SMOKE CONTROL ASSOCIATION

Guidance on Smoke and Heat Exhaust Ventilators.

Applications and the use of Actuators and Ventilators.

EN 12101-2: 2003

Dec 2021

Acknowledgements

Contributions to this revision are gratefully acknowledged from members of the Smoke Control Association. A list of members of the SCA can be viewed at:

www.smokecontrol.org.uk/members

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Contents

1. Foreword.

From the Chairman of the Smoke Control Association; David Mowatt.

Compliance for smoke vents (NSHEVs) has been contentious since its inception via BS 7346-1 in 1990 and its replacement (hEN12101-2) in 2003.

Evidence of compliance / proof of independent testing and certification is often not readily available for specifiers and building owners, making it difficult to determine if this life safety product is actually fit for purpose.

Whilst clarification was provided in 2013 by mandating the 2011 Construction Products Regulation within the UK, we still see non-compliant smoke vent applications installed, creating delays at handover stage or worst, consequences should the product fail subsequently during an incident.

The tragedy of Grenfell Tower in June 2017 has resulted in several forthcoming improvement initiatives being proposed and implemented including the Building Safety Bill, the Fire Safety Act, the Building Safety Regulator scheme, and an update to Approved Document B. Even so, a lack of accurate product information remains a key contributor to non-compliant life safety products being placed onto the market.

A new Code for Construction Product Information (CCPI) scheme is now published, which will address misinformed documentation that could lead to non-compliance. The foreword to this by Dame Judith Hackitt reads:

'Everybody deserves to feel secure in the knowledge that the buildings in which they live, work and play have been built safely and to the right standards. Provision of clear and unambiguous information on the products and systems that have been used is an essential part of providing the Golden Thread which is key to rebuilding confidence and trust in the sector. Those who are ready and willing to provide that assurance deserve to be accredited to differentiate them from competitors who are reluctant to change.'

We at the SCA are putting in place an initiative to ensure that all our members' commercial collateral (websites, data sheets, quotations, technical documents etc) relative to EN12101-2 and window actuators is consistent and accurate, added to the membership criteria of installing compliant harmonised products, third party audited by the IFCC SDI 19 competency scheme.

This document provides background information on NSHEVs usage, methodology and importantly, compliance/certification requirements.

I would like to thank the working group for their hard work and dedication in producing this document. The Smoke Control Association in conjunction with other experts from the fire industry are committed to raising standards of fire protection aligned to the Golden Thread initiative.

David Mowatt

Chairman of the Smoke Control Association

2. Introduction.

Natural smoke and heat exhaust ventilation systems are systems of safety equipment intended to perform a positive role in a fire emergency.

There are several parts to the EN12101 product family of solutions to meet this requirement.

Part 1: *Specification for smoke barriers — Requirements and test methods*

Part 2: *Specification for natural smoke and heat exhaust ventilators*

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

Part 4: *Natural smoke and heat exhaust ventilation systems — Installation and test methods*

Part 5: *Design and calculation for smoke and exhaust ventilation systems (published as CR 12101-5)*

Part 6: *Design and calculation methods and installation procedure for pressure differential smoke control systems*

Part 7*: Specification for smoke ducts*

Part 8: *Specification for smoke dampers*

Part 9: *Specification for control panels and emergency control panels*

Part 10: *Specification for power supplies*

Ventilators utilised to exhaust smoke from a building or draw in replacement air are classified as 'Natural Smoke and Heat Exhaust Ventilators (NSHEVs).

The applicable part of EN12101 for an NSHEV is part 2, the 2003 version being harmonised in the EU therefore utilised within the UK construction market. Whilst the UK has now left the EU harmonised European Norms (hEN's) remain a requirement and products must be suitably certified in accordance with the market requirements upon which they are being placed.

Compliance to hEN's within the Construction industry, especially within the field of life safety smoke ventilation is improving however, lack of awareness and at times ignorance still contributes to non-compliance.

An NSHEV is a single product that generally comprises of two components, being the ventilator and actuator that automates it. To comply both components must be tested together as a single product at an accredited test facility to all declared annexes of the standard. It must also be manufactured/completed under a third party audited factory production control (FPC) process. No components are interchangeable unless they have passed the testing and certification process or have been assessed and approved by the Approved or Notified Body.

Individually tested components that are 'designed to, manufactured to, tested to' or 'in accordance with' EN12101-2 are not compliant and are misleading, resulting in a non-complaint solution within the building creating delays at handover or worse should there be an incident and the product fails to operate.

