REPORT OF THE ROUND-ROBIN NR. TC2 20-1 ON FAÇADES

PERFORMED BY EGOLF WITHIN THE FRAMEWORK OF THE EUROPEAN PROJECT SI2.825082

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INTRODUCTION

0.1 SCOPE

The present document reports the analysis conducted on the theoretical exercise on façades issued from the TC2 20-1 round-robin within the EGOLF fire testing laboratories.

The main purpose is to evaluate the intelligibility of a new test method – under development at the time of this exercise – intended to assess the fire performance of façades.

This **introduction** briefly presents the main features related to the organization of the round-robin. It also introduces the useful concepts when dealing with round-robin on non-quantitative results.

The **first part** "Items and correct answers" firstly identifies what items have been submitted to evaluation. Then, some different categories of items are identified, which will need different processing. Finally, the correct expected answer (as set up by the steering group) is presented for each evaluated item. Some errors and misunderstanding encountered in the received answers are also examined.

The **second part** “Analyses of the data” implements some graphical and numerical basic processing to assess the level of understanding of each evaluated item and question. Those simple tools allow deducing a clear picture of the intelligibility of the assessment method.

The **third part** “Recommendations" takes advantage of the analyses above and the various contents encountered in the answers received from participating labs in order to draw up the most useful recommendations to improve the assessment method. Revision proposals of the problematic sections of the assessment method will be drafted.

0.2 CONTEXT

0.2.1 Fire performance of façades

In the frame of the European Commission project SI2.825082, a Consortium of European laboratories is currently (years 2020-2021) working out a new testing method to assess the fire performance of façades. This Consortium comprises RISE Sweden (leader of the project), Efectis France, BAM (Germany), EMI (Hungary) and the University of Liege (Belgium). The Consortium is supported by subcontractors which bring a valuable experience in fire testing, namely BRE Global (UK), RISE Fire Research Norway and EGOLF.

This new testing method – which is the subject of this round robin – intends to assess the fire performance of façades. Strictly speaking, this method doesn't belong to the well-known fields of fire resistance or reaction to fire. It is based on an alternative testing approach, differing from both above mentioned fields in the whole testing process. For instance, a specific test rig accommodated with a combustion chamber is used, the fire load is supplied by wood cribs, the test results consists of criteria about the fire spread on the surface and within façade systems (ability to limit the propagation of a fire front) and the falling parts (parts falling from the test specimen that could represent a risk for the evacuation or for fire spread downwards), etc.

This new method is under development at the time of this exercise.

0.2.2 Purpose of the round robin

Contrarily to round robins organized within EGOLF in the past, the proposed exercise does not aim to assess the individual abilities of the laboratories in implementing the testing method, but well to assess the intelligibility of this new testing method. Intelligibility here refers to whether the instructions contained in it are sufficiently adequate, unambiguous and clear.

0.2.3 Test materials in support and exercises

The proposed round robin consists of a theoretical exercise, no tests are performed.
The participants were asked to read the assessment method and to put its requirements into practice by answering to questions. The exercises split into two parts (see the full exercise sheet in Annex C).

Part 1 – Exercises on the method

In the Part 1, two different fictitious tests were used in support:
- Test 1: test performed on Façade 1 submitted to a large fire exposure
- Test 2: test performed on Façade 2 submitted to a medium fire exposure

The following test materials were provided to the participants in the form of specific files:
- drawings of the façade systems 1 and 2 (see Annex A), containing sufficient details for the purpose of the exercises. They have been chosen to be as realistic as possible, slightly adapted from real façade systems.
- test data for test 1 and 2 (see Annex B), supplied in Excel files, containing ambient conditions, temperature measurements, and observations of falling parts.
- the assessment method, version dated of May 7, 2020.

  Note:
  The assessment method is still in development at the time of this round robin. As a consequence, the current method describes test facilities, requirements, performances criteria, … that are likely to be modified at a later stage of the "façade project" (see 0.2.1).

The participants were asked to solve different specific exercises related to configuring the test, setting up the equipment, analysing the supplied test data of the test, expressing the direct field of application…

Part 2 - Comments on the assessment method

In the Part 2, the participants had the opportunity to freely comment the assessment method. They were asked to explain shortly (max. 5 lines for each chapter of the assessment method) aspects that they find not sufficiently intelligible (i.e. adequate, unambiguous and clear).

0.2.4 Instructions

An instruction sheet (see Annex D) was sent to the participating labs.

Some questions clearly and specifically refer to one of the two fictitious tests used in support. In these cases, the answers shall be based on this only test. Contrariwise, some questions do not specifically refer to one of these two fictitious tests. In these cases, the answer shall be given in the most general sense, i.e. independently of any specific façade or test configuration.

The instructions specify that the exercises shall be performed in accordance with the requirements of the draft of the assessment method which is provided to the participants. These requirements shall be strictly applied.

The tests materials, the exercise sheet, and the instruction sheet were sent to the participating labs on May 11, 2020.

0.2.5 Results submission

Each participating laboratory received a randomly assigned number from the EGOLF Secretary General. They were asked to use this number in their communications in order to remain anonymous.

Most of the answers should be expressed in writing, while a few answers should be expressed in drawing. Each question specified clearly the format expected for the answer.

The answers expressed in writing had to be submitted through an online form (created with Google Form). The participants had to connect to a specific web page to encode their answers. They identified themselves by mean of their anonymous number so that their confidentiality is guaranteed. For each question, the participants could only enter their answer according to the specific format that was provided. For instance, depending on the question, they had to choose between multiple choices, or to enter numbers, or to write a free text with a limited number of characters...
The choice of such online submission form with pre-formatted fields aims to channel the format of the participants' responses when possible, while keeping open questions when not. This provides a structure facilitating as much as possible the tabulation and the analysis of the received information.
Free text answers were intentionally limited to a limited number of characters (200, 300 or 500 depending on the question). Once again, the reason is to facilitate the processing of these answers, which are the most difficult to analyse.

The answers expressed in drawing had to be submitted by e-mail to EGOLF Secretary General, who forwarded them to the organizers of the round robin so that the confidentiality of the participants was guaranteed.

The deadline for returning the answers was set to June 26, 2020.

0.2.6 Laboratories experience

All participating laboratories are EGOLF members and are ISO 17025 accredited.

0.2.7 Scheme of the experiment

29 laboratories joined to this round robin. It can be assumed that the number of laboratories participating to this round robin is large enough to represent a reasonable sample of the potential European end users of the assessment method being evaluated. See Annex H for the list of participants.

All 29 participants have sent their answers before the deadline.

The processing of the received data is the subject of part 2 of the present report.

0.3 PARTICULAR NATURE OF THIS ROUND-ROBIN

The nature of the results issued from the present exercise is of three types (see definitions in ISO 17043 annex A.1):

- the main part of the results consists of qualitative information, namely the answers reported on a categorical or ordinal scale: this is the case for the multiple choice questions
- some other results consist of quantitative information, namely the numerical answers reported on an interval or a ratio scale: this is the case for the dimensions of the test configurations and the mock-up, the test results in minutes…
- some other results consist of interpretive information, namely the answers reported as any other set of information concerning an interpretative feature: this is the case of answers to open questions, answers expressed in drawings…

Moreover, ISO 17043 "Conformity assessment — General requirements for proficiency testing" defines:

> ***3.7*** *Proficiency testing*
> *Evaluation of participant performance against pre-established criteria by means of interlaboratory comparisons*
>
> *NOTE 1 For the purposes of this International Standard, the term "proficiency testing" is taken in its widest sense and includes, but is not limited to:*
>
> *a) quantitative scheme — where the objective is to quantify one or more measurands of the proficiency test item;*
> *b) qualitative scheme — where the objective is to identify or describe one or more characteristics of the proficiency test item;*
>
> *...*
> *h) data transformation and interpretation — where sets of data or other information are furnished and the information is processed to provide an interpretation (or other outcome).*

The present theoretical exercise can therefore be considered as an interlaboratory comparison.

0.3.1 Determination of the "accepted reference values"

As a reminder, ISO 5725-1 "Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions" defines:

> ***3.5*** *Accepted reference value: A value that serves as an agreed-upon reference for comparison, and which is derived as:*
> *a) a theoretical or established value, based on scientific principles;*
> *b) an assigned or certified value, based on experimental work of some national or international organization;*
> *c) a consensus or certified value, based on collaborative experimental work under the auspices of a scientific or engineering group;*
> *d) when a), b) and c) are not available, the expectation of the (measurable) quantity, i.e. the mean of a specified population of measurements.*

A round robin on a theoretical exercise can be assumed to fall largely under case c, while a round robin on tests falls entirely under case d).

As exposed here above, and as proposed in ISO 17043 annex B.2.4, assigned values need to be determined by expert judgement when dealing with theoretical exercises.

For this purpose, a steering group was formed from Fabien Dumont (ULiège), Lars Boström (RISE Sweden), Johan Anderson (RISE Sweden) and Roman Chiva (Efectis France). The steering group

worked out “accepted reference values”, i.e. correct reference answers in the present case (answers to the questions that are asked in the exercise sheet). This task is the subject of part 1 of this report.

0.3.2 Consequence on data processing

Contrary to round robins on tests (for which results are quantitative), round robins on theoretical exercise cannot use the tools presented in the ISO 5725, ISO 13528 and ISO 21748, as shown by the following notes:

- ISO 5725-1 "Accuracy (trueness and precision) of measurement methods and results - Part 1: General principles and definitions"
  1.2 *This part of IS0 5725 is concerned exclusively with measurement methods which yield measurements on a continuous scale and give a single value as the test result, although this single value may be the outcome of a calculation from a set of observations.*
- ISO 13528 "Statistical methods for use in proficiency testing by interlaboratory comparisons"
  1. *The present standard [...] applies to quantitative data but not to qualitative data.*

So, standards dedicated to round robin analyses acknowledge the limitations of the possible statistical tools when dealing with non-quantitative results. They clearly state that it is not appropriate to calculate usual summary statistics for qualitative and interpretive data.

According to ISO 17043 annex B.3.2.1:

> *The appropriate basic technique is to compare each participant's results with the accepted reference values. If they are identical, then performance is acceptable. If they are not identical, then expert judgement is needed to determine if the result is “fit for its intended use”. In some situations, the proficiency testing provider may […] determine that a proficiency testing item was not suitable for evaluation.*

The work was conducted by the steering group following these instructions. That analysis is the subject of part 2 of this report.

PART 1 – ITEMS AND CORRECT ANSWERS

1.1 PURPOSE

This first part firstly identifies what items have been submitted to evaluation. Secondly, some different categories of items are identified, which will need different processing. Finally, the correct expected answer (as set up by the steering group) is presented for each evaluated item. Some errors and misunderstanding encountered in the received answers are also examined.
This first part uses the data arising from the Part 1 of the exercises (see § 0.2.3). The data resulting from the Part 2 of the exercises (open comments, see § 0.2.3) will be referenced in the third part of the present report.

1.2 ITEMS SUBMITTED TO EVALUATION

1.2.1 Selection of items

The received answers contain a substantial amount of information. The first task of the steering group was thus to determine what items should be submitted to evaluation.

For the purpose of the present round robin, it was found relevant to simply follow the list of the 53 proposed questions (as presented in annex C). The base was then to consider each of them as an item to evaluate, and to split the more complex of them into several interest items when useful or necessary. Doing so, from the 53 initial questions, 210 items have been identified for evaluation.

1.2.2 List of items

The detailed list of the 210 evaluated items is presented in § 1.3.2 below. Its structure follows the list of exercises, as well as their numberings from 4.3 to 15. In the list below, the formulation of the items has been shortened for convenience, please refer to Annex C for the original and complete wording of the questions.

1.3 EVALUATION OF THE ITEMS

1.3.1 Categories of items

According to § 0.3.1, the steering group had to work out the expected answers (“accepted reference values”) for each item under evaluation. Those are referred to as "**correct answer**" in the present report. They are detailed § 1.3.2 below.

Moreover, as introduced in § 0.3.2, 55 out of the 210 evaluated items turned out to be not suitable for evaluation. These are referred to as “**ungradable items**” in this report. For these items, no correct answer could be defined by the steering group due to remaining lacks in the current version of the assessment method. These items are therefore not assessable. It was however decided to keep these ungradable items in the list of exercises. The reason is that some interesting information can be learned from the answers of the participants facing these ungradable questions, and this information will help improve the method.

A few items (3 out of 210) gave rise to unexpected but however relevant answers. It appeared that the wording of the related questions was not accurate enough, with the unwanted consequence that various

acceptable answers could be issued. These items are referred to as "**inaccurate items**" in this report. They are not due to lacks in the current version of the assessment method, but rather in the questions themselves. These items are therefore not assessable.

Finally, 13 out of the 210 evaluated items are related to questions which are specifically intended to collect open information about the need or the experience of the labs. Of course, these 13 items are not assessable. They are referred to as "**informative items**" in the present report.

That evaluation task is justified by referenced arguments as much as possible.

1.3.2 Correct answers

From this point, please note that the following legend is adopted (see § 1.3.1):

- INFO = informative item, intended to collect open information about the need or the experience of the labs, not assessable
- UNGRADABLE = ungradable item, no correct answer could be defined by the steering group, not assessable
- INACCURATE = inaccurate item, poor wording of the question leading to various acceptable answers, not assessable

Number between square brackets [x.y] refers to the section x.y in the assessment method.

ITEM	CORRECT ANSWER	COMMENT
4 TEST EQUIPMENT		
4.3 Structural frame		
4.3.1 Problem if frame passes behind the combustion chamber opening?	yes	The steel frame should not be heated nor interfere with the fire load.
4.3.2 Problem if frame passes behind the secondary opening?	INACCURATE	See below this table for more details.
4.3.3 Need the assessment method to supply more detail?	INFO	
If yes, comment on what information you would need	INFO	
5 ENVIRONMENTAL CONDITIONS		
5.1 Test can be started according to the file of ambient conditions?	yes	- [5.1] The horizontal component of the ambient air speed is less than 3 m s-1 during the 15 minutes before the commencement of the test. - [5.2] The ambient temperature prior ranges between +5 °C and +35 °C during the 5 min before the commencement of the test.
5.2 Test invalidated if rain on the specimen from test minute 13 to 21?	yes	[10.8.1] The test shall be invalidated if it begins raining on the test specimen. This rule shall be applied whatever the duration of the rain and the time at which it begins to rain during the 60 minutes test.
5.3 Test invalidated if rain on the specimen from test minute 43 to 45?	yes	See item 5.2
6 TEST SPECIMEN		
6.3 Design		
6.3.1 How do you usually manage the test specimen design?		
- I let the client perform it alone	INFO	Even if not specifically required, it is strongly recommended that the lab doesn't let the client perform
- I discuss with the client about its needs	INFO	
- I take into account the whole product range of the test specimen	INFO	

ITEM	CORRECT ANSWER	COMMENT
- I take into account the direct field of application	INFO	this task alone, discusses with him about his needs, and takes into account the whole product range of the test specimen and the direct field of application.
If needed, comment on the aspects above and on your answers	INFO	
7 MOUNTING OF THE TEST SPECIMEN		
7.1 General		According to [4.3] and [4.4], the configurations 2 and 4 in the figure 1 of the exercises do not represent any authorized configuration. The reason is that the test rig shall always include a structural frame.
7.1.1 Kind of support on which you would install the Façade 1?	On a supporting construction	[7.1] The Façade 1 doesn't consist of a full stand-alone external wall but rather of a covering system to be fixed on an existing wall. Thus the test specimen shall be mounted onto a supporting construction, which one substitutes the existing wall in practice for the purpose of the test.
7.1.2 What configuration of test rig does it correspond to in Figure 1?	Configuration 1	
7.1.3 How should the Façade 1 be attached/fixed/fastened to the rig?	INACCURATE	See below this table for more details.
7.1.4 Kind of support on which you would install the Façade 2?	On a structural frame	[7.1] The Façade 2 consists of a full stand-alone external wall. Thus the test specimen shall be mounted directly on the structural frame.
7.1.5 What configuration of test rig does it correspond to in Figure 1?	Configuration 3	
7.1.6 How should the Façade 2 be attached/fixed/fastened to the rig?	UNGRADABLE	See below this table for more details.
7.1.7.a Dimensions of test specimen 1 (in mm) - exposed face		
A	3200 mm	[6.1]
B	1500 mm	[6.1]
C	6000 mm	[6.1]
D	250 mm	[4.5], table 1
E	2000 mm	[4.5], table 1
F	2000 mm	[4.5], table 1
G	500 mm	[4.2]
H	1250 mm	[7.2.1]
I	1200 mm	[7.2.1]
J	1200 mm	[7.2.1]
K	1500 mm	[7.2.1]
L	750 mm	[6.3]
M	750 mm	[6.3]
N	196 mm	See drawing "Façade 1 - Horizontal section with legends"
O	1000 mm	[4.5], table 1
7.1.7.b Dimensions of test specimen 2 (in mm) - exposed face		
A	3200 mm	[6.1]
B	1500 mm	[6.1]
C	6000 mm	[6.1]
D	50 mm	[4.5], table 1
E	1000 mm	[4.5], table 1

