



FAÇADE FIRE TESTS

Towards a new European standard method

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Safety

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- History on the standardization of
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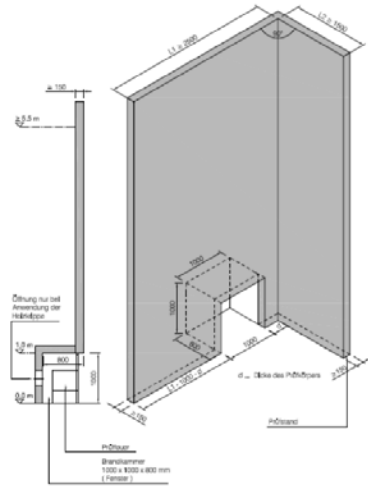
Current situation in Europe

- All EU/EFTA Member States have regulatory provisions on the fire performance of facades
- The regulations are mainly based on the existing European system on reaction to fire and fire resistance
- 14 Member States state that they have additional requirements, not covered by EN 13501 part 1 and 2
- Some countries specify a specific test method, some enables performance based testing
- 12 different test methods has been identified to presently be used

Current situation in Europe

Test methods	Countries using the test method
1. PN-B-02867:2013	Poland
BS 8414-1:2015 and BS 8414-2:2015	UK, Republic of Ireland
DIN 4102-20	Switzerland, Germany
ÖNorm B 3800-5	Switzerland, Austria
Prüfbestimmung für Aussenwandbekleidungssysteme	Switzerland/ Lichtenstein
Technical regulation A 2.2.1.5	Germany
Lepir 2	France
MSZ 14800-6:2009	Hungary
SP Fire 105	Sweden, Norway, Denmark
Engineering guidance 16 (unofficial test method)	Finland
ISO 13785-2	Slovakia
ISO 13785-1	Czech Republic

Current situation in Europe – examples on test methods



DIN 4102-20

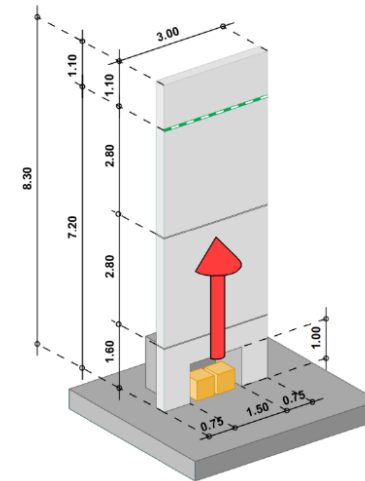


Figure A1 Example of a typical test facility

BS 8414



PN-B-02867:2013



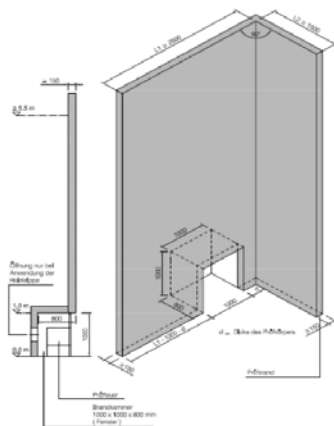
Prüfbestimmung für
Aussenwandbekleidungs-systeme



LEPIR 2



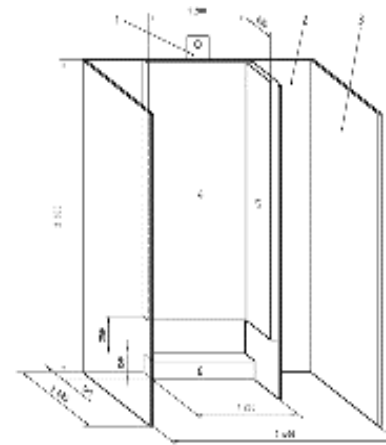
5 MSZ 14800-6



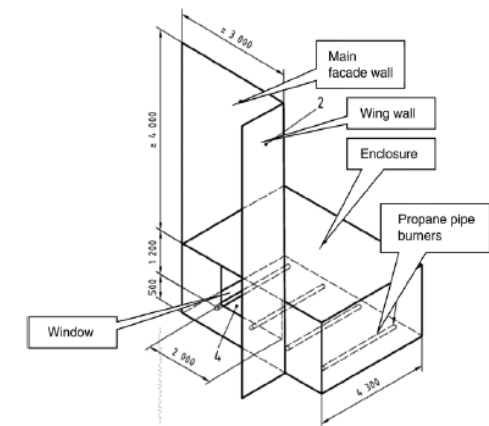
ÖNORM B 3800-5



SP Fire 105



ISO 13785-1



ISO 13785-2

Current situation in Europe

- Targets addressed by the façade tests in use:
 - Flame spread – vertical and horizontal, surface and within the system
 - Fire spread from one room to another (above)
 - Joints
 - Windows
 - Detailing around window openings
 - Smouldering
 - Falling parts and burning debris/droplets
 - Smoke
 - Heat
 - Fire from inside
 - Fire from outside
 - Damage to the system (assessed after the test)