The fitting of a window actuator to the vent is therefore non-compliant unless the two products have been tested together, completed under a third party audited process and correctly certified to EN12101-2.

The SCA has recognised this inconsistency in the clarity and accuracy of technical and commercial documentation within the marketplace and has actioned an initiative to address it to reduce the risk of non-compliant installations.

The purpose of this document is to provide an overview of NSHEVs in general, give insight into their application and performance requirements and importantly the certification route and process to compliance. Whilst specific to NSHEVs, this document supports white papers and technical documents published by the SCA which are available within the resources section of the SCA website.

3. Terms and Definitions.

1.1 **Aa** – Aerodynamic free area, expressed in square metres.
Product of the geometric area multiplied by the coefficient of discharge.

1.2 **Av** – Geometric area of the ventilator, expressed in square metres,
Area of the opening through a ventilator utilised to calculate its aerodynamic free area.

1.3 **AOV** – Automatic Opening Vent.

1.4 **ADB** – Approved Document B.

1.5 **Actuator** – A device to automate a smoke vent, AOV, NSHEV.

1.6 **Aspect Ratio** – Ratio of Length/Width of an NSHEV.

1.7 **AVCP** - Assessment and Verification of Constancy of Performance.

1.8 **CCP** – Certificate of Constancy of Performance.

1.9 **CCPI** - Code for Construction Product Information.

1.10 **CFD** – Computational Fluid Dynamics (utilised for non-prescriptive system design)

1.11 **CPR** – The Construction Products Regulation, Regulation (EU) No 305/2011).

1.12 **Cv – Coefficient of discharge, dimensionless.**
The coefficient of discharge factor applied to Av calculate the aerodynamic free area of an NSHEV.

1.13 **Cv0** - Coefficient of discharge without side wind influence, dimensionless.

1.14 **Cvw -** Coefficient of discharge with side wind influence, dimensionless.

1.15 **DoP** – Declaration of Performance.

1.16 **Escape Stair** – A stair dedicated for occupants to escape from the building.

1.17 **Fire Engineered Solution** – A non-prescriptive 'bespoke' design.

1.18 **Fire-Fighting Stair** – A stair identified for fire-fighting personnel to access the affected floor.

1.19 **FPC** – Factory Production Control. An audited manufacturing process to manufacture an NSHEV.

1.20 **GFA** – Declared geometric free area of an NSHEV measured in square metres.

1.21 **hEN** – Harmonised European Norm (standard).

1.22 **m^2** – Metres squared, unit of free area measurement of an NSHEV.

1.23 **Means of Escape** – The provision of a safe exit route from a building for its occupants.

1.24 **Negative Discharge** – Smoke blowing back into the building via the NSHEV.

1.25 **NSHEV** – Natural Smoke and Heat Exhaust Ventilator.

1.26 **Prescriptive** – An established, agreed, and documented process to be followed.

1.27 **SCA** – The Smoke Control Association.

1.28 **SDI 19** – Third party audited Installer Certification Scheme for Smoke Ventilation Specialists.

4. NSHEV Applications

4.1. Residential High-Rise Smoke Ventilation.

NSHEVs naturally exhaust smoke from common escape routes (corridors and escape stairs) to aid means of escape and provide smoke free access for fire-fighting personnel. They are also utilised to bring in replacement air to stairs and common corridors to balance pressure, especially as part of a mechanical extract smoke ventilation system.

