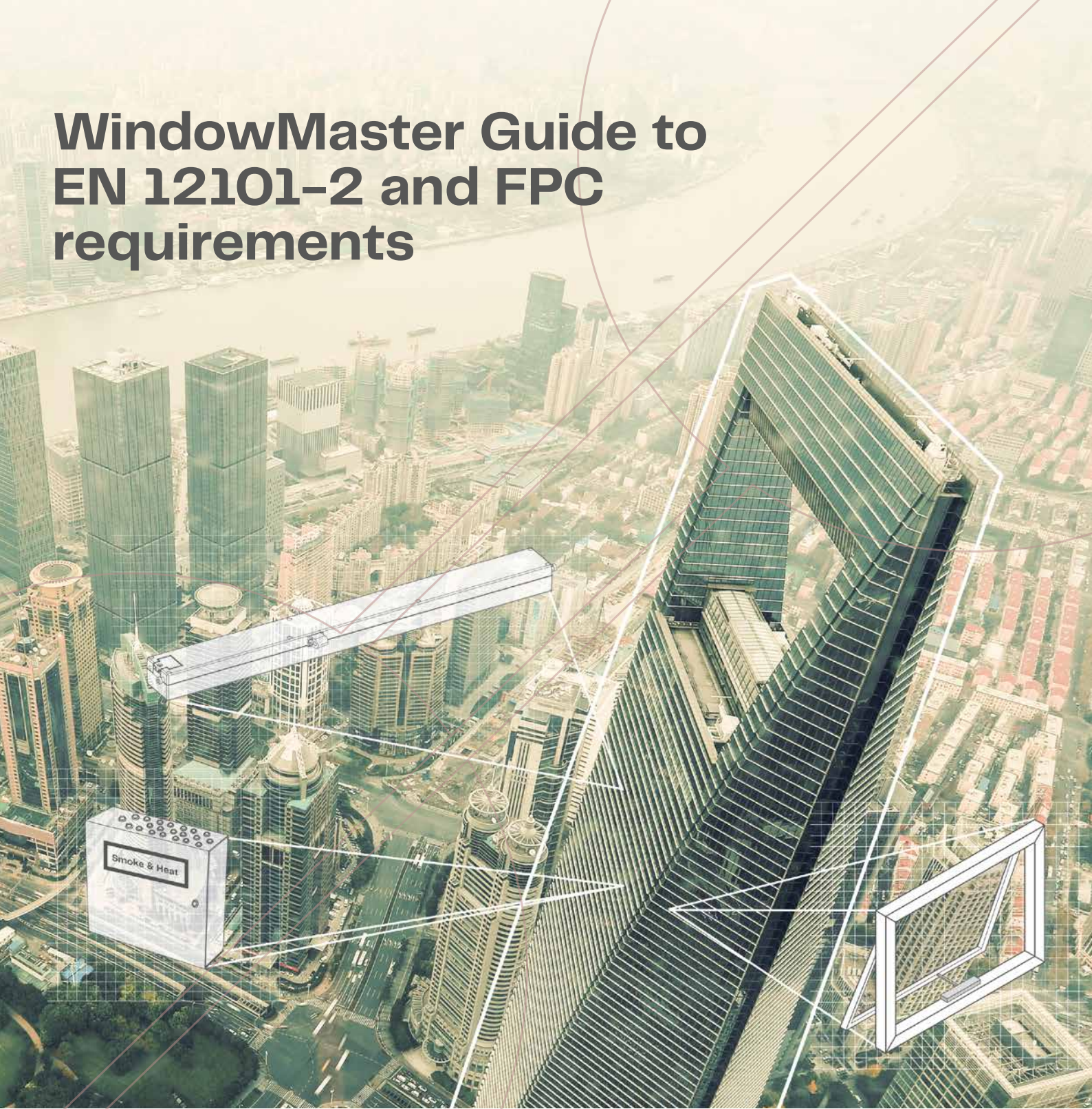


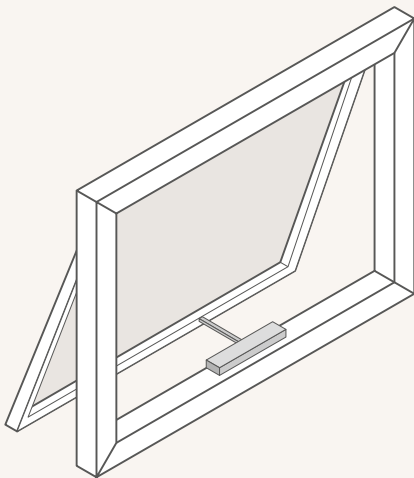
WindowMaster Guide to EN 12101-2 and FPC requirements



Are you a Window / facade fabricator?