ITEM	CORRECT ANSWER	COMMENT
F	1000 mm	[4.5], table 1
G	500 mm	[4.2]
H	1250 mm	[7.2.1]
I	1200 mm	[7.2.1]
J	1200 mm	[7.2.1]
K	1500 mm	[7.2.1]
L	750 mm	[6.3]
M	750 mm	[6.3]
N	285 mm	See drawing "Façade 2 - Horizontal section with legends"
O	800 mm	[4.5], table 1
7.1.8.a Dimensions of test rig 1 (in mm) - front side		
P	3396 mm	= A + N
Q	1696 mm	= B + N
R	446 mm	= D + N
7.1.8.b Dimensions of test rig 2 (in mm) - front side		
P	3485 mm	= A + N
Q	1785 mm	= B + N
R	335 mm	= D + N
7.2 Secondary opening		
7.2.1 Shall a secondary opening be included in test Configuration 1?	yes	[7.2.1] requires to always incorporate a secondary opening in the main face of the test specimen and of the test rig
7.2.2 Shall a secondary opening be included in test Configuration 2?	yes	See item 7.2.1.
7.3 Test specimen / ANNEX C Mounting of test specimen at openings		
7.3.1 Does the Façade system 1 offer any protection to openings?	yes	According to the drawing "Façade 1 - Vertical section with legends", the drip plate, the window sill and the caulking correspond to the definition of "protection to openings" given in [3].
7.3.2 If yes, what configuration does it correspond in annex C?	case 4	
7.3.3.a Configuration of specimen 1 regarding the window frame?	Both with and without the frame is possible	[Annex C] For the standard configuration "case 4", two testing options are proposed: mounting without any frame or mounting with a frame.
7.3.3.b Drawing of the interface between specimen 1 and edges of openings		
- drawing with frame supplied?	UNGRADABLE	69% of the participants have submitted a drawing. Among this population, the following sub-populations have chosen the following configurations:
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE	- yes for 95%
+ what has been removed?		
* TOP - Window frame	UNGRADABLE	- removed by 100%
* TOP - Caulking	UNGRADABLE	- removed by 100%
* TOP - Frame fixing lug	UNGRADABLE	- removed by 100%
* TOP - Frame edging profile	UNGRADABLE	- removed by 95%
* TOP - Drip plate	UNGRADABLE	- removed by 100%
* TOP - Completion lintel layer	UNGRADABLE	- removed by 80%
* BOTTOM - Window frame	UNGRADABLE	- removed by 85%
* BOTTOM - Caulking	UNGRADABLE	- removed by 85%
* BOTTOM - Frame fixing lug	UNGRADABLE	- removed by 85%
* BOTTOM - Frame edging profile	UNGRADABLE	- removed by 80%
* BOTTOM - External window sill	UNGRADABLE	- removed by 85%
* BOTTOM - Completion sill layer	UNGRADABLE	- removed by 65%

ITEM	CORRECT ANSWER	COMMENT
* BOTTOM - Internal window sill	UNGRADABLE	- removed by 55%
- drawing without frame supplied?	UNGRADABLE	59% of the participants have submitted a drawing. Among this population, the following sub-populations have chosen the following configurations:
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE	yes for 71%
+ what has been removed?		
* TOP - Window frame	UNGRADABLE	- removed by 100%
* TOP - Caulking	UNGRADABLE	- removed by 94%
* TOP - Frame fixing lug	UNGRADABLE	- removed by 94%
* TOP - Frame edging profile	UNGRADABLE	- removed by 94%
* TOP - Drip plate	UNGRADABLE	- removed by 59%
* TOP - Completion lintel layer	UNGRADABLE	- removed by 94%
* BOTTOM - Window frame	UNGRADABLE	- removed by 82%
* BOTTOM - Caulking	UNGRADABLE	- removed by 76%
* BOTTOM - Frame fixing lug	UNGRADABLE	- removed by 76%
* BOTTOM - Frame edging profile	UNGRADABLE	- removed by 76%
* BOTTOM - External window sill	UNGRADABLE	- removed by 47%
* BOTTOM - Completion sill layer	UNGRADABLE	- removed by 76%
* BOTTOM - Internal window sill	UNGRADABLE	- removed by 76%
7.3.4 Does the Façade system 2 offer any protection to openings?	yes	According to the drawing "Façade 2 - Vertical section with legends", the drip plate, the window sill, the caulking, the window frame, the completion lintel board and the internal window sill correspond to the definition of "protection to openings" given in [3].
7.3.5 If yes, what configuration does it correspond in annex C?	case 6	
7.3.6.a Configuration of specimen 2 regarding the window frame?	Both with and without the frame is possible	[Annex C] For the standard configuration "case 6", two testing options are proposed: mounting without any frame or mounting with a frame.
7.3.6.b Drawing of the interface between specimen 2 and edges of openings		
- drawing with frame supplied?	UNGRADABLE	69% of the participants have submitted a drawing. Among this population, the following sub-populations have chosen the following configurations:
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE	- yes for 55%
+ what has been removed?		
* TOP - Window frame	UNGRADABLE	- removed by 100%
* TOP - Caulking	UNGRADABLE	- removed by 100%
* TOP - Drip plate	UNGRADABLE	- removed by 100%
* TOP - Completion lintel board	UNGRADABLE	- removed by 95%
* TOP - Completion wall board	UNGRADABLE	- removed by 55%
* BOTTOM - Window frame	UNGRADABLE	- removed by 90%
* BOTTOM - Caulking	UNGRADABLE	- removed by 90%
* BOTTOM - External window sill	UNGRADABLE	- removed by 90%
* BOTTOM - Completion wall board	UNGRADABLE	- removed by 45%
* BOTTOM - Internal window sill	UNGRADABLE	- removed by 80%

ITEM	CORRECT ANSWER	COMMENT
- drawing without frame supplied?	UNGRADABLE	59% of the participants have submitted a drawing. Among this population, the following sub-populations have chosen the following configurations:
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE	- yes for 53%
+ what has been removed?		
* TOP - Window frame	UNGRADABLE	- removed by 100%
* TOP - Caulking	UNGRADABLE	- removed by 94%
* TOP - Drip plate	UNGRADABLE	- removed by 53%
* TOP - Completion lintel board	UNGRADABLE	- removed by 88%
* TOP - Completion wall board	UNGRADABLE	- removed by 94%
* BOTTOM - Window frame	UNGRADABLE	- removed by 88%
* BOTTOM - Caulking	UNGRADABLE	- removed by 88%
* BOTTOM - External window sill	UNGRADABLE	- removed by 65%
* BOTTOM - Completion wall board	UNGRADABLE	- removed by 82%
* BOTTOM - Internal window sill	UNGRADABLE	- removed by 82%
7.3.7 Different configuration at sec. opening and comb. chamber opening?	no	[7.3] makes no difference in the detailing of the test specimen at openings (combustion chamber opening and secondary opening).
7.3.8 Advantage of testing without any frame?	Enlarges the field of application to any frame	[13.h]
7.4 Junction between façade and floor (optional test procedure)		
7.4.1 Possible to assess the façade-to-floor-junction for Façade 1?	no	See [7.4], first note: façade-to-floor junctions don't exist in cases of façades mounted on a supporting construction.
7.4.2 Drawing of specimen 1 at the roof slab of the combustion chamber		
Proposed configuration?		No drawing was expected since it is not possible to assess the façade-to-floor-junction for Façade 1.
7.4.3 Possible to assess the façade-to-floor-junction for Façade 2?	yes	In case where the façade is mounted on a structural frame, there is a junction between the floor and the tested façade.
7.4.4 Drawing of specimen 2 at the roof slab of the combustion chamber		
- Floor of the combustion chamber	Replaced by complete floor of test façade 2	- [4.5] When assessment of the façade-to-floor junction is performed, the roof of the combustion chamber shall comply with the requirements given in Annex D. - [Annex D] The roof of the combustion chamber shall be replaced by the representative floor intended to be used in practice.
- Thermocouples position	At 25 mm from the internal wall (plasterboard)	See below this table for more details.
8 CONDITIONING OF TEST SPECIMEN		
8.2.1 Explain how you will condition the test specimen What is mentioned by participants?		

ITEM	CORRECT ANSWER	COMMENT
- Protection from adverse environmental conditions	yes	[8.1] The test rig with the mounted test specimen shall always be protected from adverse environmental conditions.
- Follow up of the moisture content	INFO	[8.1] It will depend if the tested façade system includes hygroscopic materials or not.
- Storing inside	INFO	[5] The assessment method allows indoor as well as outdoor testing.
8.2.2 Conditioning criterion to follow to decide when the test can be started What is mentioned by participants?		
- If hygrosc. materials: stabilization of the moist. content in the mock-up	yes	[8.1] requires that "if the tested façade system includes hygroscopic materials, it shall be conditioned following the requirements of 8.2, otherwise it shall be conditioned in accordance with the test sponsor's specifications". No other conditioning rule is allowed by the assessment method.
- If not: in accordance with the test sponsor's specifications	yes	
8.2.3 Is a mock-up needed to monitor the conditioning of the specimen 1?	no	[8.2]: - The drawing of Façade 1 informs that tiles are made of anhygroscopic ceramic. - Aluminium and steel are anhygroscopic. - It has been assumed that mineral fibres are largely anhygroscopic.
8.2.4 If yes, dimensions of mock-up for specimen 1 (in mm)		
X1		No answer was expected since no mock-up is deemed necessary.
Y1		
Z1		
8.2.5 If yes, faces of mock-up for specimen 1 covered in plastic?		
- Face 1		No answer was expected since no mock-up is deemed necessary.
- Face 2		
- Face 3		
- Face 4		
- Face 5		
- Face 6		
8.2.6 Is a mock-up needed to monitor the conditioning of the specimen 2?	yes	[8.2]: Wood pieces and plasterboards are hygroscopic materials.
8.2.7 If yes, dimensions of mock-up for specimen 2 (in mm)		
X2	855 mm	[8.2] 855 = 3x285 > 200 mm
Y2	855 mm	[8.2] 855 = 3x285 > 200 mm
Z2	285 mm	[8.2] Same thickness than the tested façade system
8.2.8 If yes, faces of mock-up for specimen 2 covered in plastic?		
- Face 1	no	[8.2] requires that all sides of the mock-up shall be covered in plastic except both exposed and unexposed faces where the test specimen is mounted onto a structural frame.
- Face 2	no	
- Face 3	yes	
- Face 4	yes	
- Face 5	yes	
- Face 6	yes	

ITEM	CORRECT ANSWER	COMMENT
9 APPLICATION OF INSTRUMENTATION		
9.1 Temperature measurements		
9.1.1 Drawing of locations of external and internal th. for Façade 1		See below this table for more details.
- external th. is present	yes	[9.1.2]
- external th. is at 50 mm in front of the exposed face	yes	[9.1.2]
- number of internal layers of th.	2	
+ in ceramic tiles	x	
+ in air between horizontal sections		
+ in air between vertical sections		
+ in air between all sections	x	
+ in insulation boards		
+ in supporting construction		
- internal th. are at mid-depth of each layer	yes	[9.1.3]
9.1.2 Total number of th. for Façade 1		[9.1.2], [9.1.3] and [Figure 13]
- on level 1	24	3 (1 th. ext. + 2 th. int.) x 8 locations (5 on main face + 3 on wing)
- on column 1	36	3 (1 th. ext. + 2 th. int.) x 12 locations (on main face)
- on column 2	36	3 (1 th. ext. + 2 th. int.) x 12 locations (on wing)
9.1.3 Drawing of locations of external and internal th. for Façade 2		See below this table for more details.
- external th. is present	yes	[9.1.2]
- external th. is at 50 mm in front of the exposed face	yes	[9.1.2]
- number of internal layers of th.	4	
+ in covering board	x	
+ in air between vertical laths	x	
+ in wind protection		
+ in outer insulation		
+ in insulation	x	
+ in "invisible" plasterboard		
+ in "visible" plasterboard		
+ between both plasterboards	x	
- internal th. are at mid-depth of each layer	yes	[9.1.3]
9.1.4 Total number of th. for Façade 2		[9.1.2], [9.1.3] and [Figure 12]
- on level 1	40	5 (1 th. ext. + 4 th. int.) x 8 locations (5 on main face + 3 on wing)
- on column 1	60	5 (1 th. ext. + 4 th. int.) x 12 locations (on main face)
- on column 2	60	5 (1 th. ext. + 4 th. int.) x 12 locations (on wing)
12 TEST REPORT		See below this table for more details.
12.1 Declare the test results for Test 1 (in minutes)		
- (Performance) Fire spread	18 minutes	[11.1]
+ (Criterion) Vertical fire spread	18 minutes	[11.1.1] Th. L6-E at 18,3 min
+ (Criterion) Horizontal fire spread	21 minutes	[11.1.2] Th. CMF2-E at 21,4 min
- (Performance) Falling parts	22 minutes	[11.2]
+ (Criterion) Solid falling parts	22 minutes	[11.2.1] 16 N > 1 kg at 22,9 min
+ (Criterion) Burning parts	60 minutes	[11.2.2] No burning part reported
12.2 Declare the test results for Test 2 (in minutes)		
- (Performance) Fire spread	60 minutes	[11.1]
+ (Criterion) Vertical fire spread	60 minutes	[11.1.1] No failure recorded (L4-E exceeds 500°C in rise at 21,8 min but it lasts less than 30 seconds)

ITEM	CORRECT ANSWER	COMMENT
+ (Criterion) Horizontal fire spread	60 minutes	[11.1.2] No failure recorded
- (Performance) Falling parts	11 minutes	[11.2]
+ (Criterion) Solid falling parts	11 minutes	[11.2.1] 12 N > 1 kg and 0,104 m² > 0,1 m² at 11,9 min
+ (Criterion) Burning parts	12 minutes	[11.2.2] Wood start glowing at 11,9 min + 20 sec observation
13 DIRECT FIELD OF APPLICATION		
13.1 Declare the direct field of application for the tested Façade 1 What clauses are included by participants?		
a) decrease in distance of fixing centres	Not applicable	[12.o] states that a field of application can only be granted in cases where the tested façade has achieved at least one of the classifications provided in chapter [14]. Otherwise, the dedicated section in the report shall mention "Not applicable". No classification has been achieved by the Façade 1 (see item 14.1 below).
b) increase in the number of horizontal joints	Not applicable	
c) increase in the number of vertical joints	Not applicable	
d) the width of an identical construction may be increased if…	Not applicable	
e) the height of the construction may be increased	Not applicable	
f) insulation of Euroclass A2 can be replaced by an Euroclass A1 if …	Not applicable	
g) insulation of Euroclass E can be replaced by an Euroclass B, C or D if …	Not applicable	
h) any kind of frame can be fitted when tested without any frame	Not applicable	
13.2 Declare the direct field of application for the tested Façade 2 What clauses are included by participants?		
a) decrease in distance of fixing centres	yes	
b) increase in the number of horizontal joints	yes	
c) increase in the number of vertical joints	yes	
d) the width of an identical construction may be increased if…	yes	
e) the height of the construction may be increased	yes	
f) insulation of Euroclass A2 can be replaced by an Euroclass A1 if …	yes	
g) insulation of Euroclass E can be replaced by an Euroclass B, C or D if …	no or not applicable	There is no insulation of Euroclass E in Façade 2, the answer should thus be "no". Note that "not applicable" should be used in case were no classification is met [12.o]. This answer is however also accepted here because it leads to the same DIAP.
h) any kind of frame can be fitted when tested without any frame	INACCURATE	See below this table for more details.
14 CLASSIFICATION		
14.1 Declare all the possible final classifications for Façade 1 acc. to Test 1	No classification	[14] The end of the fire spread performance at 18 minutes prevents any classification (no failure during the whole 60 minutes of testing is needed to grant a classification).
14.2 Declare all the possible final classifications for Façade 2 acc. to Test 2	LS4	[14] Medium fire exposure test fulfilling fire spread during the full test (60 minutes) allows LS4 classification, but the end of the falling parts performance at 11 minutes prevent any LS3 classification.
15 EXPERIENCE OF YOUR LAB		
15.1 Does your lab have practical experience with façade testing?	INFO	
15.2 If yes:		
+ Method ref.	INFO	
+ Since year	INFO	
+ Number of test	INFO	

Annex to 4.3.2

Originally, the answer expected by the steering group was simply "no", because the steel frame will be protected by the backing board.
The participants were allowed to comment their answer to this question. The received contents ("it could make it difficult to install the backing board", "the steel frame could be heated if the backing board breaks/opens"…) express some relevant concerns that were not foreseen by the organisers. It shows that the original question was probably expressed in a too simple way, and that the participants thought much more deeply than expected about practical problems that might arise.
This question was therefore classified as "INACCURATE" by the steering group.