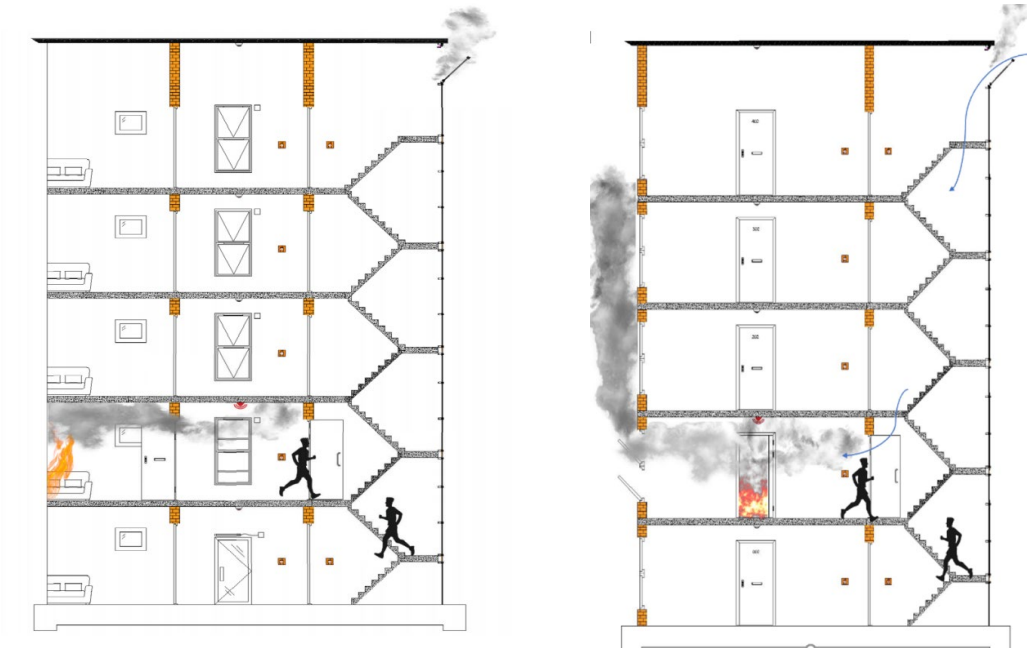
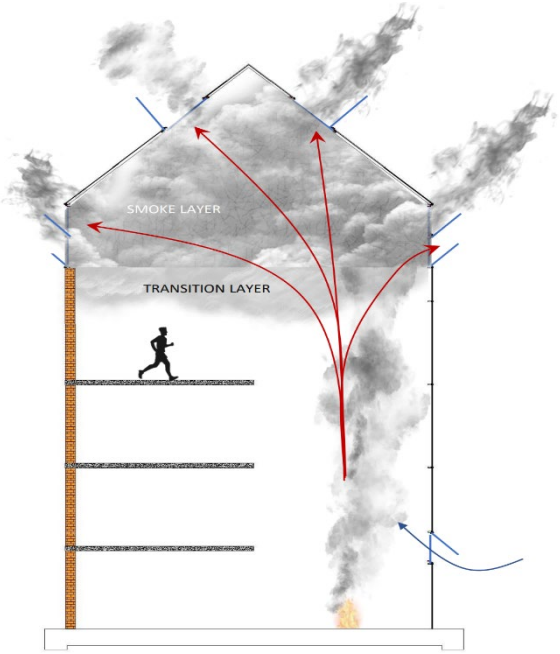


Fig 1. Typical Residential Natural NSHEV Smoke Extract Sections.

4.2. Non-Residential Smoke Ventilation.

Non-residential life safety smoke ventilation systems utilise NSHEVs predominantly in atria applications for natural smoke extract and replacement air intake to aid means of escape (fig 2). They also provide replacement air intake as part of a mechanical atria smoke extract system.

Smoke extract shafts are seen in both residential and non-residential applications where NSHEVs are utilised at the head of the shaft to exhaust to atmosphere in addition to the head of the escape and fire-fighting stairs.



The orientation and hinge arrangement of an NSHEV must meet the air intake or smoke extract path of the ventilation system (direction of flow) and must consider obstructions and applications that could result in ‘negative discharge’.

NSHEVs are also utilised within fire-fighting lobbies in non-residential buildings that have an external wall up to 30m high (section 8.4) and warehouse/distribution type buildings (section 8.5).

Further guidance on the location and installation of NSHEVs can be found in BS 7346-8:2013 Annex D, BS 9999:2017 Annex C and the Approved Documents.

Fig 2. Typical Non-Residential Natural Smoke Extract Atria Section.

5. Types of NSHEVs.

NSHEVs generally fall into three distinct categories:

- Vertical intake and extract ventilators.
- Inclined intake and extract ventilators.
- Horizontal intake and extract ventilators.

5.1. Vertical NSHEVs.

Vertical NSHEVs can take the form of open in or out operation, in top, bottom or side hung arrangement. They can also be horizontally or vertically pivoted in a framed vent or louvre form.

In general, the orientation of the NSHEV must suit its purpose be it for exhausting smoke to external atmosphere or bringing in replacement air as part of a natural or mechanical extract system.

Vertical NSHEVs are utilised within common escape corridors and stairs in high rise residential applications and as intake and exhaust ventilation within non-residential atria applications.

They are also utilised within fire-fighting lobbies, escape, and firefighting stairs at high level.