Current situation in Europe

- Harmonized assessment methods are needed
- About 20 years CEN got a mandate from EC to develop a European method
 - Did not succeed
- About 10 years ago EFTA got the same mission
 - Produced a report containing the DIN 4102-20 and BS 8414 methods
 - Difficulties to get acceptance for the proposal
- About 1 year ago EC made an Invitation To Tender on the topic

The "Facade project"

- Invitation to tender from EC a year ago
- Develop a European approach to:
 - assess the fire performance of facades
 - define all relevant details
 - classify facades
- The BS 8414 series and DIN 4102-20 should be used as a basis for testing
- "Falling off" shall be included
- Meet the regulatory provisions

- Project group with members from RISE (Sweden), BRE (UK), BAM (Germany), EMI (Hungary) and Efectis (France)
- Large group of sub-contractors

The "Facade project"

- The project started in January 2017
- The draft assessment procedure has been sent to EC
- The final report will be presented in Brussels within the coming weeks

- The future will tell whether we have been successful or not.

The work process

- Sub-contractors in all Member States
 - Collect information on the regulations and assessment procedures
 - Contact with the national regulators
 - Double-check and give eventual corrections
 - *Italian sub-contractor is LS Fire Testing Institute S.R.L.*
- A draft assessment procedure was presented to Advisory Group Fire/stakeholders/sub-contractors
- Comments on the draft assessment procedure was collected from AGF/stakeholders/sub-contractors
- The assessment procedure has been remade, where all comments have been addressed

Main comments on the draft proposal

- Develop a new modern test method
 - Outside the scope of the present project
- Smoke is important
 - There are no regulations on smoke with respect to facades
- Smouldering shall be considered - Smouldering shall not be considered
 - There is a European method for smouldering, EN 16733
- Use of historical data
 - For CE-marking it is probably not possible. Until CE-marking is mandatory, it is a national question.
- Detailing such as mounting around openings
 - Most are in favour of having this kind of detailing
- Classification
 - Aim for a simple classification system, with as few classes as possible

Definitions and national regulations

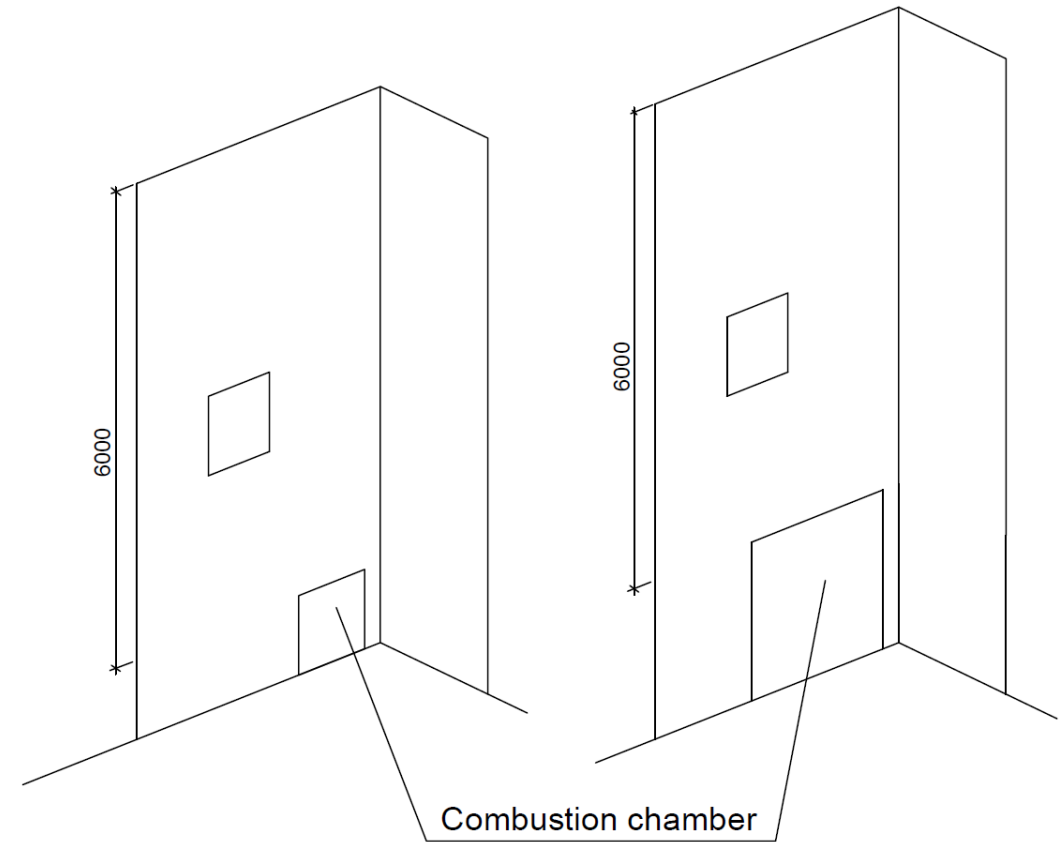
- The definition of "facade" is very different, and varies from the complete external wall, to the outer skin of a building
- Define the scope of the assessment method
 - As broad as possible – all types of external walls/claddings/facades
- Define which performance criteria must be included
 - Based on the current regulations in the Member States