If you are a fabricator who is receiving an increasing number of requests for 'Certified', 'CE Marked' or 'EN 12101 Smoke Vents', or if you are interested in extending your product offering to include CE marked smoke vents to fulfil an increasing demand for these products – this short brochure is for you.

In this guide we will explore



- 1 What is EN 12101-2 for Smoke Vents
- 2 What is needed to build and CE mark an EN12101-2 Smoke Vent
- 3 How to achieve an approved Factory Product Control (FPC) process that allows you to build, CE mark and sell smoke vents
- 4 Summary of the testing and technical info required to support EN12101-2 vents
- 5 Next steps
- 6 Appendix: Technical Terms and Responsibilities
- 7 Appendix: What does a CE Mark and DOP look like
- 8 Let's stay in touch



What is EN 12101-2 for Smoke Vents



Photo: Factory Tøyen

Smoke ventilation systems are used in buildings for a number of reasons, one of those is to clear smoke from core areas like stairwells and corridors to help people escape safely from buildings in the event of a fire. In order to try and ensure the system operates as intended every time, it is important that the equipment used has proven levels of reliability under demanding conditions and is built to sufficient quality standards and CE marked accordingly.

EN 12101 is a 'European Norm' suite of standards covering Smoke Ventilation equipment including dampers, fans and control equipment. EN 12101-2 specifically covers 'Natural Smoke and Heat Exhaust Ventilators', and this includes automated windows used for Smoke Ventilation, often known as AOVs (Automated Opening Vents).

EN 12101-2 is a European Standard which specifies requirements and gives test methods for natural smoke and heat exhaust ventilators which are intended to be installed as a component of a natural smoke and heat exhaust system.

In order to be effective, AOV systems must undergo a series of rigorous tests which adhere to EN 12101-2.

To comply with Construction Products Regulations, AOV systems must be CE marked against this standard.

The standard is published as BS EN 12101-2:2003.