5.2. Inclined NSHEVs.

Inclined NSHEVs are generally utilised within atria applications for smoke extract and replacement air solutions.

They can be glazed into an inclined architectural façade system or housed within the roofing structure, plus can be utilised as a stand-alone NSHEV at the head of an escape or fire-fighting stair if the roof is pitched.

5.3. Horizontal NSHEVs.

Horizontal NSHEVs commonly take the form of rooflights and louvres to provide natural smoke extract or replacement air intake within atria smoke ventilation systems.

They are also utilised within escape and fire-fighting stairs and at the head of smoke shafts.

6. Industry Regulations and Guidance Documents.

NSHEVs are required to meet the following regulations and design guides that state their requirement:

- The Building Regulations 2010 (last update 2016)
- The Construction Products Regulation 2011 (Regulation (EU) No 305/2011) and the UK (Statutory Instrument 2019. 465 and 2020 1359) implemented post Brexit.
- Approved Document B Fire Safety Volumes 1 & 2 : 2019 (last update 2020).
- BS 9991:2015 Fire safety in the design, management and use of residential buildings. Code of practice.
- BS 9999:2017 Fire safety in the design, management and use of buildings. Code of practice.
- BS 7346-8:2013 Components for smoke control systems. Code of practice for planning, design, installation, commissioning, and maintenance.
- Building Safety Bill 2021 (due Autumn 2021).
- Code for Construction Product Information 2021.
- Fire Safety Act 2021.
- SCA Guidance on Smoke Control to Common Escape Routes in Apartment Buildings (Revision 3.1; July 2020).
- Machinery Directive.

Where regulations and design standards contain ambiguity or a lack of clarity, SCA guides are informative documents to clarify best practice.

7. Free Area Methodology.

Historically free area was measured via two methods, geometric (physical) free area and aerodynamic (effective) free area.

7.1. Geometric Free Area.

A physical static calculation of the flow area produced when opening the NSHEV, often utilising the air or smoke path only. The stated free area cannot exceed the maximum geometric area (internal throat area or clear opening) created, factoring in framework and obstructions.

Geometric free area is not a declarable performance characteristic of a compliant NSHEV therefore aerodynamic free area should be utilised wherever possible to ensure performance is aligned to test performance and the NSHEV is certified to the standard.

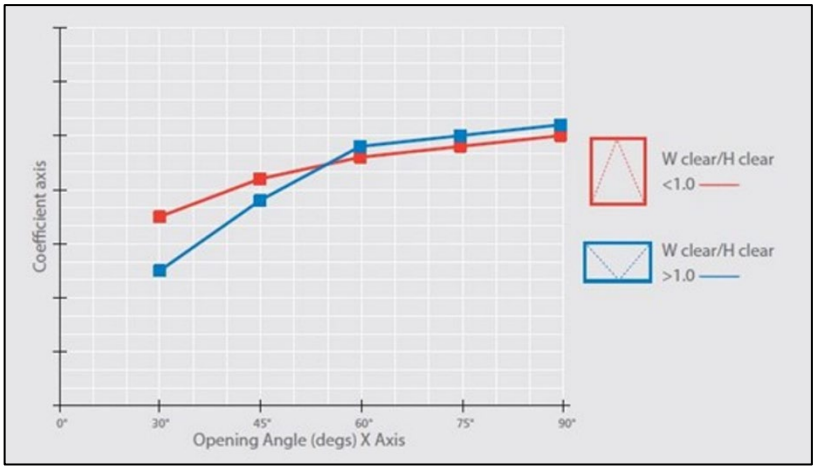
7.2. Aerodynamic Free Area (Aa).

The effectiveness of the NSHEV to exhaust smoke factoring in the hinge arrangement, width/height ratio and opening angle created, which directly influences its performance.

This prescriptive calculation method is an essential characteristic of the EN12101-2 standard (test Annex B) with the performance stated on the Declaration of Performance (DoP).

It is also used to calculate the size and quantity of NSHEVs required to meet the prescriptive or fire engineered design.

Aerodynamic free area is therefore a prescriptive, tested performance figure that aligns to the product standard and negates any ambiguity in the interpretation of a geometric calculation methodology.



