of the access to specific equipment of a component
- 3.2 air inlet**
opening, either permanent or created by operation of a special device, connected to outside air to allow the inlet of air from outside the construction works
- 3.3 automatic activation**
initiation of operation of the smoke and heat venting installation without manual action
- 3.4 automatic and manual activation**
initiation of operation of the smoke and heat venting installation, which is both automatic and manual
- 3.5 commissioning**
act of ensuring that all components and the system are installed and operating in accordance with this Technical Report and in accordance with the design specifications.
- 3.6 component**
component of a SHEVS is a complete product which is part of the SHEVS: ventilator, air inlet, electric cable, silencer, etc.
- 3.7 control panel**
device containing control and/or release devices, manual and/or automatic, used to operate the system
- 3.8 detailed engineering plan (DEP)**
document produced by the SHEVS designer giving technical specifications of the system, from which, by means of a detailed engineering plan, the specifications for the system may be derived. It includes details of controls, mode tables of how the system is to operate with particular design fires and the siting of components (see Annex D)
- 3.9 fire compartment**
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".

3.10**fire position, fire open position (where appropriate)**

position of a component to be reached and maintained while the SHEVS is venting smoke and heat

3.11**geometric area (A_v)**

area of the opening through a ventilator, measured in the plane defined by the surface of the construction works, where it contacts the structure of the ventilator. No reduction will be made for controls, louvres or other obstructions (see Annex C, Figure C.1)

3.12**initiation device**

device which activates the operating mechanism of the component (e.g. of a smoke control damper or ventilator) on receipt of information from a fire or smoke detection system or thermal device

3.13**input/output characteristics**

characteristics of a component of a SHEVS at the interface with other components of the SHEVS, such as voltage, current, frequency, impedance, power, pressure, speed, diameter or flow rate

3.14**manually initiated smoke and heat exhaust ventilation system**

smoke and heat exhaust ventilation system which is initiated by human actions after the outbreak of fire (e.g. by pressing a button or pulling a handle) leading to a sequence of automatic actions in the operation of the SHEVS

iTeh STANDARD PREVIEW

3.15**natural ventilation**

ventilation caused by buoyancy forces due to differences in density of the gases because of temperature differences (see Annex C, Figure C.2)

(standards.iteh.ai)

[SIST-TP CEN/TR 12101-4:2009](https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffd8666118/sist-tp-cen-tr-12101-4-2009)

3.16**operating time**

maximum period between the signal to operate being received by the SHEVS and the achievement of the fire position by the smoke zone of the SHEVS with the most unfavourable route

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-c3ffd8666118/sist-tp-cen-tr-12101-4-2009>

3.17**powered ventilation**

ventilation caused by the positive displacement of gases through a ventilator

NOTE

Fans are usually used.

3.18**response time**

period between the signal to operate being received by the component (e.g. a control panel, ventilator or smoke control damper) and the achievement of the fire position by the component

3.19**secondary power supply**

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

3.20**smoke and heat control system**

arrangement of components installed in a construction works to limit the effects of smoke and heat from a fire

3.21**smoke and heat exhaust system**

system which exhausts smoke and heat from a fire in a construction works or part of a construction works

CEN/TR 12101-4:2009 (E)**3.22****smoke and heat exhaust ventilation system (SHEVS)**

set of components jointly selected to exhaust smoke and heat in order to establish a buoyant layer of warm gases above cooler, cleaner air

3.23**smoke and heat exhaust ventilator (SHEV)**

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

3.24**smoke control damper**

device which may be opened or closed to control the flow of smoke and hot gases. It may have the following positions:

- Fire position: open (to exhaust smoke from fire compartment);
closed (to avoid spreading of smoke in other zones);
- Standby position: closed.

3.25**smoke and heat exhaust duct**

products used to channel the gases to and from the smoke and heat exhaust ventilator

3.26**smoke layer**

layer of smoke which stabilizes underneath the roof due to the affect of temperature gradient

3.27**smoke reservoir**

volume within a construction works limited or bordered by the ceiling and smoke barriers or structural elements so as to retain a thermally buoyant smoke layer in the event of a fire (see Figure C2, Annex C)

3.28**smoke zone**

room or a division of a room of a construction works for the extraction of smoke and hot gases. Each zone is served by a SHEVS, (or sub system of a SHEVS), which is initiated by a signal from a single device or group of initiation devices associated with the zone. A zone contains at least one smoke reservoir

3.29**stand by position**

state of a component ready for operation

3.30**thermal device**

temperature sensitive device which responds to initiate a subsequent action

iTech STANDARD PREVIEW
(standards.iteh.ai)

SIST-TP CEN/TR 12101-4:2009
c3fd8666118/sist-tp-cen-tr-12101-4-2009

4 Description of the principles of operation for smoke and heat control systems

There are three principles for smoke control in construction works.

4.1 Smoke and heat control systems which rely on the principle of the creation of a smoke layer

4.1.1 Smoke layers exhausted by natural vents

The needed area of vents is measured by the free area for each zone. For efficiency of the SHEVS, the maximum area of a smoke zone should not exceed 1 600 m².

Air inlets have to be provided to allow for the replacement of smoke by fresh air:

— with opening in roofs

The efficiency of the vents is measured by their aerodynamic free area: A_a m².

There should be at least one ventilator for 200 m² of floor area.

— with opening in side-wall

The efficiency of the vents is measured by their aerodynamic free area: A_a m².

Wall mounted ventilators have to be installed on at least two different sides of the building and be monitored by wind direction control system.