Annex to 7.1.3 and 7.1.6

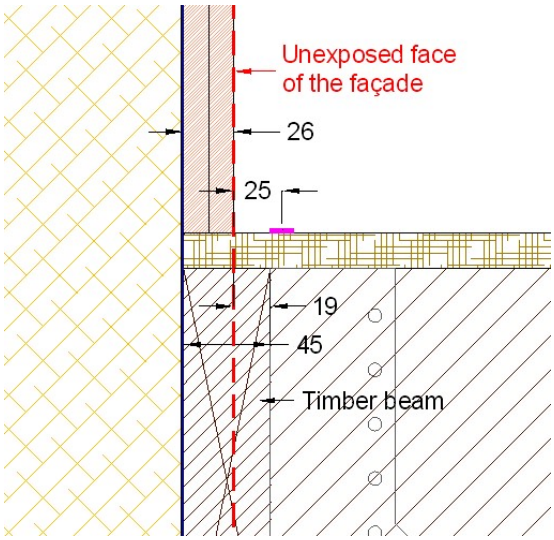
Originally, the answer expected by the steering group to the question 7.1.3 was simply "as in practice", because [7.3] requires the test specimen to be installed "on both the main wall and the wing as in practice", and "as far as possible by the same method and procedures as in practice". Various but however relevant answers have been received ("steel angles are anchored to the supporting construction", "according to the manufacturer instructions", "as described in the mounting instructions"…), showing that the original question was probably expressed in a too simple way. This question was therefore classified as "INACCURATE" by the steering group.
As for the question 7.1.6, the steering group couldn't find any correct answer strictly complying with [7.3], which requires to install the test specimen on both the main wall and the wing as in practice.

Generally speaking, the test rig (structural frame or supporting construction) imposed by the assessment method doesn't exist as such in a real building. The test specimen can therefore not be strictly fixed "as in practice", and "as far as possible as in practice" doesn't tell more about how it should/could be fixed. For instance, even for fixation in supporting construction, suitable anchors for aerated concrete should be used and this could already differ than the ones used "in practice".

Annex to item 7.4.4

According to [3], the inner timber beam has a different thermal insulation than the other areas in presence and is thus a discrete area. However, by comparison with figure 15 in [9.3], the depth to consider is 19 mm, not 45 mm (see drawing below). Chapter [9.3] then requires the thermocouples to be located on the floor at 25 mm from the unexposed face of the tested façade.

Note that these thermocouples shall be placed on the visible upper surface of the floor, not inside the floor.



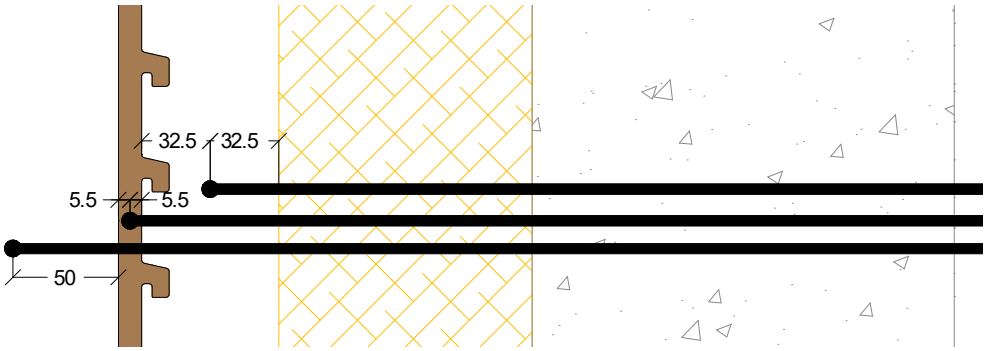
Annex to item 9.1.1

The configuration of the internal thermocouples is based on the following requirements of the assessment method:

- [9.1.3] In each location, internal thermocouples shall be positioned at the mid-depth of each combustible layer and air cavity within the test specimen with a depth ≥10 mm. In this regard, several consecutive layers of the same material shall be considered as one single layer.
- [3] Combustible (layer): Material whose Euroclass ranges from B to F or whose reaction to fire performance has not been determined

The application of these rules leads to:

- in ceramic tiles:
  an internal thermocouple shall be placed (this layer is assumed to be combustible since no reaction to fire performance is reported in the description of the test specimen)
- in air between horizontal sections:
  no internal thermocouple is needed (several consecutive layers of the same material shall be considered as one single layer)
- in air between vertical sections:
  no internal thermocouple is needed (several consecutive layers of the same material shall be considered as one single layer)
- in air between all sections:
  an internal thermocouple shall be placed (air cavity, several consecutive layers of the same material shall be considered as one single layer)
- in insulation boards:
  no internal thermocouple is needed (this layer is not combustible because reported to be Euroclass A2)
- in supporting construction:
  no internal thermocouple is needed (not part of the tested specimen)



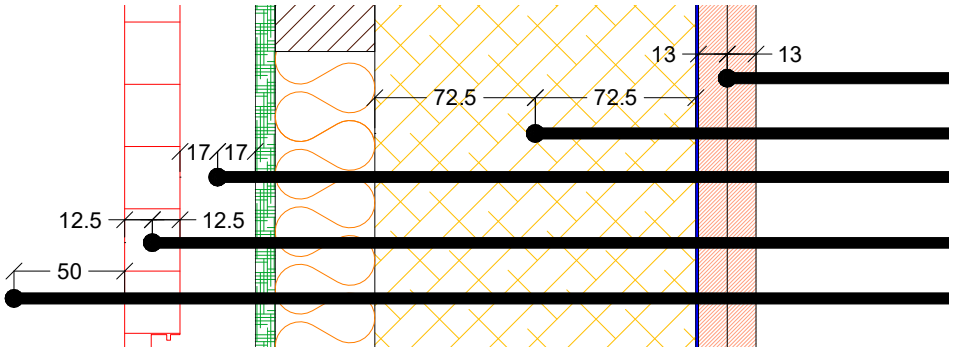
Annex to item 9.1.3

The configuration of the internal thermocouples is based on the following requirements of the assessment method:

- [9.1.3] In each location, internal thermocouples shall be positioned at the mid-depth of each combustible layer and air cavity within the test specimen with a depth ≥10 mm. In this regard, several consecutive layers of the same material shall be considered as one single layer.
- [3] Combustible (layer): Material whose Euroclass ranges from B to F or whose reaction to fire performance has not been determined

The application of these rules leads to:

- in covering board:
  an internal thermocouple shall be placed (this layer is assumed to be combustible since no reaction to fire performance is reported in the description of the test specimen)
- in air between vertical laths:
  an internal thermocouple shall be placed (air cavity)
- in wind protection:
  no internal thermocouple is needed (depth is 9 mm ≤ 10 mm)
- in outer insulation:
  no internal thermocouple is needed (this layer is not combustible because reported to be Euroclass A2)
- in insulation:
  an internal thermocouple shall be placed (this layer is combustible because reported to be Euroclass D)
- in "invisible" plasterboard:
  no internal thermocouple is needed (several consecutive layers of the same material shall be considered as one single layer)
- in "visible" plasterboard:
  no internal thermocouple is needed (several consecutive layers of the same material shall be considered as one single layer)
- between both plasterboards:
  an internal thermocouple shall be placed (this layer is assumed to be combustible since no reaction to fire performance is reported in the description of the test specimen, several consecutive layers of the same material shall be considered as one single layer)



Annex to item 12

In addition to the comment in the table above, the following requirements of the assessment method are also applied:

- [10.7] Regarding the performance criteria which didn't fail prior to termination of the test, the test results shall be given as the time of termination of the test and shall be qualified accordingly.
  → this explains the "60 minutes" results in the table above (termination of the test)
- [12.i] The test results shall be stated in completed minutes.

Annex to item 13.2.h

Originally, the answer expected by the steering group was "Yes", because testing both with and without the frame is possible, as shown in question 7.3.6.a.
The participants were allowed to comment their answer to this question. Some participants pointed out that the fictitious data supplied for the exercises (see file "Observation of falling parts – Test 2") mention that "a piece from the window frame falls down" at 9,5 minute, and that it could implicitly mean that a frame was accommodated in test 2. This relevant observation was not foreseen by the organisers. It shows that the original question together with the question 7.3.6.a and with the fictitious observation file could have confused some participants.
This question was therefore classified as "INACCURATE" by the steering group.

PART 2 – ANALYSES OF THE DATA

2.1 PURPOSE

This second part “Analyses of the data” implements some graphical and numerical basic processing to assess the level of understanding of each evaluated item on the one hand, and of each question on the other hand. Those simple tools allow deducing a clear picture of the intelligibility of the assessment method.
This second part uses the data arising from the Part 1 of the exercises (see § 0.2.3). The data resulting from the Part 2 of the exercises (open comments, see § 0.2.3) will be referenced in the third part of the present report.

2.2 PROCESSING OF THE RECEIVED ANSWERS

2.2.1 Grading definition

In preparation for the analyses to be carried out in this part 2 of this report, a predefined 2-level grading will be used: **correct answer** and **incorrect answer** (see § 1.3.1 for the definition of correct answer).

Some questions allowed the participants to answer "**I don't know**". It was necessary to provide this option. Indeed, in case participants report occasions when they are unable to follow the instructions of the assessment method, it may indicate a deficiency in the method.
Some received answers have been graded **irrelevant answers** (comprehensible response, but not answering the question) or **incomprehensible answers** (the given answer could not be understood).
Some labs didn't answer to some questions. The resulting **missing answers** will be interpreted as "I don't know".

2.2.2 Answers encoding

An in-depth reading of each received answer was conducted. All these answers have been tabulated in order to allow the processing and analyses presented below. The full table of received answers is presented in Annex E.

2.2.3 Statistics

2.2.3.1 Scores

The first step to allow the performing of a graphical and numerical processing is to assign numerical points to the answer of each lab for each evaluated item. The following definitions are adopted:

- correct answer : point = 1
- incorrect answer : point = 0

For the purpose of the analyses, the answers graded as being (see § 2.2.1) "I don't know" answers, irrelevant answers, incomprehensible answers and missing answers are considered as "incorrect answers".

For each gradable item, a score has been computed as being the average – expressed in percent – of the labs' points for this item. These scores are reported in the column "Score" in the table below.

Interpretation

The scores are a picture of the level of agreement between the participants on the correct answer. The higher the score, the more intelligible the item can be assumed, so does the related requirement of the assessment method.

For convenience, a colour code has been applied to the scores, making it easy to locate the highest and the lowest scores at a glance:

0% ≤ score ≤ 50%	→ items with a poor intelligibility (minority of agreement)
50% < score < 75%	→ items with a questionable intelligibility (low majority of agreement)
75% ≤ score ≤ 100%	→ items with a good intelligibility (strong majority of agreement)

Note that this 3-level colour code has been chosen purely arbitrarily, the aim is to allow a quick overview of the score table.

2.2.3.2 Ranks

For each gradable item, a rank has been deduced from the items' scores by assigning the rank 1 to the item having the smallest score, rank 2 to the item having the next upper score… up to rank 123 to the item having the highest score. These ranks are reported in the column "Rank" in the table below.

Interpretation

The rank-sorting provides a simple method to identify the items having the most extreme results. They will be used to set an order of priority in the requirements of the assessment method to be improved, by starting to focus on the items with the lowest ranks.

For convenience, the ranks related to the items with a "red score" (≤ 50%) appear in red bold in the table.

Note 1:
By definition, the ungradable items point out existing deficiencies in the current version of the assessment method (see § 1.3.1). Therefore, they should be classified as "poorly intelligible items" and be handled as such, with some kind of priority to be improved. For this reason, while no score is computable for them, the ungradable items will be conventionally ranked at 0 in such a way that they will appear in the "red score" group of items.

Note 2:
Since no score nor rank is computable for the inaccurate and informative items, these ones do not impact the analyses below.

Note 3:
In the present analyses, the scores and the ranks are affected the same way to all the items, i.e. each item is considered to have the same "weight". Therefore, the scoring and ranking disregard the relative importance of the items, namely their criticality on the test results. One should be aware that some items have a greater influence on the test results than the other items.

2.3 ANALYSIS BY ITEM

This chapter implements the data processing presented in § 2.2 above to the list of 210 items that have been identified for evaluation (see § 1.2). The resulting score and grading distributions illustrate the ***level of intelligibility of each evaluated item***.

2.3.1 Scoring table

The encoding, scoring and ranking steps described in § 2.2 above lead to the agreed-upon table of scores presented below.

As a reminder (see § 1.3.1):

- INFO = informative item, intended to collect open information about the need or the experience of the labs, not assessable
- UNGRADABLE = ungradable item, no correct answer could be defined by the steering group, not assessable
- INACCURATE = inaccurate item, poor wording of the question leading to various acceptable answers, not assessable

Item	Correct answer	Score	Rank
4 TEST EQUIPMENT			
4.3 Structural frame			
4.3.1 Problem if frame passes behind the combustion chamber opening?	yes	76%	55
4.3.2 Problem if frame passes behind the secondary opening?	INACCURATE		
4.3.3 Need the assessment method to supply more detail?	INFO		
If yes, comment on what information you would need	INFO		
5 ENVIRONMENTAL CONDITIONS			
5.1 Test can be started according to the file of ambient conditions?	yes	97%	114
5.2 Test invalidated if rain on the specimen from test minute 13 to 21?	yes	97%	114
5.3 Test invalidated if rain on the specimen from test minute 43 to 45?	yes	90%	88
6 TEST SPECIMEN			
6.3 Design			
6.3.1 How do you usually manage the test specimen design?			
- I let the client perform it alone	INFO		
- I discuss with the client about its needs	INFO		
- I take into account the whole product range of the test specimen	INFO		
- I take into account the direct field of application	INFO		
If needed, comment on the aspects above and on your answers	INFO		
7 MOUNTING OF THE TEST SPECIMEN			
7.1 General			
7.1.1 Kind of support on which you would install the Façade 1?	On a supporting construction	93%	103
7.1.2 What configuration of test rig does it correspond to in Figure 1?	Configuration 1	83%	64
7.1.3 How should the Façade 1 be attached/fixed/fastened to the rig?	INACCURATE		
7.1.4 Kind of support on which you would install the Façade 2?	On a structural frame	93%	103
7.1.5 What configuration of test rig does it correspond to in Figure 1?	Configuration 3	86%	79
7.1.6 How should the Façade 2 be attached/fixed/fastened to the rig?	UNGRADABLE		**0**
7.1.7.a Dimensions of test specimen 1 (in mm) - exposed face			
A	3200 mm	100%	123
B	1500 mm	100%	123
C	6000 mm	97%	114
D	250 mm	93%	103
E	2000 mm	97%	114
F	2000 mm	93%	103
G	500 mm	97%	114
H	1250 mm	100%	123
I	1200 mm	100%	123
J	1200 mm	100%	123
K	1500 mm	100%	123
L	750 mm	100%	123
M	750 mm	100%	123
N	196 mm	79%	58

Item	Correct answer	Score	Rank
O	1000 mm	97%	114
7.1.7.b Dimensions of test specimen 2 (in mm) - exposed face			
A	3200 mm	100%	123
B	1500 mm	100%	123
C	6000 mm	86%	79
D	50 mm	93%	103
E	1000 mm	90%	88
F	1000 mm	93%	103
G	500 mm	97%	114
H	1250 mm	100%	123
I	1200 mm	100%	123
J	1200 mm	100%	123
K	1500 mm	100%	123
L	750 mm	100%	123
M	750 mm	97%	114
N	285 mm	83%	64
O	800 mm	93%	103
7.1.8.a Dimensions of test rig 1 (in mm) - front side			
P	3396 mm	83%	64
Q	1696 mm	83%	64
R	446 mm	76%	55
7.1.8.b Dimensions of test rig 2 (in mm) - front side			
P	3485 mm	86%	79
Q	1785 mm	86%	79
R	335 mm	79%	58
7.2 Secondary opening			
7.2.1 Shall a secondary opening be included in test Configuration 1?	yes	100%	123
7.2.2 Shall a secondary opening be included in test Configuration 2?	yes	100%	123
7.3 Test specimen / ANNEX C Mounting of test specimen at openings			
7.3.1 Does the Façade system 1 offer any protection to openings?	yes	93%	103
7.3.2 If yes, what configuration does it correspond in annex C?	case 4	90%	88
7.3.3.a Configuration of specimen 1 regarding the window frame?	Both with and without the frame is possible	86%	79
7.3.3.b Drawing of the interface between specimen 1 and edges of openings			
- drawing with frame supplied?	UNGRADABLE		0
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE		0
+ what has been removed?			
* TOP - Window frame	UNGRADABLE		0
* TOP - Caulking	UNGRADABLE		0
* TOP - Frame fixing lug	UNGRADABLE		0
* TOP - Frame edging profile	UNGRADABLE		0
* TOP - Drip plate	UNGRADABLE		0
* TOP - Completion lintel layer	UNGRADABLE		0
* BOTTOM - Window frame	UNGRADABLE		0
* BOTTOM - Caulking	UNGRADABLE		0
* BOTTOM - Frame fixing lug	UNGRADABLE		0
* BOTTOM - Frame edging profile	UNGRADABLE		0
* BOTTOM - External window sill	UNGRADABLE		0
* BOTTOM - Completion sill layer	UNGRADABLE		0
* BOTTOM - Internal window sill	UNGRADABLE		0
- drawing without frame supplied?	UNGRADABLE		0
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE		0
+ what has been removed?			
* TOP - Window frame	UNGRADABLE		0
* TOP - Caulking	UNGRADABLE		0
* TOP - Frame fixing lug	UNGRADABLE		0
* TOP - Frame edging profile	UNGRADABLE		0

