



4^a Conferenza Nazionale Poliuretano Espanso Rigido

Poliuretano 4.0

Roma - 10 ottobre 2019 - NH Collection Vittorio Veneto

UN NUOVO METODO DI PROVA PER DETERMINARE IL COMPORTAMENTO AL FUOCO DELLE FACCIATE CON ETICS

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DIRIGENTE UFFICIO PER LA REGOLAMENTAZIONE COMUNITARIA

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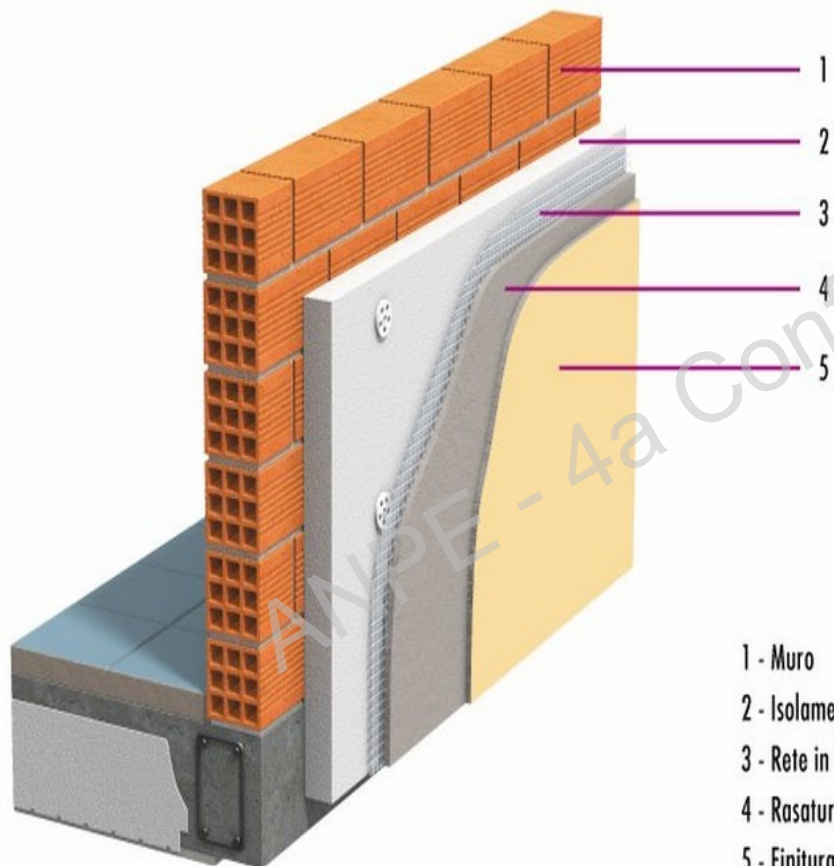
Direzione Centrale Prevenzione e Sicurezza Tecnica