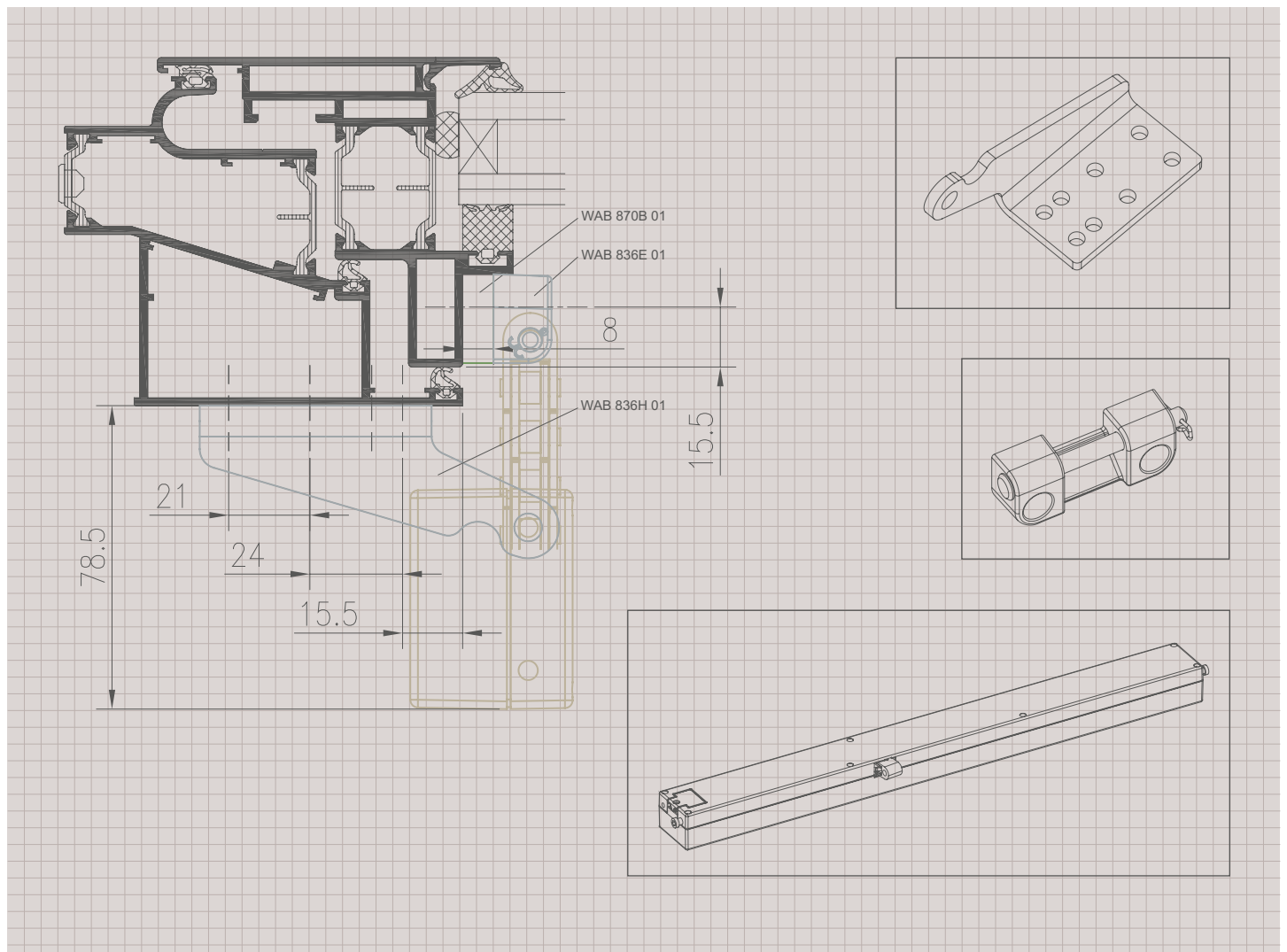


What is needed to build and CE mark an EN12101-2 Smoke Vent

To be certain that the smoke vent design components and profiles used will perform and be reliable under fire conditions, they must be tested together by an independent and authorised test house.

Once designs and components have been tested and approved, an authorised fabricator can produce those smoke vents and sell them as CE marked solutions. Becoming an authorised fabricator allows that company to CE mark the end products and to make a declaration

of their performance as per the tested arrangements and documentation. This is achieved by putting in place an approach to quality control known as a 'Factory Production Control' system. A notified body examines the FPC system and audits the factory to ensure the process is acceptable and always followed to help ensure the quality and dependability of the finished products. Once approved the notified body awards the fabricator with the necessary certificate to be able to CE Mark their products under this system.



A wide selection of our products are tested with a range of window profiles

Windowmaster is continually testing new window systems to support CE marked solutions.

Below are the suppliers who have window profiles already CE marked with windowmaster products. Contact us to find out the details.



hansen



RAICO



How to achieve an approved Factory Production Control (FPC) process to allow you to build, CE mark and sell smoke vents