Item	Correct answer	Score	Rank
* TOP - Drip plate	UNGRADABLE		0
* TOP - Completion lintel layer	UNGRADABLE		0
* BOTTOM - Window frame	UNGRADABLE		0
* BOTTOM - Caulking	UNGRADABLE		0
* BOTTOM - Frame fixing lug	UNGRADABLE		0
* BOTTOM - Frame edging profile	UNGRADABLE		0
* BOTTOM - External window sill	UNGRADABLE		0
* BOTTOM - Completion sill layer	UNGRADABLE		0
* BOTTOM - Internal window sill	UNGRADABLE		0
7.3.4 Does the Façade system 2 offer any protection to openings?	yes	93%	103
7.3.5 If yes, what configuration does it correspond in annex C?	case 6	69%	42
7.3.6.a Configuration of specimen 2 regarding the window frame?	Both with and without the frame is possible	79%	58
7.3.6.b Drawing of the interface between specimen 2 and edges of openings			
- drawing with frame supplied?	UNGRADABLE		0
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE		0
+ what has been removed?			
* TOP - Window frame	UNGRADABLE		0
* TOP - Caulking	UNGRADABLE		0
* TOP - Drip plate	UNGRADABLE		0
* TOP - Completion lintel board	UNGRADABLE		0
* TOP - Completion wall board	UNGRADABLE		0
* BOTTOM - Window frame	UNGRADABLE		0
* BOTTOM - Caulking	UNGRADABLE		0
* BOTTOM - External window sill	UNGRADABLE		0
* BOTTOM - Completion wall board	UNGRADABLE		0
* BOTTOM - Internal window sill	UNGRADABLE		0
- drawing without frame supplied?	UNGRADABLE		0
+ façade extends below the floor slab of the combustion chamber?	UNGRADABLE		0
+ what has been removed?			
* TOP - Window frame	UNGRADABLE		0
* TOP - Caulking	UNGRADABLE		0
* TOP - Drip plate	UNGRADABLE		0
* TOP - Completion lintel board	UNGRADABLE		0
* TOP - Completion wall board	UNGRADABLE		0
* BOTTOM - Window frame	UNGRADABLE		0
* BOTTOM - Caulking	UNGRADABLE		0
* BOTTOM - External window sill	UNGRADABLE		0
* BOTTOM - Completion wall board	UNGRADABLE		0
* BOTTOM - Internal window sill	UNGRADABLE		0
7.3.7 Different configuration at sec. opening and comb. chamber opening?	no	72%	47
7.3.8 Advantage of testing without any frame?	Enlarges the field of application to any frame	59%	26
7.4 Junction between façade and floor (optional test procedure)			
7.4.1 Possible to assess the façade-to-floor-junction for Façade 1?	no	86%	79
7.4.2 Drawing of specimen 1 at the roof slab of the combustion chamber			
Proposed configuration?		93%	103
7.4.3 Possible to assess the façade-to-floor-junction for Façade 2?	yes	90%	88
7.4.4 Drawing of specimen 2 at the roof slab of the combustion chamber			
- Floor of the combustion chamber	Replaced by complete floor of test façade 2	66%	39
- Thermocouples position	At 25 mm from the internal wall (plasterboard)	28%	14
8 CONDITIONING OF TEST SPECIMEN			

Item	Correct answer	Score	Rank
8.2.1 Explain how you will condition the test specimen What is mentioned by participants?			
- Protection from adverse environmental conditions	yes	72%	47
- Follow up of the moisture content	INFO		
- Storing inside	INFO		
8.2.2 Conditioning criterion to follow to decide when the test can be started What is mentioned by participants?			
- If hygrosc. materials: stabilization of the moist. content in the mock-up	yes	83%	64
- If not: in accordance with the test sponsor's specifications	yes	48%	22
8.2.3 Is a mock-up needed to monitor the conditioning of the specimen 1?	no	55%	25
8.2.4 If yes, dimensions of mock-up for specimen 1 (in mm)			
X1		59%	26
Y1		59%	26
Z1		59%	26
8.2.5 If yes, faces of mock-up for specimen 1 covered in plastic?			
- Face 1		59%	26
- Face 2		59%	26
- Face 3		59%	26
- Face 4		59%	26
- Face 5		59%	26
- Face 6		59%	26
8.2.6 Is a mock-up needed to monitor the conditioning of the specimen 2?	yes	83%	64
8.2.7 If yes, dimensions of mock-up for specimen 2 (in mm)			
X2	855 mm	72%	47
Y2	855 mm	72%	47
Z2	285 mm	79%	58
8.2.8 If yes, faces of mock-up for specimen 2 covered in plastic?			
- Face 1	no	83%	64
- Face 2	no	76%	55
- Face 3	yes	83%	64
- Face 4	yes	83%	64
- Face 5	yes	83%	64
- Face 6	yes	83%	64
9 APPLICATION OF INSTRUMENTATION			
9.1 Temperature measurements			
9.1.1 Drawing of locations of external and internal th. for Façade 1			
- external is th. present	yes	90%	88
- external th. is at 50 mm in front of the exposed face	yes	86%	79
- number of internal layers of th.	2	31%	16
+ in ceramic tiles	x	21%	10
+ in air between horizontal sections		69%	42
+ in air between vertical sections		48%	22
+ in air between all sections	x	48%	22
+ in insulation boards		45%	19
+ in supporting construction		90%	88
- internal th. are at mid-depth of each layer	yes	90%	88
9.1.2 Total number of th. for Façade 1			
- on level 1	24	28%	14
- on column 1	36	31%	16
- on column 2	36	31%	16
9.1.3 Drawing of locations of external and internal th. for Façade 2			
- external is th. present	yes	90%	88
- external th. is at 50 mm in front of the exposed face	yes	86%	79
- number of internal layers of th.	4	10%	4
+ in covering board	x	62%	37
+ in air between vertical laths	x	86%	79
+ in wind protection		90%	88
+ in outer insulation		45%	19

Item	Correct answer	Score	Rank
+ in insulation	x	90%	88
+ in "invisible" plasterboard		90%	88
+ in "visible" plasterboard		90%	88
+ between both plasterboards	x	24%	13
- internal th. are at mid-depth of each layer	yes	90%	88
9.1.4 Total number of th. for Façade 2			
- on level 1	40	7%	1
- on column 1	60	7%	1
- on column 2	60	7%	1
12 TEST REPORT			
12.1 Declare the test results for Test 1 (in minutes)			
- (Performance) Fire spread	18 minutes	66%	39
+ (Criterion) Vertical fire spread	18 minutes	79%	58
+ (Criterion) Horizontal fire spread	21 minutes	72%	47
- (Performance) Falling parts	22 minutes	83%	64
+ (Criterion) Solid falling parts	22 minutes	90%	88
+ (Criterion) Burning parts	60 minutes	72%	47
12.2 Declare the test results for Test 2 (in minutes)			
- (Performance) Fire spread	60 minutes	62%	37
+ (Criterion) Vertical fire spread	60 minutes	69%	42
+ (Criterion) Horizontal fire spread	60 minutes	72%	47
- (Performance) Falling parts	11 minutes	72%	47
+ (Criterion) Solid falling parts	11 minutes	83%	64
+ (Criterion) Burning parts	12 minutes	45%	19
13 DIRECT FIELD OF APPLICATION			
13.1 Declare the direct field of application for the tested Façade 1 What clauses are included by participants?			
a) decrease in distance of fixing centres	Not applicable	17%	9
b) increase in the number of horizontal joints	Not applicable	21%	10
c) increase in the number of vertical joints	Not applicable	21%	10
d) the width of an identical construction may be increased if…	Not applicable	14%	5
e) the height of the construction may be increased	Not applicable	14%	5
f) insulation of Euroclass A2 can be replaced by an Euroclass A1 if …	Not applicable	14%	5
g) insulation of Euroclass E can be replaced by an Euroclass B, C or D if …	Not applicable	66%	39
h) any kind of frame can be fitted when tested without any frame	Not applicable	14%	5
13.2 Declare the direct field of application for the tested Façade 2 What clauses are included by participants?			
a) decrease in distance of fixing centres	yes	83%	64
b) increase in the number of horizontal joints	yes	79%	58
c) increase in the number of vertical joints	yes	59%	26
d) the width of an identical construction may be increased if…	yes	90%	88
e) the height of the construction may be increased	yes	97%	114
f) insulation of Euroclass A2 can be replaced by an Euroclass A1 if …	yes	83%	64
g) insulation of Euroclass E can be replaced by an Euroclass B, C or D if …	no or not applicable	69%	42
h) any kind of frame can be fitted when tested without any frame	INACCURATE		
14 CLASSIFICATION			
14.1 Declare all the possible final classifications for Façade 1 acc. to Test 1	No classification	93%	103
14.2 Declare all the possible final classifications for Façade 2 acc. to Test 2	LS4	69%	42
15 EXPERIENCE OF YOUR LAB			
15.1 Does your lab have practical experience with façade testing?	INFO		
15.2 If yes:			
+ Method ref.	INFO		
+ Since year	INFO		
+ Number of test	INFO		

2.3.2 Global results

The following reminder (see § 1.3.1) may be useful to get a better picture of the results:

Total number of items:	210
broken down as:	
- number of gradable items:	139
- number of ungradable items ("UNGRADABLE"):	55
- number of ungradable items ("INACCURATE "):	3
- number of informative items ("INFO"):	13

The enumeration above is influenced by a "weighting effect" bias: in cases where the more complex questions have been split (see § 1.2.1) into a particularly large amount of items which have mainly been classified as "ungradable", the resulting enumeration leads to an overestimation of the proportion of these ungradable items. Namely, the detailed enumeration above counts 26% (= 55 / 210) of ungradable items, while only 6% (= 3 / 53) of the original questions are considered as "ungradable" (see § 2.4.2 below). See for instance questions 7.3.3.b and 7.3.6.b.

The scoring table above shows the following frequency distribution for the scores of the gradable items:

0% ≤ score ≤ 50%	→ 24 items (with a poor intelligibility)
50% < score < 75%	→ 30 items (with a questionable intelligibility)
75% ≤ score ≤ 100%	→ 85 items (with a good intelligibility)

The global mean score computed on the gradable items is 73,5%.
One must be aware that this global score is affected by two sources of biases, namely:

- an "ungradable" bias: the exclusion of the ungradable items – for which no score can be calculated – from the calculation of the global score leads to an overestimation of the global score,
- a "weighting effect" bias: in cases where the more complex questions have been split (see § 1.2.1) into a particularly large amount of items which have mainly received high (or low) scores, the resulting large amount of high (or low) scores in the balance of the mean leads to an overestimation (or underestimation) of the global score. See for instance questions 7.1.7.a, 7.1.7.b, the number of internal layers of thermocouples in question 9.1.1, or question 13.1.

Therefore, this global mean score should only be considered with care.

2.3.3 Limitation

As seen above, the analysis by item is more useful to focus on the details that cause understanding difficulties. See § 2.6 below for more analyses. However, it can't give a general vision of the global intelligibility by main themes of the assessment method. This will be provided through the analyses by question here below.

2.3.4 Influence of labs' experience

The last question of the exercises asked the participants to report their practical experience with façade testing (only fire spread tests are considered here, not fire resistance tests). In case of any experience, the testing methods used, how long tests are performed, and the number of tests carried out were asked.

Out of the 29 participants, 16 reported detailed experience, while 13 did not (see table at the end of Annex E).
In order to know if such experience could have any influence on the results of this round robin, scores have been computed for each participant as the average of their points to each item. It turns out that 6

labs justify an experience of more than 50 tests, 10 labs justify an experience of less than 50 tests, and 13 labs do not report or justify any experience.

Experienced labs reach an average score of 76,8%, while inexperienced labs reach an average score of 69,5%. A Student's t-test concludes that there is indeed a significant difference between the means of these two groups: the average of the experienced labs is significantly higher than the average of the inexperienced labs, and the t-test specifies that this difference in averages could have happened by chance only with a probability of 4,5% (p-value of this test).

Experienced labs are thus very likely (more than 95% of probability) to have a higher score (+7,3% on average) than the inexperienced labs.

2.4 ANALYSIS BY QUESTION

This chapter implements the data processing presented in § 2.2 above to the list of 53 questions that have been identified for evaluation (see § 1.2). The resulting score and grading distributions illustrate the ***level of intelligibility of each evaluated question***.

2.4.1 Scoring table

In order to have a summarized overview on the results, scores have been computed for each question as the average of the scores of their sub-items. These ones are presented in the table above (see § 2.3.1). Ranks have then been assigned to the questions, based on their score. The interpretation of scores and ranks for the questions is the same than for the items (see § 2.2.3).

Question	Score	Rank
4 TEST EQUIPMENT		
4.3 Structural frame		
4.3.1 Problem if frame passes behind the combustion chamber opening?	76%	18
4.3.2 Problem if frame passes behind the secondary opening?	INACCURATE	
4.3.3 Need the assessment method to supply more detail?	INFO	
5 ENVIRONMENTAL CONDITIONS		
5.1 Test can be started according to the file of ambient conditions?	97%	40
5.2 Test invalidated if rain on the specimen from test minute 13 to 21?	97%	40
5.3 Test invalidated if rain on the specimen from test minute 43 to 45?	90%	30
6 TEST SPECIMEN		
6.3 Design		
6.3.1 How do you usually manage the test specimen design?	INFO	
7 MOUNTING OF THE TEST SPECIMEN		
7.1 General		
7.1.1 Kind of support on which you would install the Façade 1?	93%	33
7.1.2 Configuration of test rig for Façade 1?	83%	24
7.1.3 How should the Façade 1 be attached/fixed/fastened to the rig?	INACCURATE	
7.1.4 Kind of support on which you would install the Façade 2?	93%	33
7.1.5 Configuration of test rig for Façade 2?	86%	27
7.1.6 How should the Façade 2 be attached/fixed/fastened to the rig?	UNGRADABLE	**0**
7.1.7.a Dimensions of test specimen 1	97%	42
7.1.7.b Dimensions of test specimen 2	95%	39
7.1.8.a Dimensions of test rig 1	80%	22
7.1.8.b Dimensions of test rig 2	84%	26
7.2 Secondary opening		
7.2.1 Shall a secondary opening be included in test Configuration 1?	100%	43
7.2.2 Shall a secondary opening be included in test Configuration 2?	100%	43
7.3 Test specimen / ANNEX C Mounting of test specimen at openings		
7.3.1 Does the Façade system 1 offer any protection to openings?	93%	33

Question	Score	Rank
7.3.2 Configuration of Façade 1 in annex C?	90%	30
7.3.3.a Configuration of specimen 1 regarding the window frame?	86%	27
7.3.3.b Drawing of the interface between specimen 1 and edges of openings	UNGRADABLE	0
7.3.4 Does the Façade system 2 offer any protection to openings?	93%	33
7.3.5 Configuration of Façade 2 in annex C?	69%	12
7.3.6.a Configuration of specimen 2 regarding the window frame?	79%	20
7.3.6.b Drawing of the interface between specimen 2 and edges of openings	UNGRADABLE	0
7.3.7 Different configuration at sec. opening and comb. chamber opening?	72%	15
7.3.8 Advantage of testing without any frame?	59%	6
7.4 Junction between façade and floor (optional test procedure)		
7.4.1 Possible to assess the façade-to-floor-junction for Façade 1?	86%	27
7.4.2 Drawing of specimen 1 at the roof slab of the combustion chamber	93%	33
7.4.3 Possible to assess the façade-to-floor-junction for Façade 2?	90%	30
7.4.4 Drawing of specimen 2 at the roof slab of the combustion chamber	47%	4
8 CONDITIONING OF TEST SPECIMEN		
8.2.1 Explain how you will condition the test specimen	72%	15
8.2.2 Conditioning criterion to follow to decide when the test can be started	66%	10
8.2.3 Is a mock-up needed to monitor the conditioning of the specimen 1?	55%	5
8.2.4 If yes, dimensions of mock-up for specimen 1	59%	6
8.2.5 If yes, faces of mock-up for specimen 1 covered in plastic?	59%	6
8.2.6 Is a mock-up needed to monitor the conditioning of the specimen 2?	83%	24
8.2.7 Dimensions of mock-up for specimen 2	75%	17
8.2.8 Faces of mock-up for specimen 2 covered in plastic?	82%	23
9 APPLICATION OF INSTRUMENTATION		
9.1 Temperature measurements		
9.1.1 Drawing of locations of external and internal th. for Façade 1	62%	9
9.1.2 Total number of th. for Façade 1	30%	3
9.1.3 Drawing of locations of external and internal th. for Façade 2	71%	14
9.1.4 Total number of th. for Façade 2	7%	1
12 TEST REPORT		
12.1 Declare the test results for Test 1 (in minutes)	77%	19
12.2 Declare the test results for Test 2 (in minutes)	67%	11
13 DIRECT FIELD OF APPLICATION		
13.1 Declare the direct field of application for the tested Façade 1	22%	2
13.2 Declare the direct field of application for the tested Façade 2	80%	21
14 CLASSIFICATION		
14.1 Declare all the possible final classifications for Façade 1 acc. to Test 1	93%	33
14.2 Declare all the possible final classifications for Façade 2 acc. to Test 2	69%	12
15 EXPERIENCE OF YOUR LAB		
15.1 Does your lab have practical experience with façade testing?	INFO	
15.2 Method - Year - Number of tests	INFO	