Handling of the regulatory provisions

Regulation characteristics	Slovak republic	Hungary	Switzerland	Sweden	Austria	Germany DIN	Germany -technical regulation	Finland	Poland	England & Wales, Scotland, Ireland	France	Denmark-Norway	Proposed criteria
Flame spread – vertical	x	x	x	x	x	x	x	x	x	x	x	x	Yes
Flame spread horizontal		x	x		x	x	x			x	x		Yes
Flame spread – internal	x		x	x	x	x	x	x	x	x	x	x	Yes
Connection between floor and facade		x		x						x	x		Optional (Fire resistance)
Smouldering						x					x		EN 16733
Falling parts		x	x	x	x	x		x	x	x		x	Yes
Smoke				x*		x							Only observations
Heat (through temperature or flux)		x		x	x							x	Yes
Detailing (window openings, fire stop, etc)		x		x							x	x	Definition of scope

Assessment method

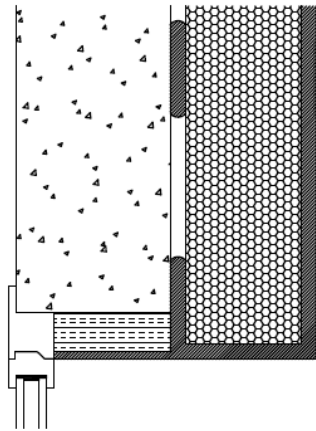
- The shape and size of the different methods are quite similar.
- Two different heat exposures are proposed
 - medium fire exposure (30 kg wood crib)
 - large fire exposure (400 kg wood crib)
- Detailing around openings is introduced
- Classification in four different classes, two for the large fire exposure and two for the medium fire exposure



Secondary opening

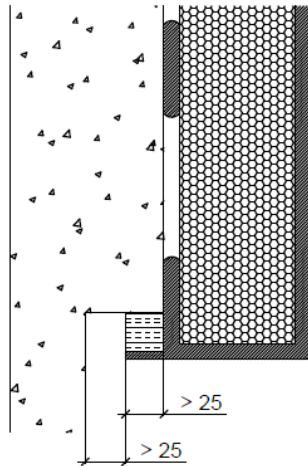
- Mandatory in the method
- Mounting and detailing of the façade system around openings