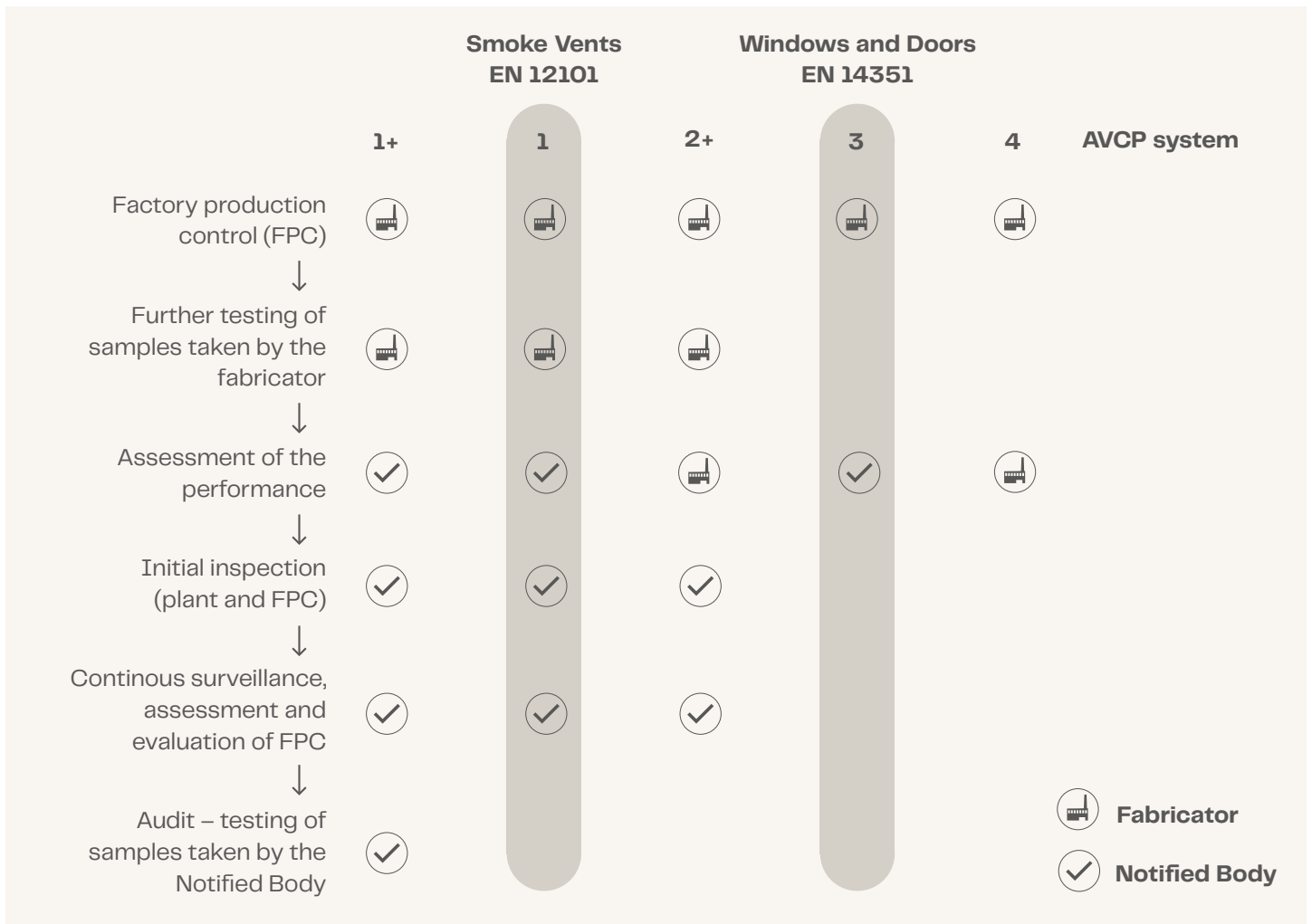
Most companies will have some form of quality control system in place, such as ISO 9001. The majority of fabricators have a quality control system sufficient to support CE marking of Windows and Doors to EN 14351 in relation to their energy performance.

Different products require different levels of factory production control. Eg. Block paving requires a much lower level of control quality than medical devices.

Similarly, Smoke Ventilators built to EN 12101-2 require a higher level of quality control than windows and doors built to EN 14351.

This means the quality system / Factory Production Control system needs reviewing and may require additional steps in the production and quality control process to achieve a higher level of detail and control, known as AVCP Level 1 (Assessment and Verification of Constancy of Performance) for Smoke Vents, compared with that required to manufacture and CE Mark to EN 14351 (AVCP Level 3).

Normally this only means introducing additional steps in the production and record keeping process, as well as an initial inspection and annual audit of the fabricators FPC by a notified body.



Summary of the testing and technical info required to support EN12101-2 vents

The Window System, Actuators and Common Assembly components will normally have been tested by the manufacturers as a complete system. For example WindowMaster has conducted testing with Schueco, Hueck and Wicona systems amongst others.

EN 12101-2 sets out specific performance criteria (essential characteristics) that may have been tested according to local regulations and requirements in the markets where the products are being sold.

The results form part of the technical documentation required to make the declaration of performance (DOP) and CE Mark by the authorised fabricator.

- ✓ **Aerodynamic free area (Annex B)**
Testing and assessment of the achievable aerodynamic free area of the vent, Aa expressed in m².
- ✓ **Low Temperature (Annex E)**
Testing and classification of the motors ability to operate in rooms with low ambient temperatures expressed as T and min deg C temp eg T(-15).
- ✓ **Reaction to Fire (Annex H)**
Declaration of the materials class defined by which materials are used in the vents manufacture and their reaction to fire eg E.
- ✓ **Reliability (Annex C)**
Testing and classification of reliability of the vent to open and close into the fire open position. Expressed as Re and number of openings eg. Re 1,000 (+ 10,000) = 1,000 times opening for smoke ventilation in addition to 10,000 for comfort ventilation for dual purpose ventilators.