2.4.2 Global results

The following enumeration may be useful to get a better picture of the results by question:

Total number of questions: 53

broken down as:

- number of gradable questions: 44
- number of ungradable questions ("UNGRADABLE"): 3
- number of ungradable questions ("INACCURATE"): 2
- number of informative questions ("INFO"): 4

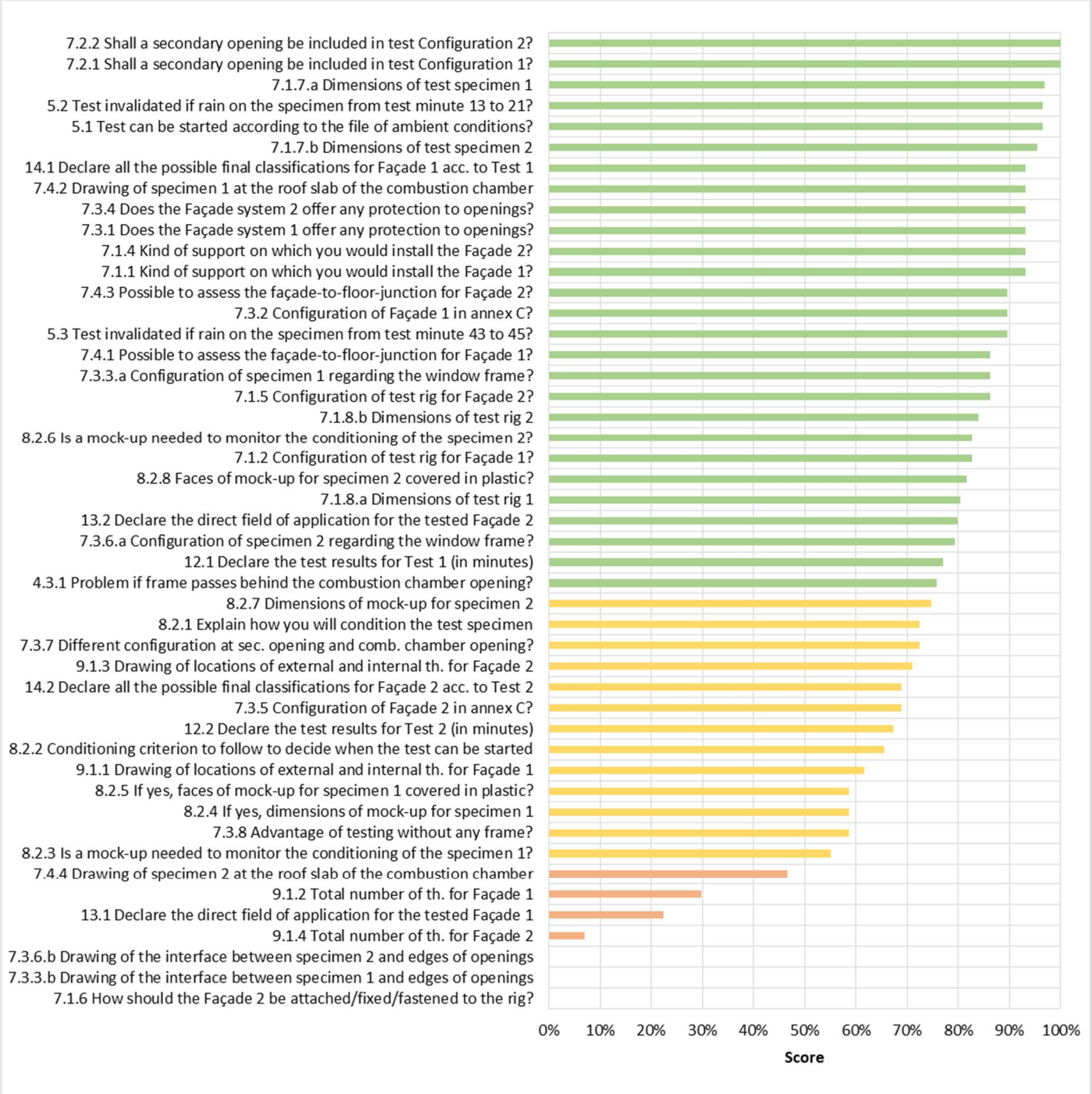
Contrary to the enumeration based on the list of items, the enumeration based on the list of questions is not influenced by a "weighting effect" bias (see § 2.3.2): the proportion of the ungradable items is more realistic (6% = 3 / 53).

The scoring table above shows the following frequency distribution for the scores of the gradable questions:

0% ≤ score ≤ 50%	→ 4 questions (with a poor intelligibility)
50% < score < 75%	→ 13 questions (with a questionable intelligibility)
75% ≤ score ≤ 100%	→ 27 questions (with a good intelligibility)

The global mean score computed on the gradable questions is 76,2%. This global score is no more affected by the "weighting effect" bias but still by the "ungradable" bias (see § 2.3.2). Therefore, this global mean score should also be considered with care.

A bar-plot of questions sorted by their mean scores is shown below.



The table and bar-plot above clearly gives a clear and direct overview of which aspects are affected by poor or questionable intelligibility (lower and intermediate scores). In particular, the questions appear from the bottom to the top of the graph in ascending order of score.

See § 2.6 below for more analyses.

2.5 ANALYSIS OF ANSWERS TO OPEN QUESTIONS

The full content of the answers to open questions are gathered in Annex F. Here below is presented, question by question, a short summary of the trends emerging from the received answers. See § 2.6 below for more analyses.

4.3.1 Is it problematic if a steel section of your structural frame passes just behind the combustion chamber opening? Explain shortly why.

Summary of answers:
- yes because:
  - steel frame should not be heated (distortion, stability)
  - steel frame should not deflect the flame nor interfere with the fire load
  - steel frame should not prevent access to the combustion chamber (installation of the crib)
- no if the steel frame passes behind the whole combustion chamber

4.3.2 Is it problematic if a steel section of your structural frame passes just behind the secondary opening? Explain shortly why.

Summary of answers:
- no because the steel frame will be protected by the backing board
- yes because:
  - it could make it difficult to install the backing board
  - the steel frame could be heated if the backing board breaks/opens
  - such position would not relate to the building practice

4.3.3 Would you need the assessment method to supply more detail on how the structural frame should be designed? Comment on what you would need.

Summary of answers:
- Yes (clearly asked by 59% of the participants):
  - supply a harmonized design of a functional frame (drawings, materials, cross sections, mounting…)
  - need for more details regarding the junction between the test rig and the walls of the combustion chamber, amongst other the lowest transom of the test rig needs to be positioned higher than the roof of the combustion chamber to allow testing floor junction
  - explain how to protect the frame from heat in case of failure
- But: a proposal would be useful, but it should not be mandatory to comply with

6.3.1 Additional comment on how you usually manage the test specimen design. This question is only related to the DESIGN stage of the test configuration (not the manufacturing or the mounting of the test specimen nor any other stage).

Summary of answers:
- To the question "How do you usually manage the test specimen design?", the participants have answered:
  - I let the client perform it alone: 86% answer "no"
  - I discuss with the client about its needs: 100% answer "yes"
  - I take into account the whole product range of the test specimen: 100% answer "yes"
  - I take into account the direct field of application: 100% answer "yes"
- Other comments:

- need to get the maximum information from the manufacturer to provide the widest applicability of test results
- the client is responsible for the design of its façade system, the lab is responsible for the test configuration (no advice is given with regard to product development)
- how should be accommodated irregular-shape façades (curved, other kind of joints than the horizontal or vertical ones…) on the flat, L-shaped test rig?

7.1.3 Describe shortly how you/the manufacturer should attach/fix/fasten the Façade 1 to the rig.

Summary of answers:
- as in practice (steel angles are anchored to the supporting construction, and so on…)
- according to mountings/manufacturer's instructions
- with suitable anchors for aerated concrete
- only from areas accessible in practice, with the main and wing walls assembled as one

7.1.6 Describe shortly how you/the manufacturer should attach/fix/fasten the Façade 2 to the rig.

Summary of answers:
Four mains ideas are given:
- fix the first internal layer (plasterboards) on the structural frame, and then fix the other successive layers from internal to external ones according to manufacturer's instructions
- recreate the building floor slab noses at appropriate heights by means of a secondary frame made of horizontal beams of the same material and thickness as in practice (wooden here) fixed to the test rig, the whole façade can then be mounted as in practice
- fix steel angles or U profiles onto the horizontal sections of the structural frame, and then fix the façade to these angles by means of suitable screws, preferably in the vertical loadbearing structure of the façade (vertical wall studs here)
- such façade is a self-supporting system and does not need to be fixed to the structural frame, except for safety reasons

7.3.7 Will you configure differently the detailing of the test specimen at the edges of the secondary opening and at the edges of the combustion chamber opening? Comment on your answer.

Summary of answers:
- The majority of the participants (72%) have answered "no" to this question. However, their drawings show that many labs actually don't configure both openings exactly the same way. Contrary to the answer and the participants don't seems to care about this point. There is clearly a misunderstanding of this requirement.
- Some participants point out that the presence of the backing board at the secondary opening could interfere with the detailing and could therefore imply some slight adaptation compared to the combustion chamber opening.

7.3.8 Explain shortly the advantage of testing without any frame in cases where testing with a frame is provided by annex C?

Summary of answers:
- Two opposite opinion are reported:
  - the frame protects the opening, meaning that testing without any frame is the worst case, that's why the DIAP allows any kind of frame if the test has been performed without any frame

- the frame could represent a risk for the fire spread (a combustible frame could increase the fire load at the edge of the openings, continue to burn after the extinguishing of the crib, cause falling parts and that a steel frame could distort and create cracks in the system), meaning that testing with a frame could be the worst case

- When participants argue that testing without a frame is the worst case, they sometimes just suggest that the test performance will be affected (lower test results), but they don't report the DIAP rule related to the frame.
- The other answers consist of various explanations not relevant with the purpose of the question (e.g. easier, cheaper and faster installation by the test sponsor)

8.2.1 Once the mounting of the test specimen completed, explain shortly how you will condition the test specimen.

Summary of answers:

- Two main concepts have been searched for in the received answers:
  - the protection from adverse environmental conditions: this is mentioned by 72% of the participants, a greater majority could be expected but perhaps is it obvious for the vast majority that the specimen shall be protected against rain, wind etc.
  - the follow up of the moisture content: this is mentioned by 86% of the participants
- Only 2 labs out of 29 (7%) report that mounting, conditioning and testing should be performed indoor in order to meet the requirements on environmental conditions. All others implicitly consider it possible to manage the test indoor or outdoor. Whatever, the assessment method allows testing outside.

8.2.2 Regarding the conditioning, explain shortly what criterion you will follow to decide when the test can be started.

Summary of answers:

- Two main concepts have been searched for in the received answers:
  - "in presence of hygroscopic materials: stabilization of the moisture content in the mock-up": this is mentioned by 83% of the participants, this procedure is already well known in fire resistance testing (EN 1363-1)
  - "in absence of hygroscopic materials: in accordance with the test sponsor's specifications": this is mentioned by only 48% of the participants, perhaps is it obvious for the vast majority that the instructions of the manufacturer should be followed
- the decision making between "mock-up if hygroscopic" and "sponsor's specification if not hygroscopic" seems to be not systematically applied, while it should. Some labs answer that they would also follow the sponsor's instruction while ignoring the mock-up procedure.

13.1 Among the clauses of § 13, would you include "h) any kind of frame can be fitted when tested without any frame" in the direct field of application for the tested Façade 1, and how?

Summary of answers:

- only 10% of the participants reports "not applicable"
- the participants apply this DIAP rule without any regard to the rule given in 12.o (no classification achieved → "not applicable")
- even more dangerous, some participants invent rules depending on the material of the frame

13.2 Among the clauses of § 13, would you include "h) any kind of frame can be fitted when tested without any frame" in the direct field of application for the tested Façade 2, and how?

Summary of answers:

- this question should not be included in the analyses since some unwanted conflicting information have been pointed out by some participants: on the one hand the specimen could be tested with or without frame, but on the other hand the visual observation for this test 2 reports the "falling of a piece from the window frame". This could have troubled the participants.
- once again, some participants invent rules depending on the material of the frame

2.6 FINDINGS

The table below collects the aspects that have been identified by the above analyses as being poorly or questionably understood.

Section concerned in the assessment method

	Origin of the findings		
	Analysis by question	**Analysis by item**	**Analysis of answer to open questions**
4.3			Summary 4.3.3 – There is a need for a description of a harmonised structural frame in the assessment method, to be used at the discretion of any lab (not mandatory).
6.3			Summary 6.3.1 – The use of a flat L-shaped test rig implicitly limits the test specimens to flat vertical ones. Does the scope of the method intend to also assess irregular-shape façades (curved, inclined, other kind of joints than the horizontal or vertical ones…)?

	Origin of the findings		
	Analysis by question	**Analysis by item**	**Analysis of answer to open questions**
7.1, 7.3	Question 7.1.6 – The assessment method doesn't provide detailed rules for the fixation of the test specimen directly on the structural frame in cases where the façade system consists of a full stand-alone external wall.	Items 7.1.3 and 7.1.6 – The assessment method requires in its § 7.3 to install the test specimen on the test rig "as in practice". However, the test rig (structural frame or supporting construction) imposed by the assessment method doesn't exist as such in a real building. The test specimen can therefore not be strictly fixed "as in practice", and "as far as possible as in practice" doesn't tell more about how it should/could be fixed. For instance, even for fixation in supporting construction, suitable anchors for aerated concrete should be used and this could already differ than the ones used "in practice".	Summaries 7.1.3 and 7.1.6 – There is a need for more detailed explanations on the fixation of the test specimen on the test rig. The current assessment method should provide practical rules for the fixation of the test specimen.
7.3	Questions 7.3.3.b, 7.3.5, 7.3.6.b, 7.3.7 – The assessment method doesn't provide practical rules for the configuration of the interface between the test specimen and the edges of openings, including the presence of the frame.	Item 7.3.5 – Identifying the relevant standard configuration in the annex C of the assessment method could reveal to be difficult for practical detailing around openings.	Summary 7.3.7 – There is a need for more detailed explanations on the configuration of the interface between the test specimen and the edges of openings. There is also a need to allow some detailing of the secondary opening to be adapted to accommodate the backing board in case of interference.
7.4	Question 7.4.4 – The practical configuration of the façade-to-floor junction (when assessed) is misunderstood.	Item 7.4.4 "Instrumentation" – The exact positions where the thermocouples shall be placed are not understood at all.	
8	Questions 8.2.1, 8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.7 – The way to manage the conditioning of the test specimen, including the use of a mock-up, is misunderstood.		Summary 8.2.2 – The assessment method should emphasize which cases require a mock-up and, if so, that it cannot be ignored. The current rules are not systematically applied.

	Origin of the findings		
	Analysis by question	**Analysis by item**	**Analysis of answer to open questions**
9.1.3	Questions 9.1.1, 9.1.2, 9.1.3, 9.1.4 – The practical configuration of the internal thermocouples is misunderstood. The total number of thermocouples to be used is particularly erroneous.	Items 9.1.1 and 9.1.3 – The main cause of the errors is the identification of the combustibles layers: the number of internal layers of thermocouples in the received answers ranges from 1 to 4 for Façade 1 and from 1 to 5 for Façade 2.	
11, 12.l	Question 12.2 – Assessing the test results according to the definitions of the performance criteria reveals many errors.	Items 12.1 and 12.2 – Both fire spread and falling parts performance criteria give rise to errors.	
13	Questions 13.1, 7.3.8 – The declaration of the direct field of application is misunderstood.	Items 13.1 and 13.2 – The main causes of the errors are: - the obligation to declare "not applicable" in case where no classification is achieved, and - the kind of frame that can be fitted around openings.	Summary 7.3.8 – The received comments make aware that the current DIAP rule that allows "any kind of frame at the openings if the test has been performed without any frame" may turn out to be non-conservative and should thus be revised. This probably explains the low score related to this DIAP rule (see item 13.1.h). Summaries 13.1 and 13.2 – The DIAP still need to be clarified. The main problems are that: - the participants largely don't state "not applicable" when no classification has been granted, and - some participants simply invent rules depending on the material of the frame.

	Origin of the findings		
	Analysis by question	**Analysis by item**	**Analysis of answer to open questions**
14	Question 14.2 – Assessing the final classification seems to be problematic.	Comparing the classifications (items 14.2) to the test results (items 12.2) show that 5 out of the reported classifications are erroneous because based on erroneous test results, but these erroneous classifications however comply with the corresponding reported test results. Therefore, the score for the ability to assess the correct classification from given test results would become 86% (instead of 69%), and the cause of the problem would rather be the assessment of the test results as underlined above.	

PART 3 – RECOMMENDATIONS

3.1 PURPOSE

This third part takes advantage of the analyses above and the various contents encountered in the answers received from participating labs in order to draw up the most useful recommendations to improve the assessment method. The analyses carried out in Part 2 of the present report, the errors and misunderstandings that have been detected in the answers, the comments received, and the discussions with the steering group members are used to draft revision proposals of the problematic sections of the assessment method. These proposals are presented below, each one is referencing to the related section in the assessment method.