Practise

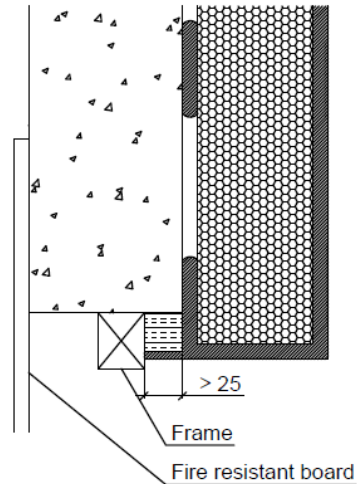


Test set-up

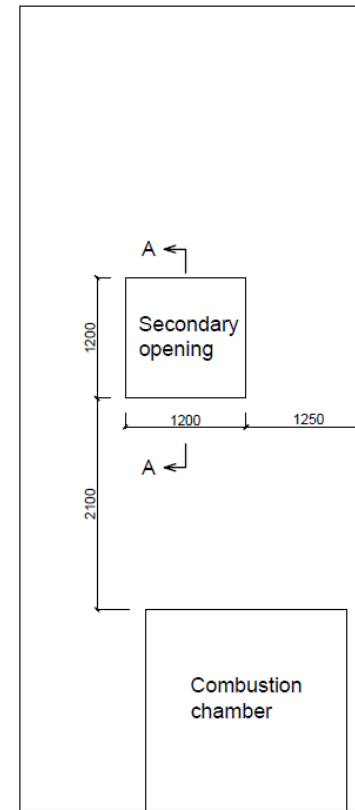
Without frame



With frame

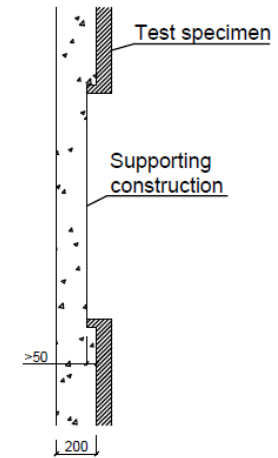


Main face

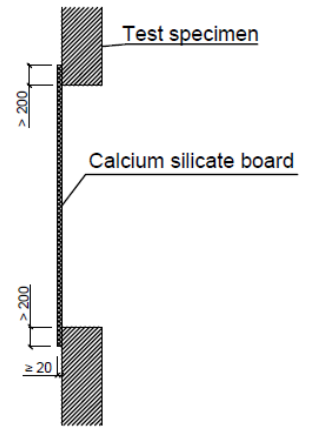


Section A-A
Secondary opening

Specimen mounted
on supporting
construction

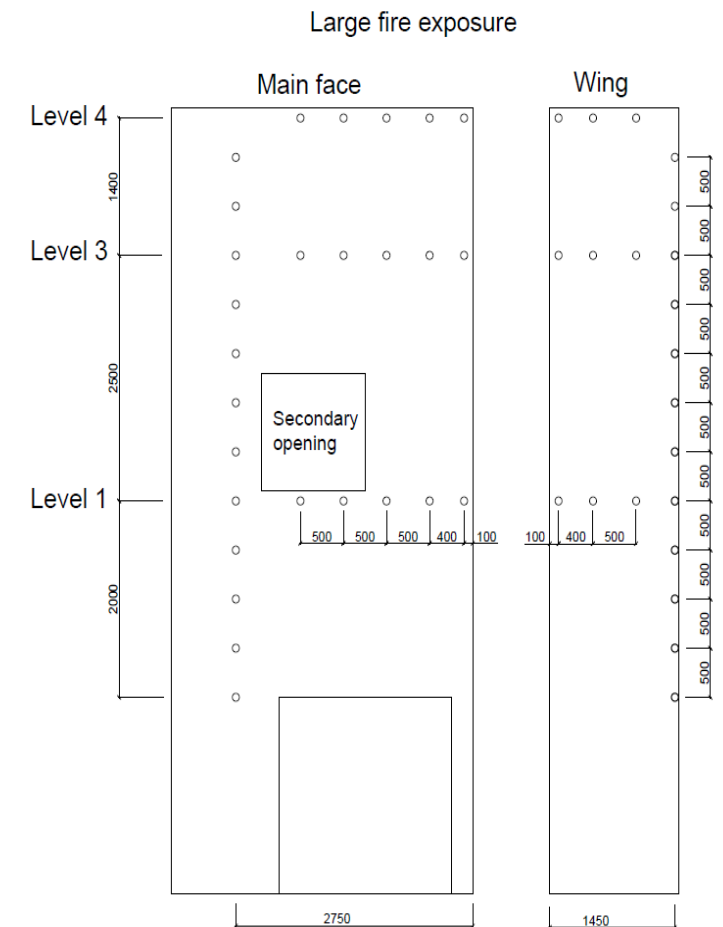
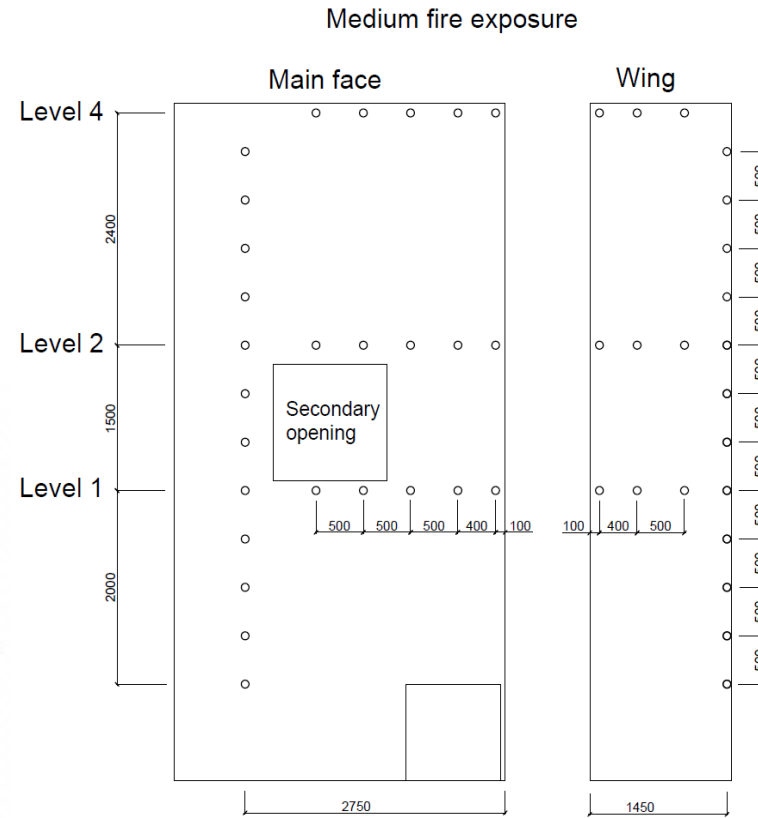
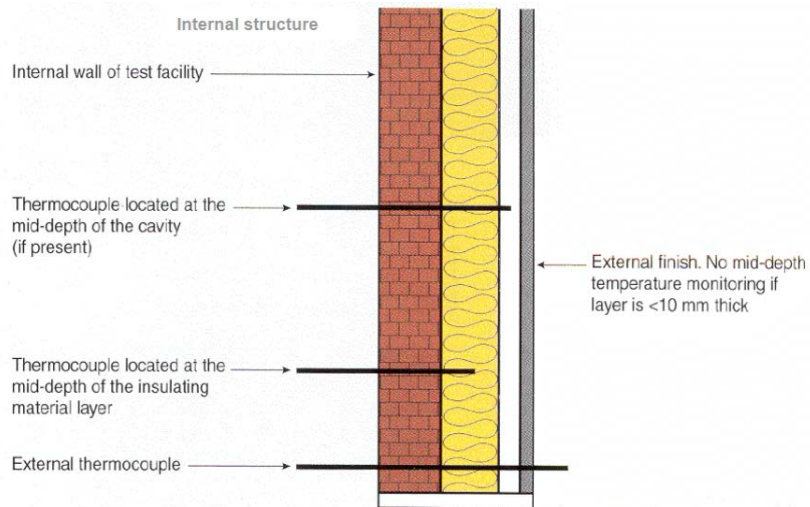