- ✓ **Resistance to Heat (Annex G)**
Testing and classification of the vents ability to open within 60 seconds, its resistance to heat, and its mechanical stability to achieve and maintain the vent opening at high temperature for 30 minutes. Eg B300 = 300 deg for 30 minutes.
- ✓ **Snow Load (Annex D)**
Testing and declaration of the vents ability to open under snow load, expressed in pascal or N/m² e.g. SL 500.
- ✓ **Wind Load (Annex F)**
Testing and classification of the vents stability under wind load, expressed as WL and rating in pascal or N/m², eg WL 500.

In some instances where the application and local regulations allow, it may be acceptable to make a declaration of no performance declared (NPD) against certain essential performance characteristics.

” for the listed essential characteristics for which no performance is declared, the letters ‘NPD’ (No Performance Determined) is stated, or in other words local authority can decide to either bypass, comply or raise the requirements.”

–CPR article 6.2 (f)



Next steps

Product certification requires the following steps

- 1 The Manufacturer prepares a technical specification and tests the finished product to establish its performance, known as Initial Type Testing. (This may be conducted by the major component suppliers eg The System House and/or WindowMaster).
- 2 The certification body prepares a scope of approval, based on what was tested and the results obtained (Field of Application or Classification document).
- 3 The fabricator defines the scope of products it will manufacture and develops a documented Factory Production Control system (FPC).
- 4 There is an Initial Inspection of the Fabricators FPC and the notified body reviews the audit findings.
- 5 If the audit shows the fabricator has an FPC system in place to ensure it always complies with the technical specification, then a positive certification decision is made
- 6 There may be regular audits and testing to check the fabricator's FPC is being followed and identify any errors that need to be corrected ensuring standards are maintained.



Appendix

Technical Terms and Responsibilities

Ongoing responsibilities

The EN 12101-2 standard has been updated and constantly evolving therefore the latest approved and adopted standard should be adhered to as well as other existing and new standards and legislation that is relevant. Product changes must be kept up to date in the tested and approved solutions. An annual audit of the authorised fabricator holding the FPC must take place.

Testing, Building and CE Marking

A simple process to help you understand **what** to do **when** and **how** WindowMaster can help



01

Assessment of performance and Initial Type Testing (ITT)

What

The window system and actuators used in the final product are subjected to joint testing by a Notified Body to assess their performance. An ITT report is issued.

Then

WindowMaster supply tested actuator types. These are **CE** marked to the **Machinery Directive etc.** and provided with a **Declaration of Conformity** and Installation Manual.

Who

Test Sponsors (eg WindowMaster/ Window Systems House) and Notified Body



02

Preparation for FPC

What

WindowMaster can provide an **initial assessment** and proposal based on the fabricators description of their quality control and setup.

Then

This allows the Vent Fabricator to prepare for their **Initial Inspection** with the Notified Body.

Who

WindowMaster and Fabricator





03 CE Marking and Certification

What

Once manufacture and assembly is complete, the Smoke Vent Fabricator produces a **Declaration of Performance (DoP)** specific to that vent, and applies the **CE Label** to the finished vent showing performance and compliance with EN 12101-2.

Who

Fabricator

Then

The client and its contractors, or the local building inspector, will normally ask for the **Declaration of Performance** and/or verify the Vent's **CE Label** at the time of building inspection.



04 Factory Production Control

What

The Notified Body carries out the **Initial Inspection** at the Smoke Vent Fabricator's facilities. The inspection is an audit of the quality processes followed by the fabricator which helps them ensure the finished product is consistently built and performs in line with that tested. When the fabricator passes the audit, a **Certificate of Constancy of Performance (CCP)** is issued.

Who

Fabricator

Then

Production has started and the fabricator is allowed to sell CE marked SHEV legally.



05 Annual Inspection

What

The fabricator must maintain its FPC and is subject to annual inspection by the notified body.

Who

Fabricator & Notified Body

Then

The Fabricator can continue to manufacture and certify vents under its FPC.



General rules and helpful tips

- It's important to note that the CE Label on the window actuator (Machinery Directive etc.) is completely independent of the CE Label applied to the finished vent by the Vent Fabricator which declares performance and compliance to EN 12101-2
- The finished vent must be **identical** to that produced during the Initial Type Test.
- As Natural Smoke and Heat Exhaust Ventilators are a **life safety** product, the CPR does not allow alternative materials to be utilized unless they have been subjected to an Initial Type Test.
- WindowMaster can provide you with a template to create your own CE Label.