> *Note:*
> *In the frame of the European Commission project SI2.825082 (see § 0.2.1), it is planned to rewrite the assessment method based on the proposals of the present report. This updating work is not meant to be carried out by this round robin but will rather be a consequence of it.*

3.2 PROPOSALS OF IMPROVEMENT

4.3 Structural frame

The assessment method should propose a description of a harmonised structural frame, including: drawings, materials, cross sections, mounting, position of the transoms in relation to the floor levels (in any relation…), any protection of the frame from heat in case of failure.

Such harmonised structural frame should not be mandatory, it would be a functional example to be used at the discretion of any lab.

4.5 Combustion chamber

The assessment method should also give details on how to configure the junction between the test rig and the walls of the combustion chamber (when the structural frame is used alone, and when both supporting construction and structural frame are used together).

7 Mounting of the test specimen

The assessment method should provide detailed practical rules for the configuration of the interface between the test specimen and the edges of openings, including the presence of any frame. A specific sub-chapter should be dedicated to these aspects. This sub-chapter should refer to Annex C. This annex is currently only referred to in the DIAP.

The current DIAP rule that allows "any kind of frame at the openings if the test has been performed without any frame" may turn out to be non-conservative. Therefore, an idea could be to define standardised frames:

- a combustible frame (plastic or wooden?)
- a non-combustible frame (steel?)

These could be made of very simple sections. Test results obtained with such (non-)combustible frame would then be applicable to test specimens with any kind of (non-)combustible.
Optionally, the possibility to perform the test with the same frame than in practice could be allowed.

Regarding all the detailing around the openings, it should be investigated if it would be possible to propose a standardised configuration. The question of the extension of the façade inside the openings is allowed or not.

Generally speaking, the assessment method should clearly state how the edges at the combustion chamber should be configured on the one hand and at the secondary opening on the other hand. Practically, it should be acknowledged that some differences could appear between both openings? For instance, some detailing of the secondary opening will sometimes need to be adapted to accommodate the backing board in case of interference.

Examples should be given in drawings in annex.

7.1 Selection of the test rig

In cases of façade systems consisting of a full stand-alone external wall, it should be mentioned that the test specimen shall be mounted directly on the structural frame, and that mounting on a supporting construction is not allowed in that case.

7.3 Test specimen

The assessment method requires in its § 7.3 to install the test specimen on the test rig "as in practice". However, the test rig (structural frame or supporting construction) imposed by the assessment method doesn't exist as such in a real building. The test specimen can therefore not be strictly fixed "as in practice", and "as far as possible as in practice" doesn't tell more about how it should/could be fixed.
In case of mounting on a supporting construction for instance, suitable anchors for aerated concrete should be used and this could already differ than the ones used "in practice".
As for the case of mounting on a structural frame, the assessment method doesn't provide any detailed rules at all for the fixation.

Detailed explanations should be given about the fixation of the test specimen on the test rig in § 7.3. Several ideas should be investigated:

- fix the first internal layer of the façade on the structural frame, and then fix the other successive layers from internal to external ones according to manufacturer's instructions; this would however probably not follow the usual mounting process
- recreate the building floor slab noses at appropriate heights by means of horizontal beams of the same material and thickness as in practice (concrete, timber…) fixed to front side of the structural frame, the whole façade can then be mounted as in practice; this solution would be relevant
- fix steel angles or U profiles onto the horizontal sections of the structural frame, and then fix the façade to these angles by means of suitable screws, preferably in the vertical loadbearing structure of the façade

Examples should be given in drawings in annex.

The § 6 "Test specimen" will have to be corrected/updated consequently regarding these fixation aspects.

7.4 Junction between façade and floor (optional test procedure) and Annex D

The annex D requires the roof of the combustion chamber to be replaced by the representative floor intended to be used in practice. Examples of such configuration should be given in drawings.

The exact positions where the thermocouples shall be placed should be exemplified by some examples given in drawings in annex.

8 Conditioning of test specimen

The requirements on how to manage the conditioning of the test specimen, including the use of a mock-up, are not systematically applied. It should be made clear that in presence of any hygroscopic materials, the stabilization of the moisture content shall be followed up by means of a mock-up, and if not then the conditioning shall be made in accordance with the test sponsor's specifications. In presence of any hygroscopic materials, the mock-up procedure cannot be ignored. A logical decision-making list could be proposed to insist on this simple requirement.
This will also imply to give a definition and examples of hygroscopic materials, for instance:

- the following materials shall systematically be considered as hygroscopic:
  - any timber, even if treated with any material (paint, varnish, chemicals…)
  - any concrete (cement based, aerated…)
  - any plaster/gypsum based material
  - any organic fibre (of vegetal or animal based)
- the following materials shall systematically be considered as anhygroscopic:
  - any metal or resulting alloy (steel, stainless steel…)
  - any mineral fibre (glass wool, rock wool, ceramic fibre…)
  - any petroleum base product (plastic, rubber, …)

Another solution could be to impose the use of a mock-up in any case.

Regarding the dimensions of the mock-up and the faces to cover in plastic, the drawings included in questions 8.2.5 and 8.2.8 should be given as examples in annex.

9.1.3 Internal thermocouples

The assessment method requires to position internal thermocouples at the mid-depth of each combustible layer and air cavity, and a reminder that "combustible" is defined in chapter 3. This last specifies "material whose Euroclass ranges from B to F or whose reaction to fire performance has not been determined". This rule is particularly not applied by the participants to this round robin.
The assessment method should insist that when no information on reaction to fire is available for a layer of material, then it is mandatory to place thermocouples in this layer.

The drawings of the façades 1 and 2 used in this round robin should be given as examples (see drawings below the table in § 1.3.2 above).

11 Performance criteria and 12.l Test report

Assessing the test results according to the definitions of the performance criteria reveals many errors. Both fire spread and falling parts performance criteria give rise to errors.

The current fire spread criteria are based on the temperature rise. This one has first to be computed from the measured absolute temperature measurement. This processing creates difficulties for some labs, resulting in errors. The proposal is to base the criteria on the absolute temperature instead of the temperature rise.

Several simple numerical examples should be given in annex regarding the application of the criteria definitions. Examples with and without the occurrence of a failure should be given.
These examples should then be continued to illustrate how the final test results are assessed from the criteria failure times.

13 Direct field of application

The assessment method requires in 12.o that a field of application can only be granted in cases where the tested façade has achieved at least one of the classifications provided in chapter 14, otherwise, the dedicated section in the report shall mention "Not applicable". This rule should be reminded at the top of § 13.

The application 13.h of the DIAP should be review according to the decision in 7 above (use of a standardised frame).

14 Classification

Several simple numerical examples should be given regarding the application of the classification definitions, bases on fictitious test results.

General

It should be considered how testing of flat vertical specimens on the provided flat L-shaped test rig could eventually allow to assess irregular-shape façades (curved, inclined, other kind of joints than the horizontal or vertical ones…).
To be eventually developed in:

1 Scope
6 Test specimen
13 Direct field of application

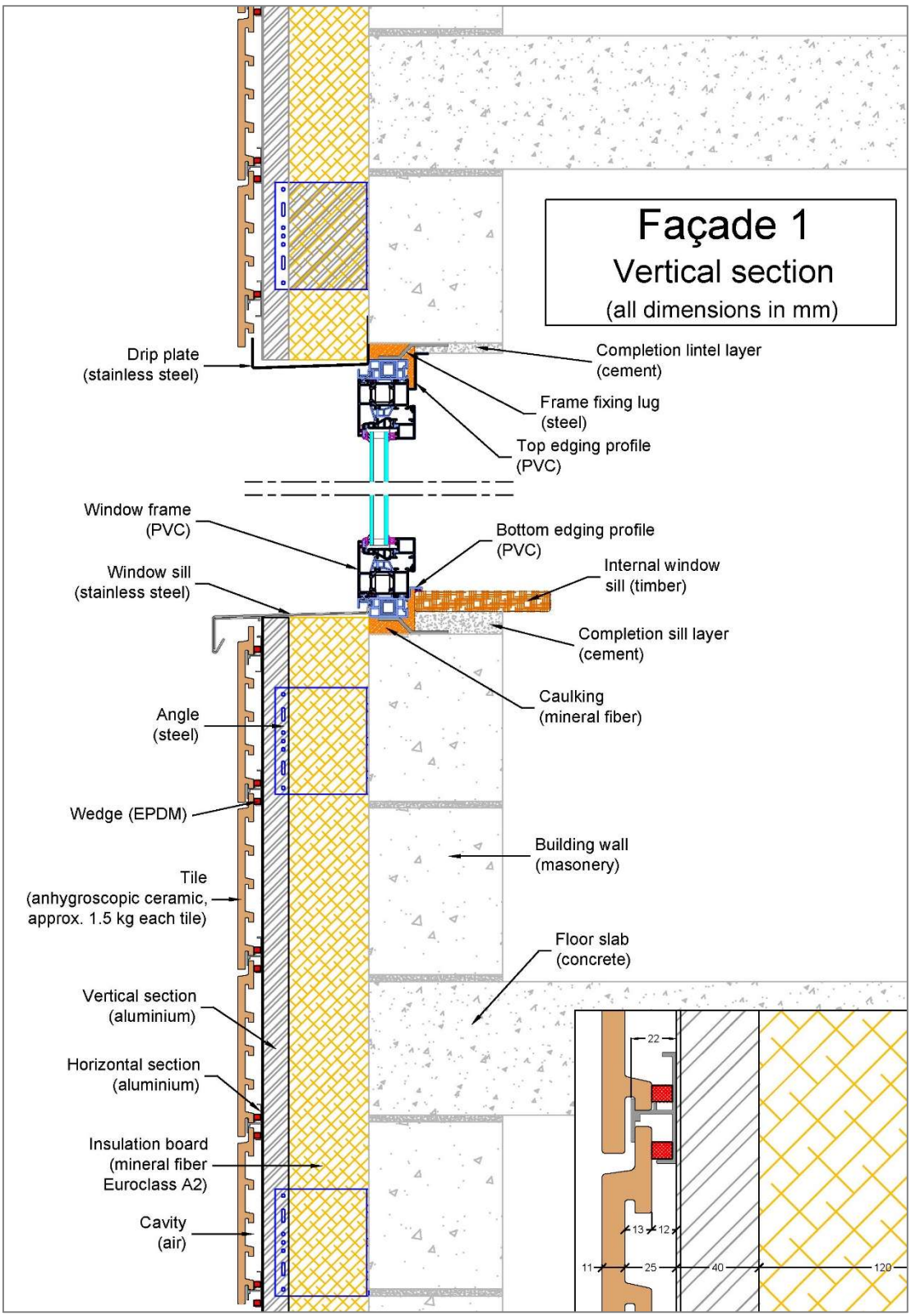
3.3 CONSIDERATION OF OTHER COMMENTS RECEIVED

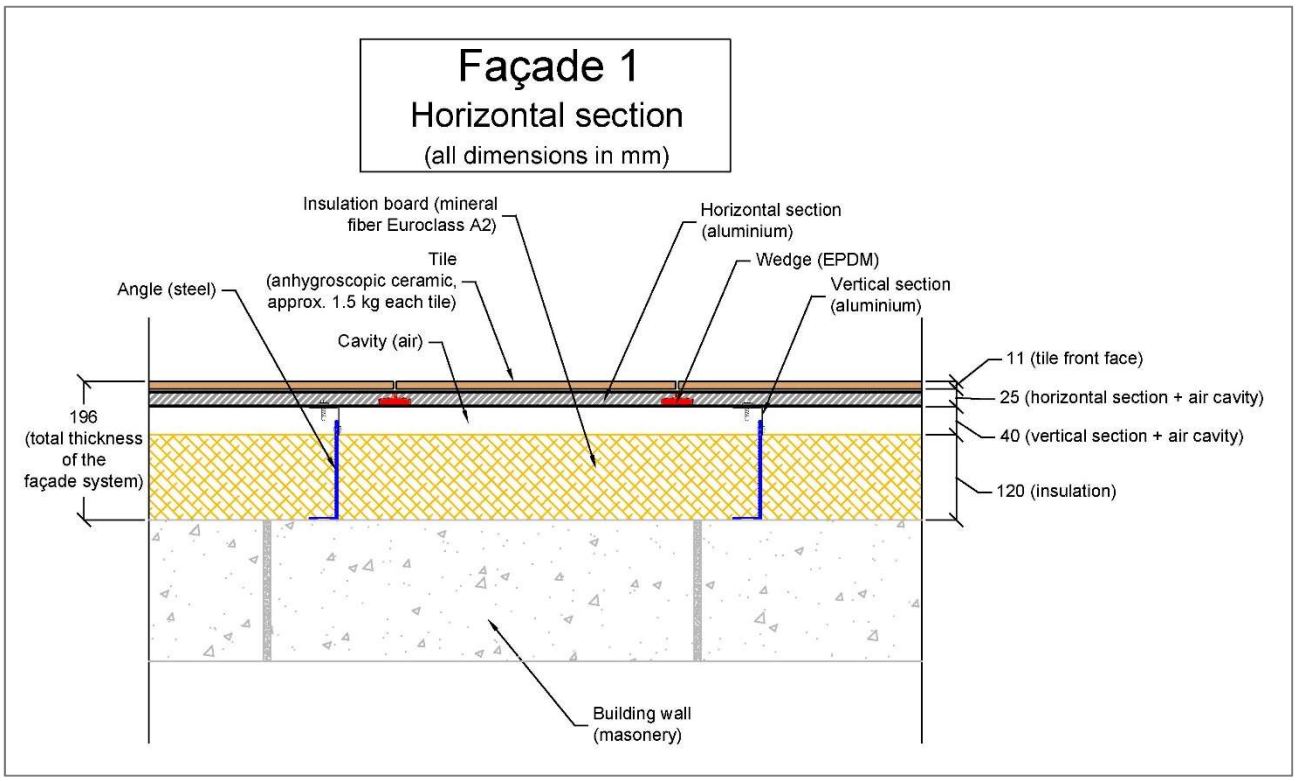
In the second part of the exercises, the participants had the opportunity to freely comment the assessment method. Lots of remarks have been received (see Annex G).
This huge amount of information comes in addition to the one resulting from the first part of the exercise and that has been analysed in this report. This additional information has been added to the "Comments Handling Document" file managed by the Consortium (see § 0.1.2) of the Façade project. Doing so, all these free comments will be collectively analysed and processed by all the members of this Consortium. This work will be carried out in the next months, apart from the present report, and the assessment method will be adapted according to the identified improvements.

REFERENCES

- Assessment of fire performance of façades, EC-funded project SI2.825082, version dated of May 7, 2020
- EN 1363-1:2012: “Fire resistance tests - Part 1: General Requirements”
- ISO 17043:2010: “Conformity assessment - General requirements for proficiency testing”
- ISO 5725-1:1994: “Accuracy (trueness and precision) of measurement methods and results - Part 1 : General principles and definitions”
- ISO 13528:2015: “Statistical methods for use in proficiency testing by interlaboratory comparison”
- ISO 21748:2017: “Guidance for the use of repeatability, reproducibility and trueness estimates in measurement uncertainty estimation”
- ISO 3534-1:2006: “Statistics - Vocabulary and symbols - Part 1 : General statistical terms and terms used in probability”

ANNEX A – TEST SPECIMEN DESCRIPTION

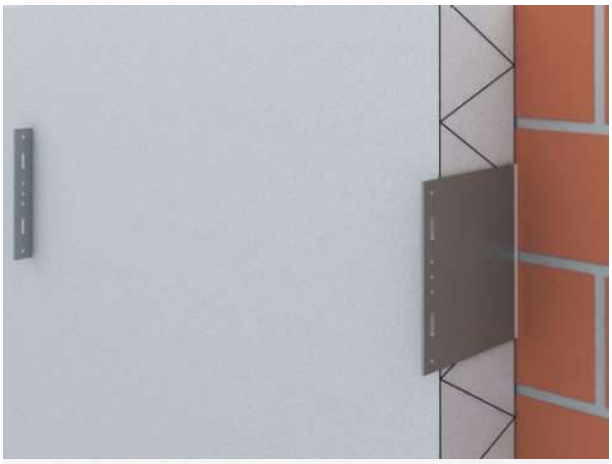




Façade 1 – Mounting instructions

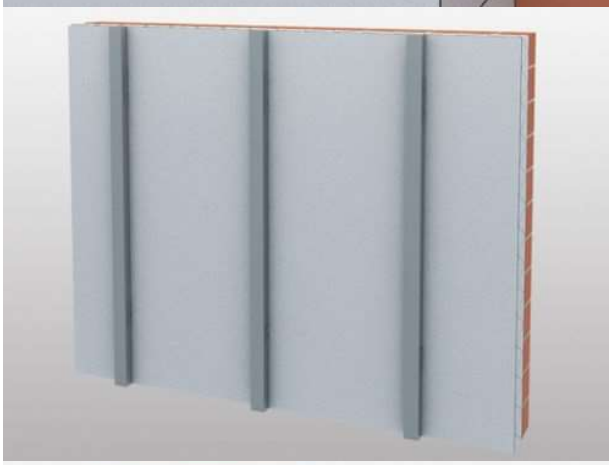
Step 01

For the vertical base substructure, steel angles are anchored to the building wall in statically required intervals with approved anchors. To minimize the thermal bridge, special thermostops are used between the wall and the console.