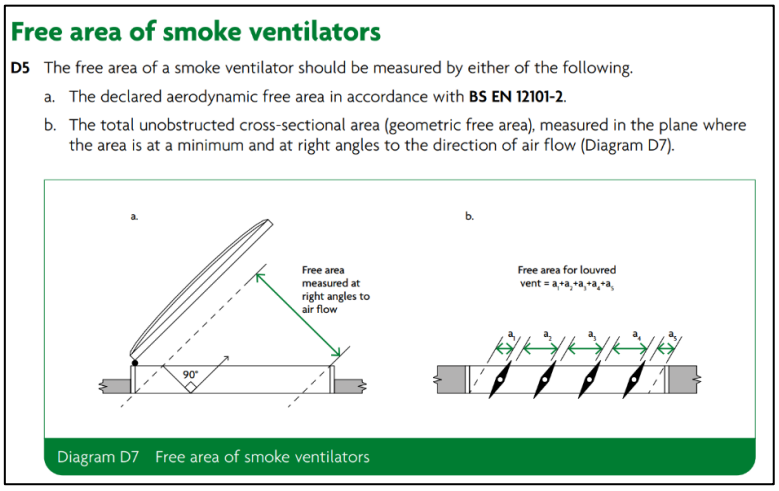
- The ‘aspect ratio’ of the NSHEV (width/height), hinge arrangement and opening angle achieved directly effects the efficiency of its performance.
- Greater opening angles result in a higher ‘coefficient of discharge’ (Cv) which is the factor applied to the geometric area (Av) of the NSHEV to confirm its aerodynamic free area performance.

Figure 3. Typical aerodynamic free area graph example for indicative purposes only.

8. Free Area Applications.

8.1. High-rise Residential Corridor Means of Escape.

Two options are described in ADB however aerodynamic free area is acknowledged as the primary calculation method.



- **Option a**. Aerodynamic free area for an end of corridor NSHEV option A) is **0.9 m²**, clarified within the SCA Guidance on Smoke Control in Apartment Buildings rev 3.1

- **Option b**. Geometric free area requirement for an end of corridor NSHEV is **1.5 m²** measured as diagram D7

Figure 4. Diagram D7 from Approved Document B Vol 1.

Diagram D7 does not illustrate how a vertical hinged NSHEV free area is calculated for this application creating confusion at design, procurement, and approval stages. The SCA guide and best practice (below) therefore recommends option a. which is prescriptive, performance tested and aligns to the product standard.

2 ADB specifies minimum free area, which is not a method of measurement defined in EN12101-2 and can lead to a totally unrealistic claim of ventilation performance in some product categories.

To remove any ambiguity, it is suggested that the area used is taken as the aerodynamic free area, Aa. As this is a defined and tested characteristic under the EN, it must be declared on the CE mark label for the product, which should also make it simpler for the ventilator performance to be identified under inspection.

Figure 5. SCA Guidance on Smoke Control in Apartment Buildings rev 3.1

Due to the width of a common corridor within a high-rise residential building it is common to see a double stack bottom hung, side hung, or full height glazed louvre application to achieve the required free area.

Double Stacked Bottom Hung

Side Hung

Glazed Louvre

Figure 6. Typical end of corridor and Fire Fighting Lobby NSHEV (AOV) Applications.

A larger single bottom hung open out solution is possible however fall from height, vent weight restriction and exposure to wind must be considered to provide a safe solution.

It is common for residential projects with multiple blocks to utilise a corridor access door as the AOV NSHEV whilst also providing access to the roof level. This application should be certified to EN12101-2 as its primary usage is means of escape life safety smoke ventilation.

Consideration must be given to security and access/egress requirements.

8.2. Escape and Fire Fighting Stairs.

The extract free area requirement for this application as recommended by option a. is **0.7 m² aerodynamic (Aa).** The geometric requirement for option b. is **1.0 m²** however this figure cannot be declared on the product certification document (DoP) unlike option a.

All three vertical NSHEV types can be simillar to end of corridor AOV's, plus a single bottom hung open out option is common due to the reduced free area compared to an end of corridor NSHEV.

Where access is required onto the roof from the stair for maintenance purposes it is common to utilise a door as the AOV however prevention of unathorised personnel must be considered, in addition to compliance to EN12101-2.

Horizontal solutions such as louvres, 140 degree rooflights and 90 degree twin flap rooflights are also utilised. Considerations such as light into the stair and access onto the roof will influence the product selection but all must comply to EN12101-2 and factor performance under wind conditions.

Inclined NSHEVs are utilised if the top of stair has a pitched roof.