Photo: Hufton+Crow



Appendix

What does a CE Mark and DOP look like

Example with explanation of CE marking content

Official CE mark logo	CE		
	20		Last two digits of the year in which the CE marking was affixed
Unique reference number of the DoP	12345-ABCDE		Unique identification code of the product type
	NSHEV model XYZ 1a2b3c		
Intended use incl restrictions to be aware of	For fire safety use in a Natural smoke and heat exhaust systems. Dual purpose		
	EN 12101-2:2003 Notified Body: 0402		Harmonised standard and notified body
Aerodynamic free area in m ²	Aa: 0.64		
Reliability	RE50+10000	T (-05)	Temperature classification
Resistance to heat	B300	E	Reaction to fire
Snowload in Pascal or N/m ²	SL 750	WL 1500	Wind load in Pascal or N/m ²
Name and registered address of the fabricator	Façade Builder International Production Boulevard Fresh Air City		

Applying the CE mark

The CE Mark must be applied to the finished vent and must be visible, legible and indelible.

The official identification number of the notified body who conducted the conformity assessment and issued the Certificate of Conformity of Performance (CCP) to the fabricator must be detailed.

The CE Mark must be affixed **before** the product can be placed on the European market.

Without a label clearly affixed to the finished vent, it cannot be considered an EN 12101-2 compliant vent. It should also be accompanied by a matching 'Declaration of Performance' normally a signed certificate submitted as part of the building approval process and kept in the building O&M manuals.

Source: European Commission. 'CE Marking of construction products, step by step'



Example of the correlation Declaration of Performance DoP

	Declaration of performance		
Unique reference number of the DoP	12345-ABCDE		
	NSHEV model XYZ 1a2b3c		Unique identification code of the product type
Intended use incl restrictions to be aware of	For fire safety use in a Natural smoke and heat exhaust systems. Dual purpose		
	System 1		AVCP system
	EN 12101-2:2003 Notified Body: 0402		Harmonised standard and notified body
Aerodynamic free area in m ²	Aa: 0.64		
Reliability	RE50+10000	T (-05)	Temperature classification
Resistance to heat	B300	E	Reaction to fire
Snowload in Pascal or N/m ²	SL 750	WL 1500	Wind load in Pascal or N/m ²
Name and registered address of the fabricator	Façade Builder International Production Boulevard Fresh Air City		
	Signature, place and date		Signature

How to make the DoP's available online

The Declaration of Performance does not have to follow the product as a printed document and can be made available online instead.

The conditions that must be fulfilled when making DoP's available online

- There must be a clear and unique identification code linking the CE marking on the product with the relevant DoP.
- The content of a DoP must not be altered after publication.
- The website where the DoP's are published must be monitored and maintained so that they are always available.
- DoP's must be available free of charge over a period of 10 years after the product is placed on the market.
- There must be instructions for the recipients of the products on how to access the website and the DoP's.





Let's stay in touch

We can discuss with you how we can support you through the FPC process as well as;

- Free area calculations
- Suitable profiles and applications
- Ongoing support and training
- Technical support and assistance

Please contact WindowMaster who will be able to request a quotation for an FPC on your behalf

WindowMaster Control Systems Ltd.

Phone	+44 1536 614070
E-mail	info.uk@windowmaster.com
Address	Lampport Close Kettering Parkway Kettering Northants NN15 6XY
Hours of operation	Monday - Thursday · 8:15am - 5pm Friday · 8:15am - 3:30pm

WindowMaster International A/S

Phone	+45 4567 0300
E-mail	info@windowmaster.dk
Address	Skelstedet 13 DK-2950 Vedbæk
Hours of operation	Monday - Thursday · 8:00am - 16pm Friday · 8:00am - 3:30pm



WindowMaster aspires to protect people and the environment by creating a healthy and safe indoor climate, automatically ventilating spaces with fresh air through facade and roof windows in buildings. We offer the construction industry foresighted, flexible and intelligent window actuators and control systems for natural ventilation, mixed mode ventilation, and smoke ventilation – of the highest quality.

WindowMaster employs highly experienced cleantech specialists in Denmark, Norway, Germany, United Kingdom, Ireland, Switzerland, and the United States of America. In addition, we work with a vast network of certified partners. With our extensive expertise built up since 1990, WindowMaster is ready to help the construction industry meet its green obligations and achieve their architectural and technical ambitions.

windowmaster.com

**WINDOW
Master®**
Fresh Air. Fresh People.