Step 02

The laying of the insulation boards on the previously cleaned wall surface is carried out in compliance with the manufacturer's guidelines. Normally, high-quality mineral-fiber insulation materials are used.



Step 03

Vertical, angled aluminium support profiles are aligned with the wall angles and fastened with approved connecting elements such as blind rivets or screws.

Step 04

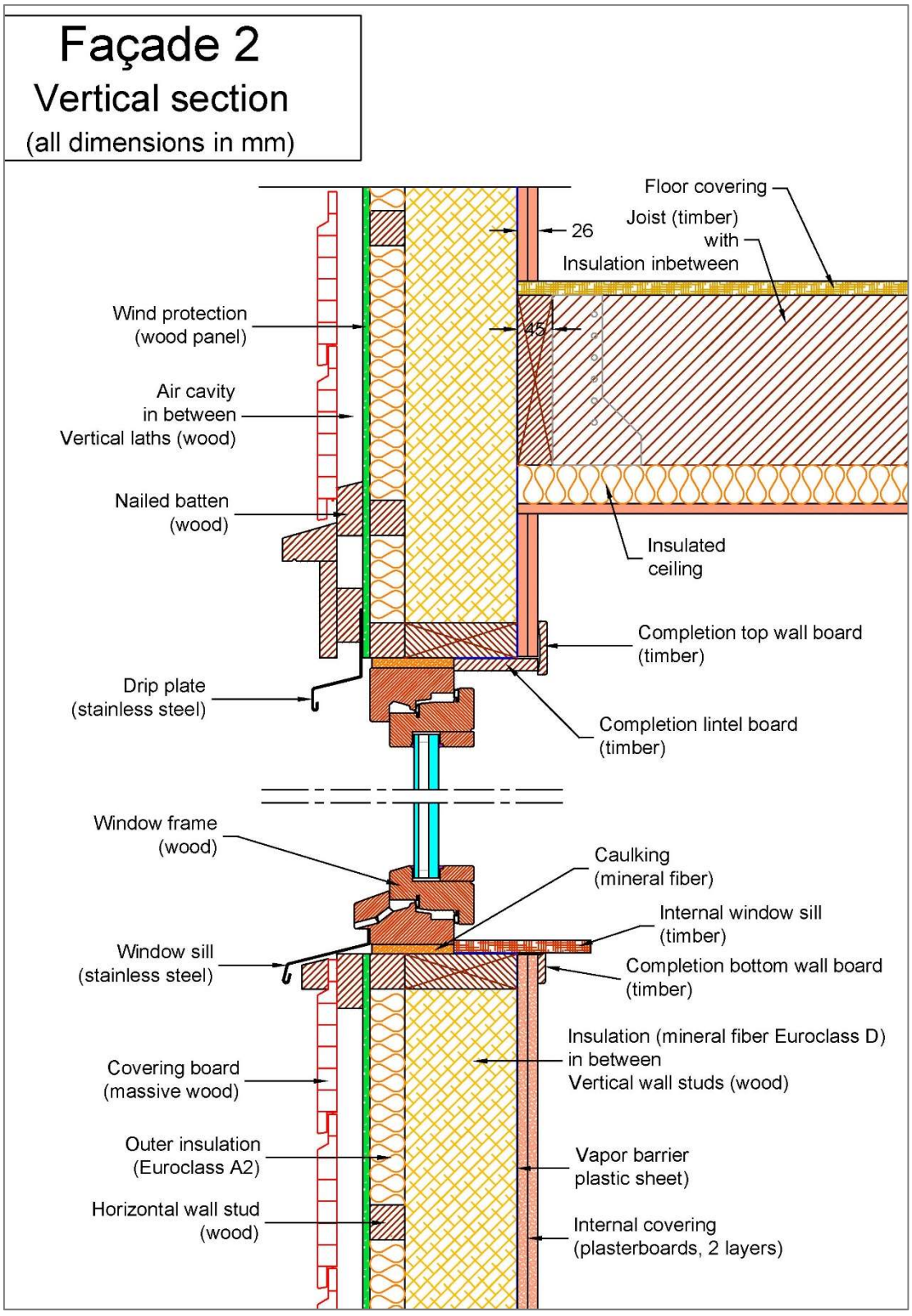
The special horizontal support rails are fastened to the vertical support profiles in the height grid of the tile slabs with screws. The exact dimensions for the arrangement of the support rails can be found in the Product installation dimensions.

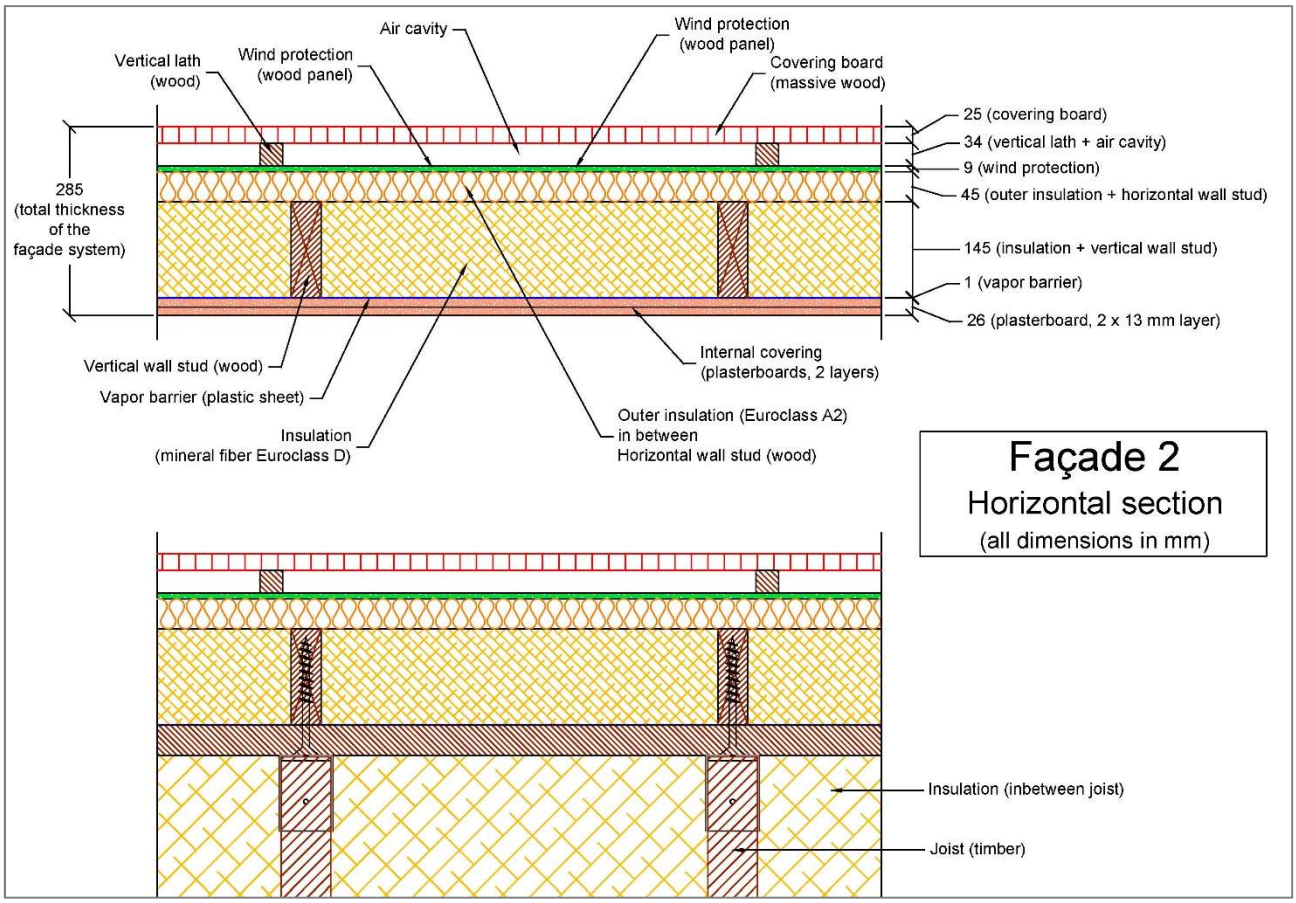
Step 05

When mounting the tiles, no prescribed sequence is to be observed. The installation can be carried out either from the bottom upwards or vice versa.
The tiles are slightly angled with the upper plate fold and are guided into the lower opening of the aluminium support rail. The lowest hook on the back of the plate is then inserted into the profiling of the lower support rail.

Step 06

Each tile is secured with an EPDM spacer after mounting. The EPDM spacers secure a 4mm wide vertical joint and firmly fix the tile slabs in the support rails. Due to the shape of the spacers, the support rails are completely covered so that they are not visible through the open vertical joints of the mounted façade.


Façade 2
Vertical section
(all dimensions in mm)
Floor covering
Joist (timber)
with
Insulation inbetween
26
45
Wind protection
(wood panel)
Air cavity
in between
Vertical laths (wood)
Nailed batten
(wood)
Insulated
ceiling
Completion top wall board
(timber)
Drip plate
(stainless steel)
Completion lintel board
(timber)
Window frame
(wood)
Caulking
(mineral fiber)
Internal window sill
(timber)
Window sill
(stainless steel)
Completion bottom wall board
(timber)
Insulation (mineral fiber Euroclass D)
in between
Vertical wall studs (wood)
Covering board
(massive wood)
Outer insulation
(Euroclass A2)
Vapor barrier
plastic sheet)
Horizontal wall stud
(wood)
Internal covering
(plasterboards, 2 layers)


Air cavity
Wind protection (wood panel)
Vertical lath (wood)
Wind protection (wood panel)
Covering board (massive wood)
285 (total thickness of the façade system)
25 (covering board)
34 (vertical lath + air cavity)
9 (wind protection)
45 (outer insulation + horizontal wall stud)
145 (insulation + vertical wall stud)
1 (vapor barrier)
26 (plasterboard, 2 x 13 mm layer)
Vertical wall stud (wood)
Vapor barrier (plastic sheet)
Insulation (mineral fiber Euroclass D)
Internal covering (plasterboards, 2 layers)
Outer insulation (Euroclass A2) in between Horizontal wall stud (wood)
Façade 2
Horizontal section
(all dimensions in mm)
Insulation (inbetween joist)
Joist (timber)

ANNEX B – FICTITIOUS TEST DATA

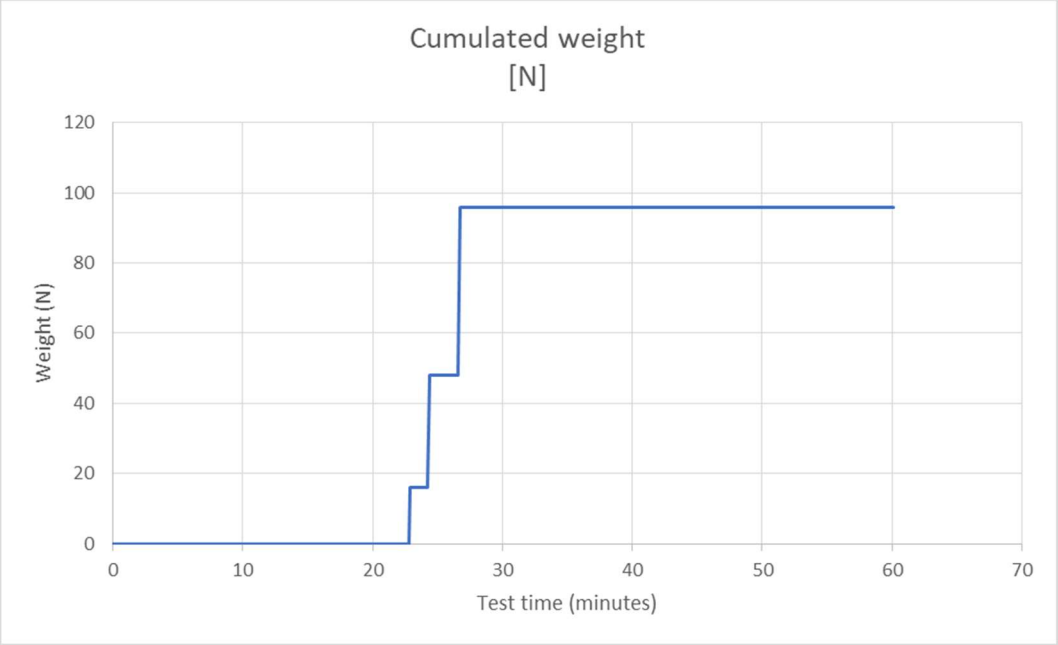
The data presented below are the full tables of measurements when possible, and only more condensed versions given in graphs when not.

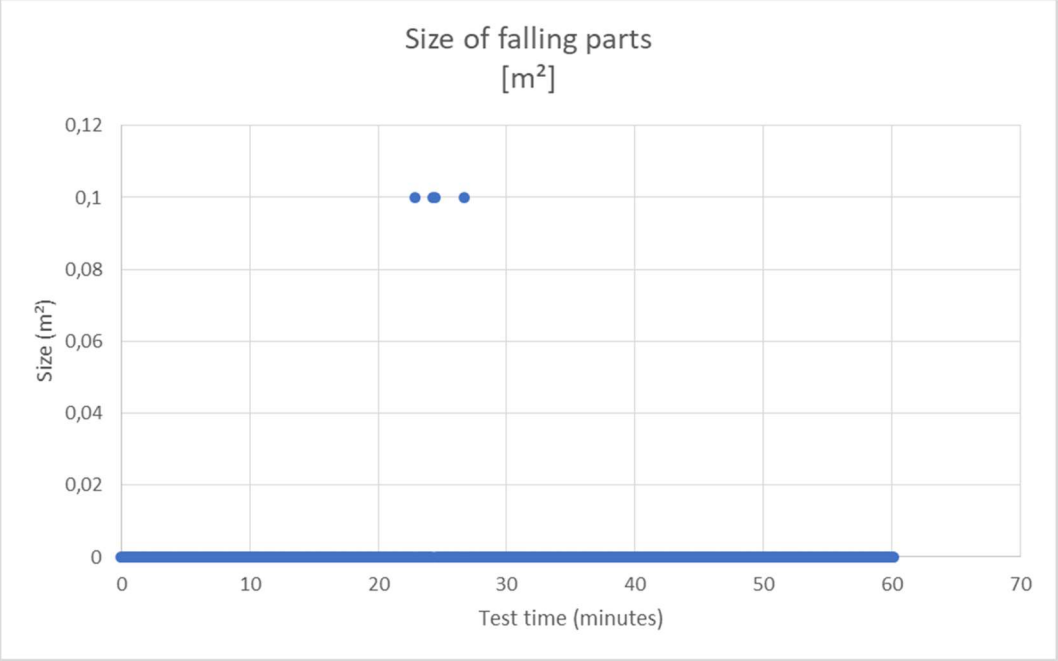
Ambient conditions (Test 1 and Test 2)

Time [hh:mm]	Temp [°C]	Hum [%]	Wind [Degrees]	Wind [m/s]	Pressure [Bar]	
09:50	12,1	60	38,4	1,3	1010,5	
09:51	12	60	36	1,4	1010,5	
09:52	12,1	60	37,2	1,4	1010,5	
09:53	12,2	60	38,3	1,4	1010,5	
09:54	12,1	60	38,3	1,3	1010,5	
09:55	12	60	35,7	1,2	1010,5	
09:56	12	60	38,6	1,2	1010,5	
09:57	12,1	60	37,7	1,3	1010,5	
09:58	12,1	60	37,2	1,4	1010,5	
09:59	12	60	36,8	1,3	1010,5	
10:00	12,1	60	36	1,3	1010,5	
10:01	12,2	60	37,1	1,4	1010,5	
10:02	12,1	60	36,7	1,4	1010,5	
10:03	12,1	60	39,3	1,2	1010,5	
10:04	11,9	60	37,2	1,3	1010,5	
10:05	12	60	36,8	1,3	1010,5	
10:06	12	60	37	1,3	1010,5	Test starts at 10:06 (test time 0)
10:07	12,1	60	36,4	1,4	1010,5	
10:08	12,2	60	39,1	1,3	1010,5	
10:09	12,3	60	37,6	1,2	1010,5	
10:10	12,3	60	37,1	1,3	1010,5	
10:11	12,1	60	38,1	1,3	1010,5	
10:12	12,1	60	37	1,3	1010,5	
10:13	12,2	60	36,9	1,4	1010,5	
10:14	12,1	60	36,4	1,1	1010,5	
10:15	12,2	60	36,4	1,2	1010,5	
10:16	12,2	60	38,6	1	1010,5	
10:17	12	60	37,8	1,4	1010,5	
10:18	12,2	60	37,1	1,2	1010,5	
10:19	12,1	60	38,7	1,3	1010,5	
10:20	12,3	60	37	1,4	1010,5	

Observations of falling parts (Test 1)