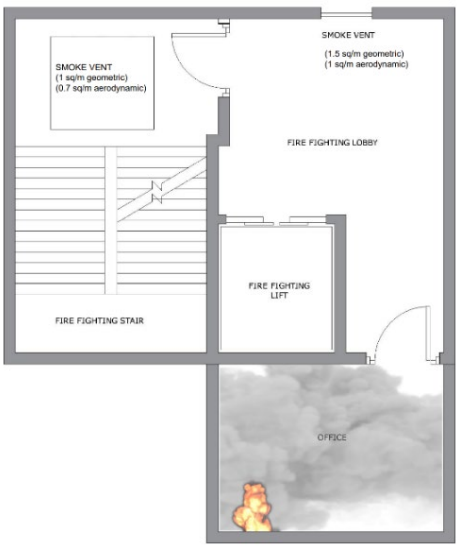
8.3. Top of Smoke Shafts.

Top of shaft NSHEVs are predominanly horizontal application solutions however light into the shaft is not required and rarely access onto the roof.

The free area requirement for a naturally ventilated top of smoke shaft AOV NSHEV in a high-rise residential application is 1 m² geometric, it must open 140 degrees if a single hinged horizontal NSHEV is utilised.

Performance under wind load and direction is essential, especially as the NSHEV is not visible unlike the top of stair solution. It is good practice for the controls system to provide an indication that the top of shaft vent is open via the Manual Control Point (MCP) or a repeater panel to prevent the NSHEV being left open and exposed to potential rain ingress and wind. The NSHEV can be automatically closed upon system reset if there is no trap hazard risk.

8.4. Fire-Fighting Lobbies.



Fire fighting lobbies adjacent to the fire-fighting stair are utilised to provide a smoke free tenable route to the affected floor. An NSHEV provides smoke exhaust to atmoshere when there is an external wall.

The requirement per floor is 1.0 m² aerodynamic free area (BS 9999) to the lobby and 0.7 m² aerodynamic free area to the head of the stair that opens in unison with the lobby NSHEV.

Figure 7. Typical Fire-Fighting Lobby Floor Plan.

8.5. Non-Residential Smoke Ventilation Applications.

Smoke ventilation systems within atria applications (see 4.2 fig 2) utilise NSHEVs to provide a natural intake and extract flow to provide a tenable means of escape route for occupants.

Replacement air can be brought in at low level to serve a single extract atrium area or the atrium may be split into compartmental zones that provide intake and extract areas separated by smoke curtains or smoke barriers.

The required aerodynamic area is governed by the design size of the fire and atria space below as defined in BS 9999, or the fire engineered CFD design model produced. Fire engineering software may incorporate an assumed coefficient (efficiency factor) of the NSHEV (commonly 0.6 or 60%), which is at the high end of NSHEV performance, therefore it is important to factor the actual performance of the NSHEV being utilised against the requirements.

Vertical and inclined NSHEVs are common solutions and are often automated for environmental ventilation in addition to natural smoke extract.

NSHEVs are also incorporated into warehousing and distribution type buildings for extract smoke ventilation solutions, predominantly utilising louvred and hinged AOV's installed both horizontally and inclined.

Requirements are generally a fire engineered solution utilising BS 7346 parts 4 & 5 guidance for steady state and time dependant fire types.

Aerodynamic performance is the common area calculation for this application.

Figure 8. Typical Distribution/Warehouse NSHEV application.

It is important to factor external conditions such as wind direction and snow load when designing NSHEV installations in roof applications.

9. Product Legislation and Certification.

9.1. Legislation.

Compliance to harmonised European Norms (hEN's) remains mandated by law via the Construction Products Regulations both in the EU (Regulation (EU) No 305/2011) and the UK (Statutory Instrument 2019. 465 and 2020 1359) that will result in 'designated standards' being required.

The harmonised applicable version of the EN12101-2 standard is 2003 which is identical in all markets, only the certification marking method has changed. There is a 2017 version of the standard which is not harmonised therefore not applicable for product certification. From January 2023 products in the UK must be certified via a UKCA mark, in the EU at the date of this document a CE mark and in Northern Ireland a CE mark and UKNI mark.

EN12101-2:2003 is a listed designated standard therefore applicable within the UK.

Proof of Compliance is the issuing of a signed Declaration of Performance (DoP) by the company, person or organisation that places the NSHEV onto the market. The DoP identifies the accredited body that is notified to the standard and confirms the performance criteria of the NSHEV via the essential characteristic performance declarations.