ISOLAMENTO A CAPPOTTO

SICUREZZA ANTINCENDIO

INTRODUZIONE

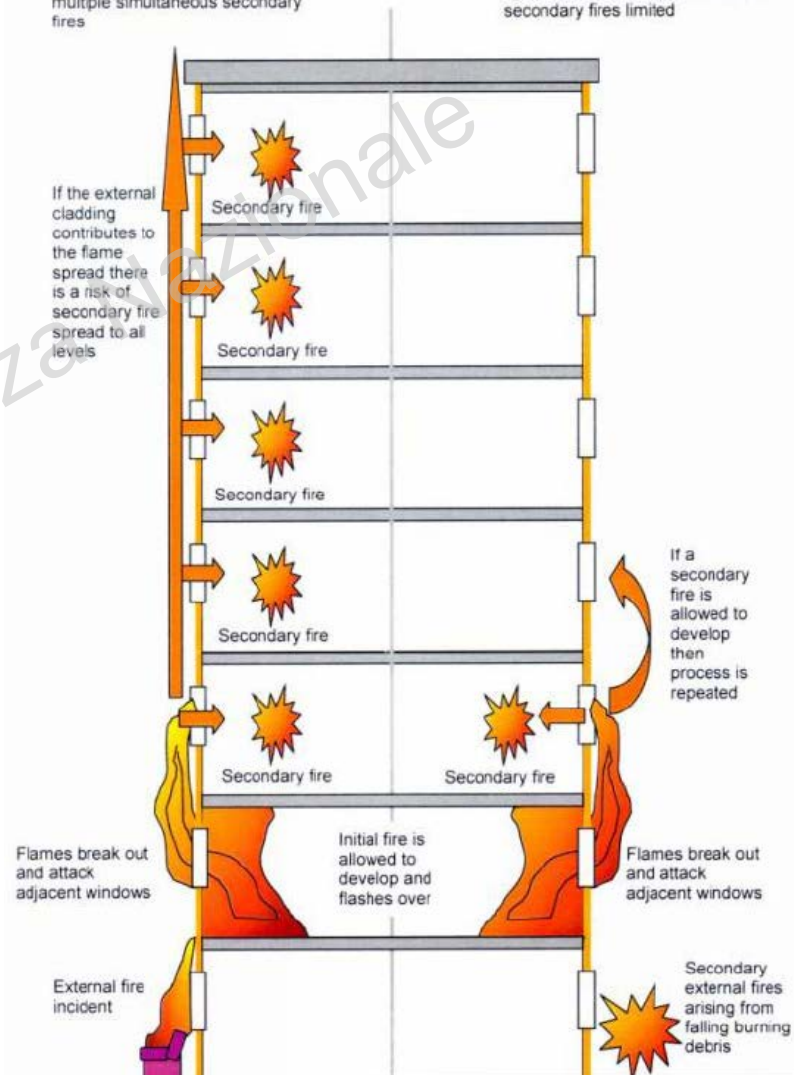


Rapid Fire Spread

Cladding system contributes to flame spread resulting in risk of multiple simultaneous secondary fires

Restricted Fire Spread

Cladding System does not contribute to flame spread. Risk of secondary fires limited



QUALIFICAZIONE

DM 26/06/1984

OMOLOGAZIONE NON POSSIBILE

REGOLAMENTO (UE) N. 305/2011

Secondo specificazione tecnica armonizzata

ETAG 004 Edition 2013 (emendamento pendente)

GUIDELINE FOR EUROPEAN TECHNICAL APPROVAL

of

EXTERNAL THERMAL INSULATION

COMPOSITE SYSTEMS (ETICS) WITH RENDERING

MARCATURA CE VOLONTARIA

Metodi di prova e qualificazione europei

Standard	BS 8414-1	LEPIR II	MSZ 14800-6	SP FIRE 105	Önorm B 3800-5	PN-90/B-02867	DIN E 4102-20	ISO 13785-1
Country	UK	F	H	S, DK	A	PL	D	CZ, SK
Fire exposure	Wood crib, peak heat 3,5 MW, 4500 MJ	600 kg wood crib	650 kg wood crib, 3 MW approx. (controlled)	60 l heptane	25 kg wood / 320 kW propane	20 kg wood crib + wind towards the wall (2 m/s)	25 kg wood / 320 kW propane	100 kW propane
Max. heat flux on surface	70 kW/m ² at 1 m height	Not specified	Not specified	15 or 80 kW/m ²	Not specified	Not specified	70-95 kW/m ² at 1 m height	Not specified
Max. temperature on surface	600° C / 20 min	Average 500° C, peak 800° C	600° C 0,5 m high / 50 min	450° C / 12 min	Not specified	800° C peak	Not specified	Max 150° C 0,5 m high
Test duration	30 min	60 min (30 min fire exposure)	60 min	Min. 12 min	30 min	30 min	21 min gas, 30 min wood	30 min
Test specimen	Corner 2,5 m x 8,0 m + 1,5 m x 8,0 m	Flat wall 5,3 m x 6,6 m	Flat wall 6,0 m x 7,0 m	Flat wall 4,0 m x 6,7 m	Corner 3,0 m x 6,0 m + 1,5 m x 6,0 m	Flat wall 2,3 m high	Corner 3,0 m x 5,2 m + 2,0 m x 5,2 m	Corner 1,2 m x 2,4 m + 0,6 m x 2,4 m
Substrate	Masonry or light frame	Any	Masonry	Aerated concrete	Aerated concrete	Masonry	Aerated concrete	12 mm Ca-Si board
Criteria	Temp. limits	Flame spread, temp. rise, falling parts	Temp. rise, fire spread, falling parts	Flames 2 floors above; Falling parts	Temp. rise, fire spread, falling parts	Temp. limits; Burning particles	Temp. rise, fire spread, falling parts	Not included

EOTA N073 Technical Report

Large Scale Fire Performance Testing of External Wall Cladding Systems

Una metodologia di prova per determinare:

- propagazione della fiamma,
- contributo all'incendio e
- prestazioni meccaniche

dei sistemi non portanti di chiusura delle facciate, con o senza isolamento.

La resistenza al fuoco non è presa in considerazione

L'esposizione al fuoco è rappresentativa:

- di un incendio in una stanza, (attraverso un'apertura)
- o una sorgente fuoco esterno

che espone il rivestimento agli effetti delle fiamme e dei fumi.
Al fine di prendere in considerazione diversi requisiti normativi la metodologia si compone di due scenari differenti.