4.1.2 Layers of smoke exhausted by powered vents

<https://standards.iteh.ai/catalog/standards/sist/cd243900-cd79-488a-a54f-311660160160-2014-01-01>

Smoke and heat exhaust systems in buildings provide the possibility to remove the design amount of thermally buoyant smoky gases at high level, creating in the compartment or smoke zone a smoke layer floating above a cold and relatively smoke-free layer formed from cold air entering through inlets.

The efficiency of the powered vents is measured by the capacity of the vents measured in m³/s.

The number of exhaust openings needed is determined as a function of the location and its geometry.

Supply of air has to be provided to allow for the replacement of smoke by fresh air. The supply air has to be provided at a speed in accordance with the DEP and to match the needs of the largest exhaust from any potentially affected smoke zone.

4.2 Smoke free areas by differential pressure systems

This system is specified in EN 12101-6, therefore, it is only given for information and not covered by this Technical Report.

4.3 Air renewal of the room with fresh air by dilution of smoke

The efficiency of the system is measured by its capacity in m³/s.

NOTE This type of principle has to be considered to fight smoke and heat.

Dilution systems are brought to the place in case of a fire and do not create a free layer, therefore they are outside the scope of this Technical Report which deals with systems permanently in place and creates a layer relatively free of smoke.

5 Description of the combination of products for construction of SHEVS

5.1 General

The basic input to define the SHEVS, which will be used to determine the combination of products for construction of a SHEV, is the detailed engineering plan. The purpose and content of the detailed engineering plan are described in Annex D.

This is valid for any principle of smoke ventilation.

The detailed engineering plan (DEP) should be approved by the appropriate authority.

5.2 General requirements

The three principles of smoke control described in 4.1 to 4.3 should not be mixed within one room.

In the case of the layer system, natural extraction should not be mixed with powered extraction in one smoke zone.

Before installation, there should be a detailed engineering plan prepared in accordance with the design requirements and regulations valid in the place of use of the SHEVS.

The performance, the position of the components, the height of the smoke barriers and of the air inlets in regard to the level of the smoke layer are important factors, they should be in accordance with the DEP.

A failure of a component should only affect the operation of that component.

Any use of the smoke and heat ventilation system for a purpose other than the ventilation of heat and smoke under fire conditions should not prevent the smoke and heat exhaust ventilation system from performing its design function when required. The ventilation of heat and smoke under fire conditions should have priority on any other use of the system.

It should only be possible to reset a component from the fire position to the standby position by a manual operation.

Where one or more devices form part of the control system, components should only be controlled by signals coming from that control system.

All components covered by a Part of EN 12101 should be in accordance with the relevant Part. Smoke barriers, natural or powered smoke and heat ventilators, dampers, ducts, control panels and power supplies should be in accordance with EN 12101-1 and EN 12101-2, EN 12101-3 and EN 12101 Parts 7, 8, 9 and 10 respectively. The classes should be selected from these standards in accordance with the DEP.

The SHEVS should have a maximum operating time of 120 s.

NOTE 1 For automatic smoke barriers deeper than 8 m, it may take more than 120 s to reach the fully deployed position. They should have at least dropped by 8 m within the 120 s.

NOTE 2 It is recommended that automatic smoke barriers are controlled by smoke detection.

If a component is fitted with more than one initiation device (e.g. smoke detection, local push button, thermal device), a defective device should not prevent the operation to the fire position of the component by any other initiation device.

The sizing of components, including power supplies and lines, should be calculated such as to meet the needs of the detailed engineering plan and the operating characteristics of the components.

The compatibility of all components of a SHEVS which interact should be checked, especially input and output characteristics. The effect of lines on input/output characteristics should be taken into account.

Power supplies should be rated to meet power needs as defined in the DEP to operate the components of the SHEVS driven from the power supply. This should include both peak energy supply rate and capacity.

For manual initiation, the power to move the component into the fire position should not be provided by the operator physically.

A secondary supply should be provided if the external power moves the component into the fire position. No secondary supply is required if the purpose of the supply is only to reset the system, to hold the system in the standby position or to recharge an internal power supply.

NOTE 3 A secondary supply may be advisable in any case to avoid nuisance operation of SHEVS components in case of power failure.

5.3 Requirements for smoke layer systems with natural ventilators

Air inlets for natural ventilators should only be natural. The aerodynamic air inlet area should be at least 50% more than the aerodynamic free area of the largest smoke zone of the room.

Air inlets should be installed outside the smoke layer, near the floor.

When installed, reduction of geometric area due to side walls and/or ceiling have to be taken into account.

The installer should check that no obstacle can affect the operation and the performance of the ventilator into the fire position (curtains, blinds, etc). Instructions should be given not to install obstacles. Provisions should be taken not to install obstacles (protection, marking, etc see Clause 8)

The same applies to natural air inlets with wall mounted ventilators.

Systems with wall mounted ventilators should have the ventilators mounted on at least 2 walls and be equipped with wind direction sensor. In that case, the air inlets should be also on 2 walls.

When the wind speed is more than 1 m/s, only the units on the wall opposite to the incoming wind should be opened at a time, which implies control of wind direction (see Annex C).

Wall mounted ventilators should not be equipped with thermo devices.

NOTE Smoke detection should be considered.

5.4 Requirements for smoke layer systems with powered ventilators

5.4.1 Requirements for power supplies for powered smoke and heat exhaust ventilation systems

Each power supply should provide the power requirements of the highest power rated group of ventilators able to operate together at design duty under ambient conditions.

The power supply to the powered ventilators and to the other components should be available for the time of fire resistance of the powered ventilators.

Electrical power can be provided by either:

- two independent electrical public utility lines, or
- one electrical public utility line and backup power supply (generating plant).