9.2. Product Compliance Requirements.

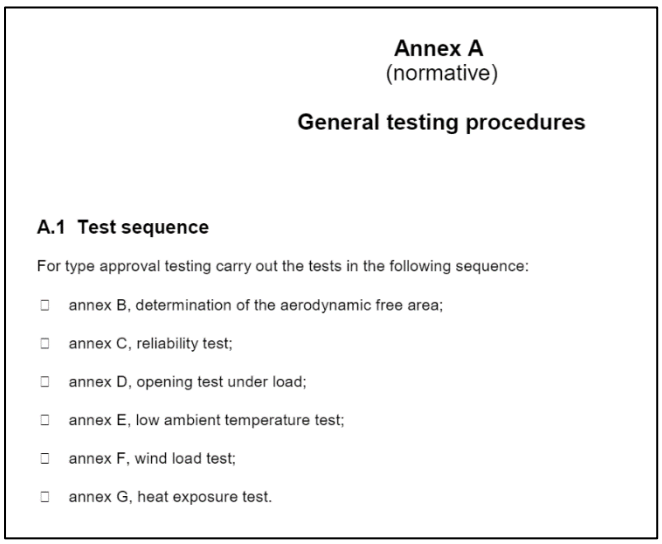
A certified NSHEV generally comprises of two constituent components namely the ventilator itself and the actuator that operates it.

To comply to the standard all components must be tested together as a whole to the annexes of the standard at a suitably certified test facility.

The various test annexes are performed to ensure the NSHEV is fit for purpose as a life safety product with the performance (essential characteristics) declared on the DoP.

9.2.1. Test Annexes.

The NSHEV is tested to the annexes of the standard with a Certificate of Constancy of Performance (CCP) produced by the body certified (or notified) to the standard. This document forms part of the process to produce the DoP therefore is not proof of compliance, as it does not guarantee the correct manufacturing/completion process has been followed.



Annex A
(normative)

General testing procedures

A.1 Test sequence

For type approval testing carry out the tests in the following sequence:

- annex B, determination of the aerodynamic free area;
- annex C, reliability test;
- annex D, opening test under load;
- annex E, low ambient temperature test;
- annex F, wind load test;
- annex G, heat exposure test.

Figure 9. EN12101-2 : 2003 Test Annexes.

9.2.2. Declarable Essential Characteristics (EC's).

The declarable EC's for the product are stated within table ZA.1 of the Construction Products Regulations.

Construction Products: Natural smoke and heat exhaust ventilators

Intended use(s): Natural smoke and heat exhaust ventilators for smoke and heat control in construction works

Table ZA.1 — Relevant clauses

Essential Characteristic	Requirement Clause in this European Standard	Mandated levels and/or classes	Notes:
nominal activation conditions/ sensitivity	4.1 4.2		
response delay (response time)	7.1.2		s
operational reliability	7.1 7.4		
effectiveness of smoke/hot gas extraction	6		
aerodynamic free area	6.		m^2
performance parameters under fire conditions	7.5		
fire resistance – mechanical stability	7.5		
ability to open under environmental conditions	7.2 7.3		
reaction to fire	7.5.2.1		

Figure 10. Table ZA.1 Declarable Essential Characteristics (CPR).

9.2.3. Manufacturing/Completion Process.

NSHEVs are classified 'Assessment and Verification of Constancy of Performance' (AVCP) system level 1, meaning they must be manufactured and completed under an audited system 1 Factory Production Control (FPC) process.

The product can be completed in a controlled factory environment or on site therefore the audited, documented process must ensure the completed product on site complies with the initial type tested sample. There can be no modification in any way as this will invalidate compliance.

Both NSHEV manufacturer and actuator installer (if installed on site) must therefore possess the correct FPC credentials with an audit trail in place to prove the NSHEV is certifiable.

It is the responsibility of the company, organisation or person placing the product onto the market to do so as they are taking ultimate responsibility via the submission of the DoP.

ZA.2 Procedure(s) for the attestation of conformity of products

Natural smoke and heat exhaust ventilators for the intended use listed shall follow the system of attestation of conformity shown in Table ZA.2.

Table ZA.2 — Attestation of conformity system

Product	Intended use	Level(s) or class(es)	Attestation of conformity system
Natural smoke and heat exhaust ventilators	Fire safety	-	1
System 1: See Construction Products Directive Annex III.2.(i), without audit testing of samples.			

The product certification body will certify the initial type testing of all characteristics given in Table ZA.1, in accordance with the provisions of 8.2 and for the initial inspection of the factory and of the factory production control, and for the continuous surveillance, assessment and approval of the factory production control, all characteristics shall be of interest to the approved body, see 8.3.