EU approach to assess the facade fire performance

Draft final report

Development of a European approach to assess the fire performance of façades

Dated: November 10, 2017

Project: SI2.743702-30-CE-0830933/00-14

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EU approach to assess the facade fire performance

Scope:

The proposed assessment method is applicable for:

- external walls;
- Façades;
- façade cladding systems vertically fixed to and supported by a structural frame or a concrete masonry sub-structure.

OSS: **The method will not address the load-bearing capacity of the tested system, nor inclined façade systems**

Main limitation: This method cannot assess the risk of fire re-entry into the compartments above the combustion chamber.

Out of scope: fire resistance characteristics of curtain walling systems are addressed through the European Standards EN 1364-3 and EN 1364-4.

EU approach to assess the facade fire performance

The test method is a large scale test method based on the British and German test methods:

Fire exposure	BS 8414-1 and 2	DIN 4102-20
Heat exposure (non-combustible wall)	Mean within range of 45-95 kW/m ² at height of 1 m above opening over continuous 20 min period. Typical steady state mean of 75 kW/m ² at height of 1 m above opening	60 kW/m ² at 0.5 m above opening 35 kW/m ² at 1.0 m above opening 25 kW/m ² at 1.5 m above opening
Temperature exposure (non-combustible wall)	> 600 °C above ambient within fire compartment > 500 °C above ambient on exterior of non-combustible wall 2.5 m above opening	Maximum temperature of 780-800 °C on exterior of non-combustible wall 1 m above opening soffit
Maximum height of flames above opening for non-combustible wall	App. 2.5 m	App. 2.5 m

EU approach to assess the facade fire performance

Two fire load scenarios are proposed:

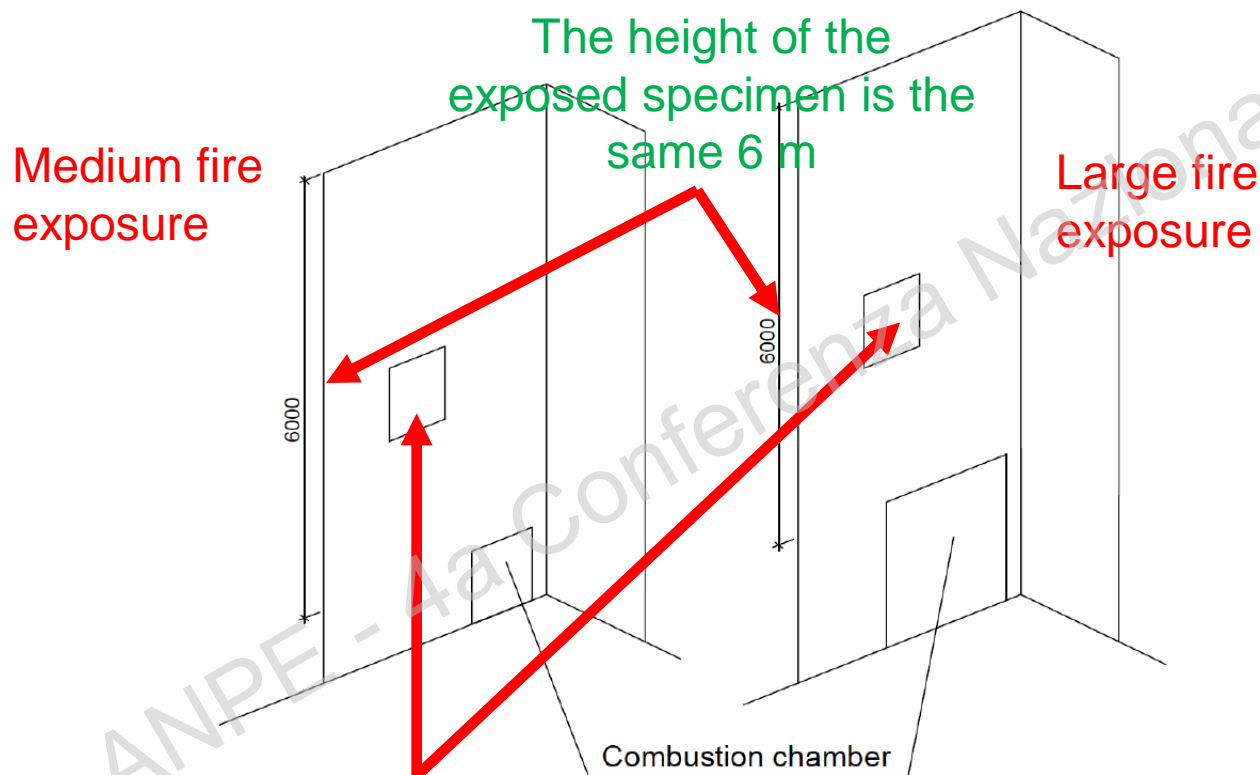
- a medium fire exposure test
- a large fire exposure test

The **large** fire exposure scenario is representative of a fully-developed (post-flashover) fire in a room, venting through an opening such as a window aperture that exposes the cladding to the effects of external flames, or from an external fire source.