Specimen mounted
on structural frame



Flame spread

- Assessed by measurements
- Measure with thermocouples
- Temperature rise < 500 K



Falling parts and burning debris/droplets

- The 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 m².
- The general criterion is that burning particles and/or droplets shall not be able to spread the fire downwards. If the material falling down continues to burn for more than 20 seconds, it is considered to failed the criterion.

Test procedure

- Document the test set-up
- Confirm that all measurement devices are functioning
- Determine the ambient test conditions; wind speed, precipitation and local temperatures
- Begin data logging and audio-visual recording equipment.
- Ignite the timber cribs following the relevant procedure for the selected fire load scenario
- Monitor and record the behaviour of the test sample during the full 60 minute test period
- The fire load shall be extinguished 22 or 30 minutes, depending on fire scenario, after the ignition using the technique detailed in the relevant clauses.
- Continue to record measurements and observations for the full duration of the test.
- Terminate the test 60 mins after ignition of the timber crib.
- Record observations of damage to the test samples following the test.

Classification

- LS1 – Large test fulfilling flame spread and falling parts
 - LS2 – Large test fulfilling flame spread but not falling parts
 - LS3 – Medium test fulfilling flame spread and falling parts
 - LS4 – Medium test fulfilling flame spread but not falling parts
-
- LS1 will cover all other classes
 - LS2 will cover LS4
 - LS3 will cover LS4

Coming challenges

- Get acceptance for a new assessment method in the MS
 - Changes for all MS
- Is the proposed test method good enough?
 - Very little data on repeatability and reproducibility of facade test methods
 - The method have to be validated for novel and innovative facade systems (solar panels, green facades...)
 - Environmental conditions - in many countries are the tests performed outdoors
- Field of application
 - Both direct and extended field of application will be needed
 - Due to the wide scope it will be a challenging work



THANK YOU!

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