The manufacturer shall operate a factory production control system in accordance with the provisions of 8.3.

Figure 11. Table ZA.2 Manufacturing FPC Certification (CPR).

9.2.4. Declaration of Performance (DoP).

Proof of compliance to meet the mandated requirements of the CPR is provided by the submission of the DoP by the company, organisation or person that places the NSHEV onto the market.

The DoP will state the standard that the product applies to and it's intended use, it will bear the name of whom is placing the NSHEV onto the market and will state the unique reference number of the certification body that produced the CCP.

All performance criteria are stated via declaring the relevant essential characteristic classifications that align to the test annexes.

It is now commonplace for the NSHEV and other EN12101 family DoP's to be requested as part of the overall smoke ventilation system sign off process in accordance with code of practice BS 7346-8.

Most smoke ventilation specialists who complete the overall system are now third party audited under the SDI 19 competency scheme. They will request all DoP's for overall sign off and raise a 'non-compliance' if they are not received.

1	**Unique Identification Code of Product Type:** Description of the SHEV
2	**Manufacturing Date Code and Serial Number:** As appears on product.
3	**Intended Use:** Natural smoke and heat exhaust ventilator for smoke and heat control in construction works.
4	**Name of Manufacturer:**
5	**System of Assessment and verification of constancy of performance:** System 1
6	**Harmonised Standard covered by Construction Products Regulation:** EN 12101-2:2003 Smoke and Heat Control Systems –Specification for Natural Smoke and Heat Exhaust Ventilators.
8	**Notified Body:** Name & Address of NB Notified body number Performed the initial inspection of the manufacturing plant and of factory production control (FPC), and the continuous surveillance, assessment and evaluation of FPC, and issued the certificate of constancy of performance. Certificate ref
9	**Essential Characteristics:**

Declared performance		EN12101-2:2003
Nominal Activation Conditions	Voltage	4.1/ 4.2
Response Delay	<60s	7.1.2
Operational Reliability	Re (cycles)	7.1/ 7.4 (Annex C/F)
Effectiveness of Smoke/ hot gas extraction	Av area	6 (Annex B)
Aerodynamic Free Area	Av area	6 (Annex B)
Performance Under Snow Load	SL in N/sqm	Annexes D&E
Performance Under Wind Load	WL in N/sq/m	Annex F
Performance Criteria under Fire Conditions	B temp	7.5 (Annex G)
Fire Resistance –Mechanical stability	B temp	7.5 (Annex G)
Ability to open under Environmental Conditions	T temp	7.2/ 7.3 (Annex D/E)
Reaction to Fire	A1	7.5.2.1

10	**The performance of the product identified in sections 1 and 2 above is in conformity with the declared performance in section 9 above.** The declaration of performance is issued under the sole responsibility of the manufacturer identified in section 4 above.		
	Date:		Signed:
	Place of Issue:		Title

Figure 12. Typical NSHEV DoP layout.

10. CDM Criteria.

Like any product application, whilst not specifically stated within the product standard it is important to consider potential CDM risk for a NSHEV.

Risk	**Mitigation**
Fall from height	Internal or external guarding
Trap hazard	Local reset (via MCP), guarding or trap sensors
Product damage via wind exposure or actuator removal	Security fixings, safety stays, wind baffles

11. Summary.

Regardless of the certification requirements by region, smoke ventilators utilised for life safety means of escape should be certified to EN12101-2 : 2003, with the proof of compliance being the Declaration of Performance (DoP).

The completed and certified NSHEV on site should comply with the initial type tested sample with an audit trail in place to prove the correct manufacturing and completion processes has been followed.

The DoP should declare all essential characteristics for the NSHEV aligned to its application and regulatory requirements.

An actuator fitted to a window is therefore non-compliant unless the two products have been tested together to the annexes of EN12101-2, completed under a third party audited FPC process, placed onto the market via a DoP and certified aligned to the market upon which the NSHEV is being placed.

To meet this requirement all SCA members have formally agreed to only install certified smoke ventilation products in addition to attaining SDI-19 third party audited smoke ventilation specialist installer qualifications.

The SCA has also agreed a procedure to address misleading or inaccurate documentation and information regarding NSHEV compliance and will act or forward the information to Trading Standards for further action should the offending company fail to address the issue. Contact the SCA at Smoke Control Association