The **medium** fire exposure scenario is also based on a flash-over scenario, but the method **has been down-scaled**. The method has thus virtually removed one storey from the test set-up, and only focus on the façade part located two storeys above the fire room, i.e. the top of the flames.

EU approach to assess the facade fire performance

Principle drawing of the test method: represented on the left and on the right:



A secondary opening is used to simulate a window focusing on the method applied by the manufacturer to treat the connection or interface between the façade and a window.

EU approach to assess the facade fire performance

Test time: test duration is 60 minutes.

10.1.1 Medium fire exposure

Time	Action	Reference Clause
0	Ignition of the timber crib	4.5.2
4	Addition of air to the combustion chamber via a fan unit	4.4, table 1
22	Extinguish Timber Crib and switch off fan	10.3
60	Termination of test	

10.1.2 Large fire exposure

Time following ignition	Action	Reference Clause
-5	Soak fibreboard ignition strips and insert strips into cribs	4.5.1
0	Ignition of the timber crib	4.5.1
30	Extinguish Timber Crib	4.5.1 & 10.3
60	Termination of test	

EU approach to assess the facade fire performance

Performance criteria

Vertical fire spread

No thermocouple positioned at the horizontal classification levels (3.5 m and 5.9 m for medium test, and 4.5 m and 5.9 m for large test) shall indicate a temperature rise greater than 500 K over a period of 30 seconds during the test frame time of 60 minutes after the test start time.

Horizontal fire spread

No thermocouple positioned on the classification vertical lines located at 2.75 m from the corner on main face and at 1.45 m from corner on wing shall indicate a temperature rise greater than 500 K over a period of 30 seconds during the test frame time of 60 minutes after the test start time.

Falling parts/burning particles

Falling parts and burning particles/droplets are assessed by visual observations, until a suitable measurement technique is available.

The general criterion is that falling parts shall not be a risk for the evacuation, the rescue personnel nor the fire brigade. As a guideline the weight of a single falling part shall not exceed 5 kg and the area of a falling part that may be dangerous (e.g. glass panes, panels) shall not be larger than 0.2 mq.

EU approach to assess the facade fire performance

Classification

Heat exposure	Classification	Comment
Large heat exposure	LS1	Fulfilling requirements on flame spread and falling parts
	LS2	Fulfilling requirements on flame spread only
Medium heat exposure	LS3	Fulfilling requirements on flame spread and falling parts
	LS4	Fulfilling requirements on flame spread only

Comment:

A classification in class LS1 also covers classes LS2, LS3 and LS4

A classification in class LS2 also covers class LS4

A classification in class LS3 also covers class LS4

Classification

AGF 04/2

To EUROPEAN COMMISSION

Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
Industrial transformation and advanced value chains
Clean Technologies and Products

Bruxelles, 8th December 2017

Furthermore, for simple facades typologies, such as claddings or curtain wall, where there is no ventilation systems and air-gap cavities, an intermediate scale test (meaning an intermediate scale between small scale and medium scale configurations) could also be proposed. As stated in the final report (Doc Number CEN/TC 127 N 3050) at page 11, the Italian National Fire rescue and Service in cooperation with a Notified body has developed an intermediate scale test based on the cone calorimeter test-rig, using a premixed flame fire source.

Italy does recognise the importance of large-scale tests for the assessment of the fire performance of the facades. In fact, the outcomes, observation and data collected during and after a large façade test fire can describe the façade fire performances in a more detailed way that are, at present, not covered by the results obtained by a reaction to fire tests. On the other hand, large-scale tests suffer in terms of repeatability and reproducibility (in particular when a wood crib fire source is used) and are also very expensive.

Therefore, large-scale tests should be used as “the reference fire test scenario” (as room corner test is for the SBI test) for developing and validate an intermediate scale façade test based, for example, on the cone calorimeter set-up that could be more easy to use and to implement within the CPR for product classification.

The aim of the proposed test method is:

- To provide the relevant parameters for a fire risk assessment of façades with ETICS made with different insulation materials

The test method would like to be:

- Repeatable in the same conditions
- Versatile
- Less expensive than large scale test methods

The hazardous parameters have to be:

- Measurable