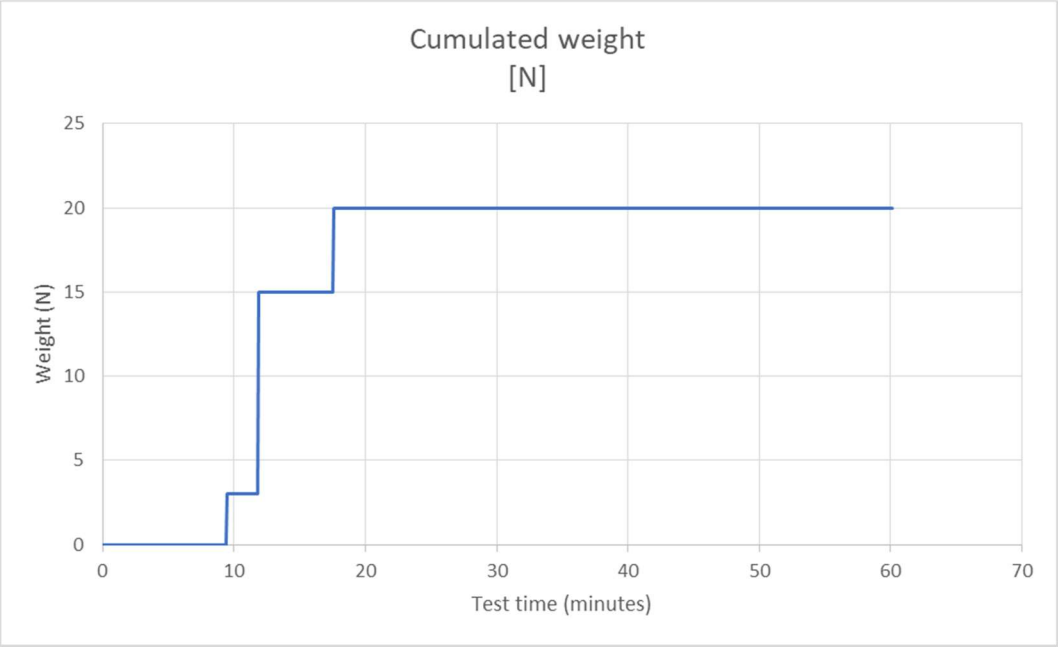
Test time [minutes]	Observation
22,9	A tile at the right lower corner of the secondary opening falls down
24,3	Two tiles below the one falling down earlier falls down
26,7	Three more tiles to the right of the previous fallen tiles falls down

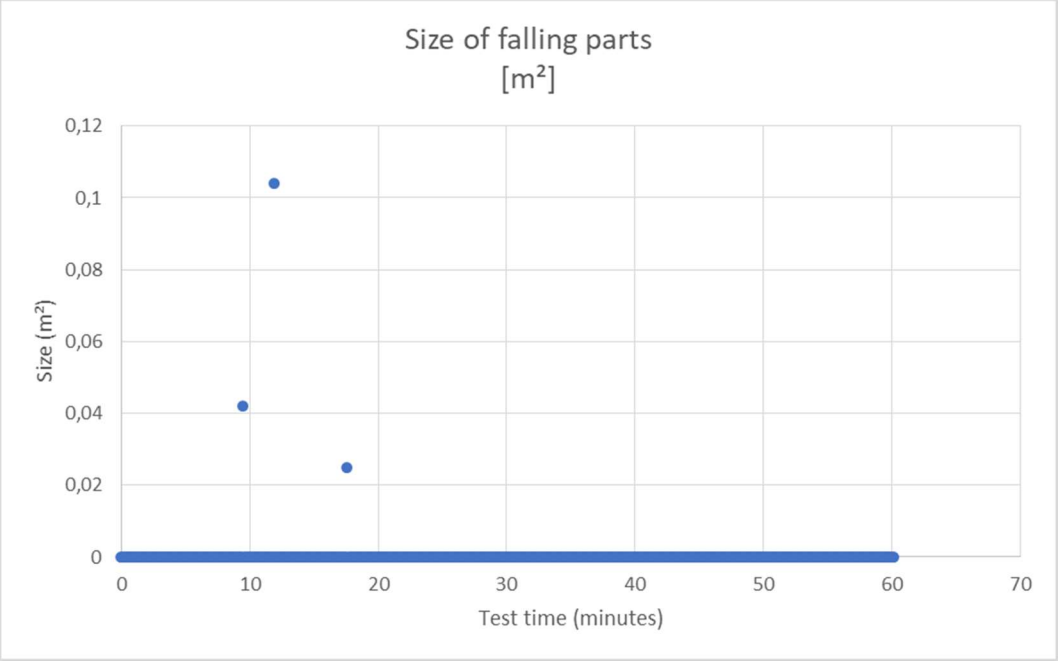




Observations of falling parts (Test 2)

Test time [minutes]	Observation
9,5	A piece from the window frame falls down, no continous burning on the floor
11,9	A larger piece of wood falls down, it does not burn on the floor but glows for several minutes
17,6	A smaller piece of wood falls down, and it burns for 5 seconds, and thereafter glows for several minutes





Temperature measurements

Legends

L	5	-	D1

Depth in the façade (see figure below)

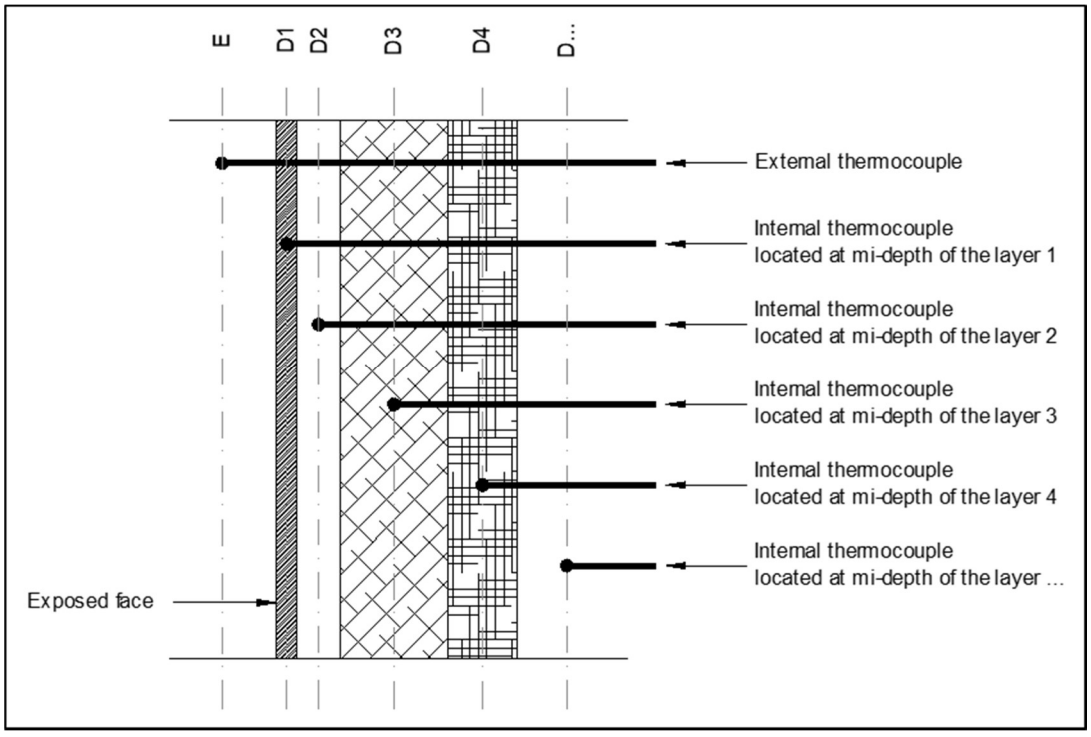
- E: External thermocouple
- D1 to 5: Internal thermocouple located at mid-width of the layers 1 to 5 (from exposed to unexposed face)

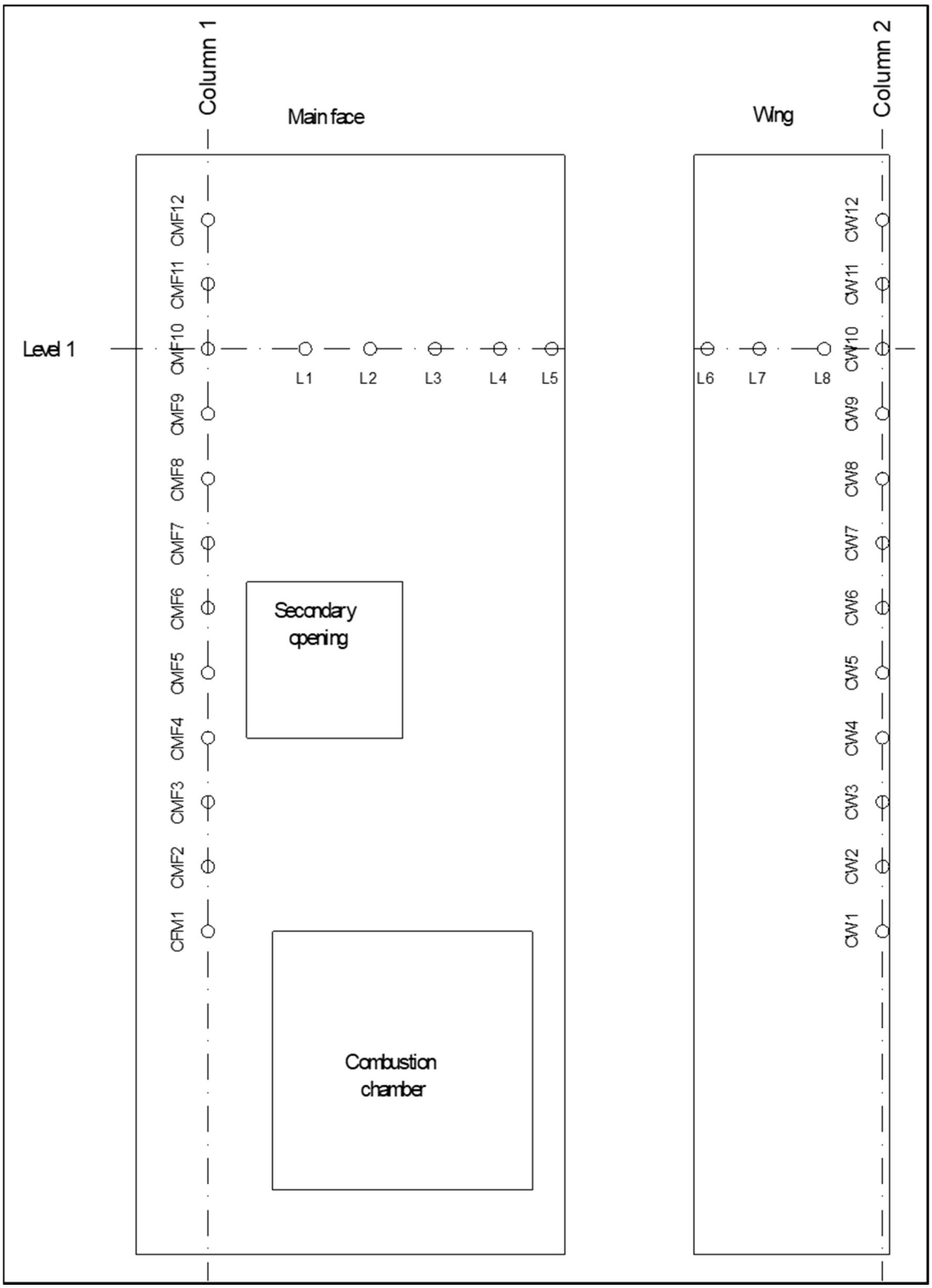
Location on the line (see figure below)

- 1 to 8 for Level, 1 to 12 for Columns

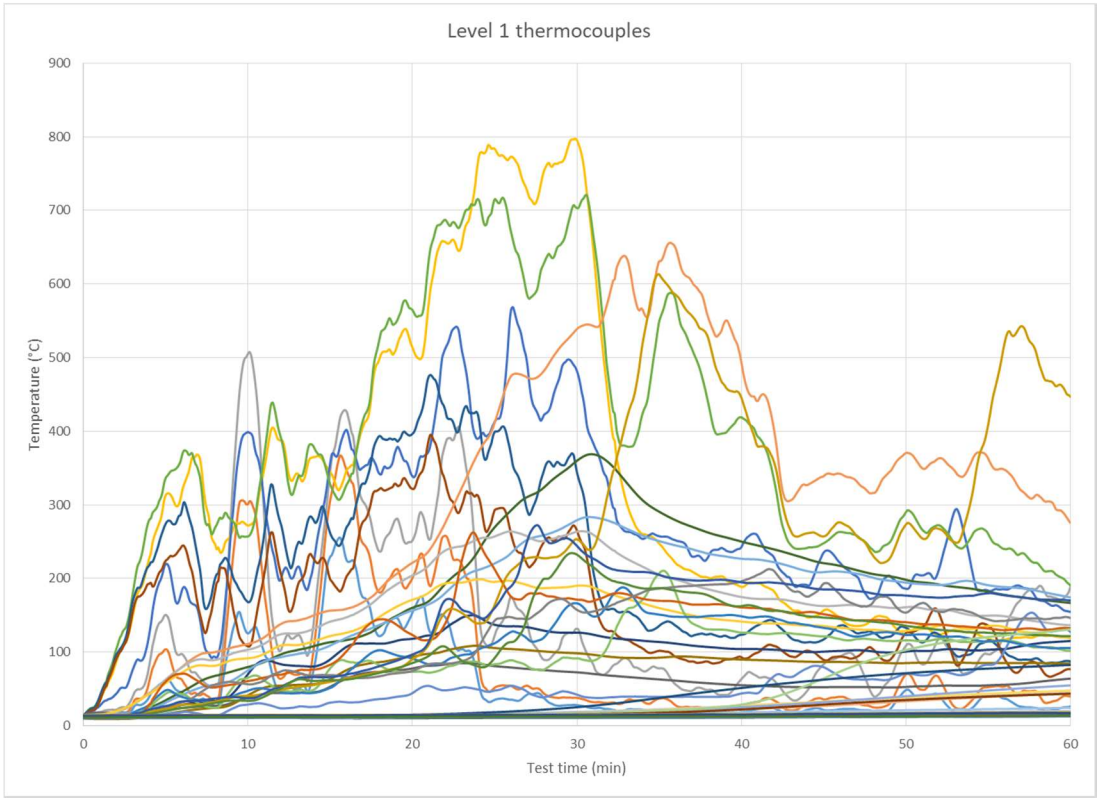
Line on the front view of the façade (see figure below)

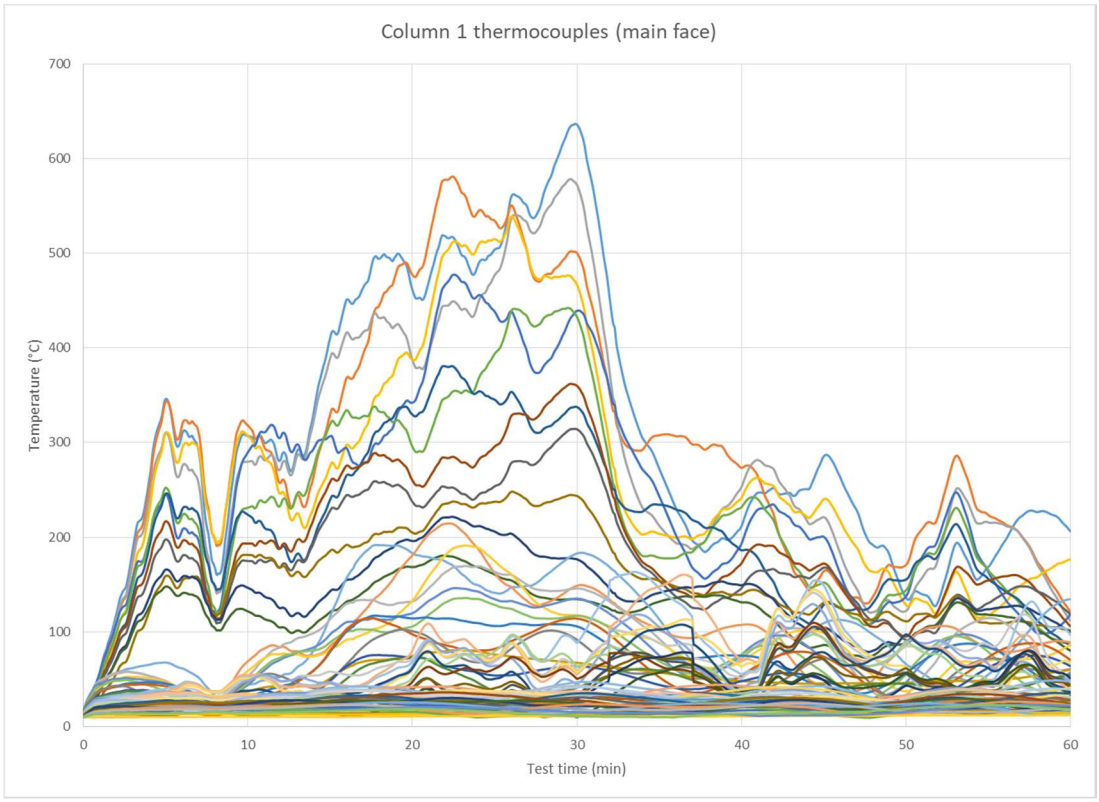
- L: Level 1
- CMF: Column 1 ("MF" is for "Main face")
- CW: Column 2 ("W" is for "Wing")

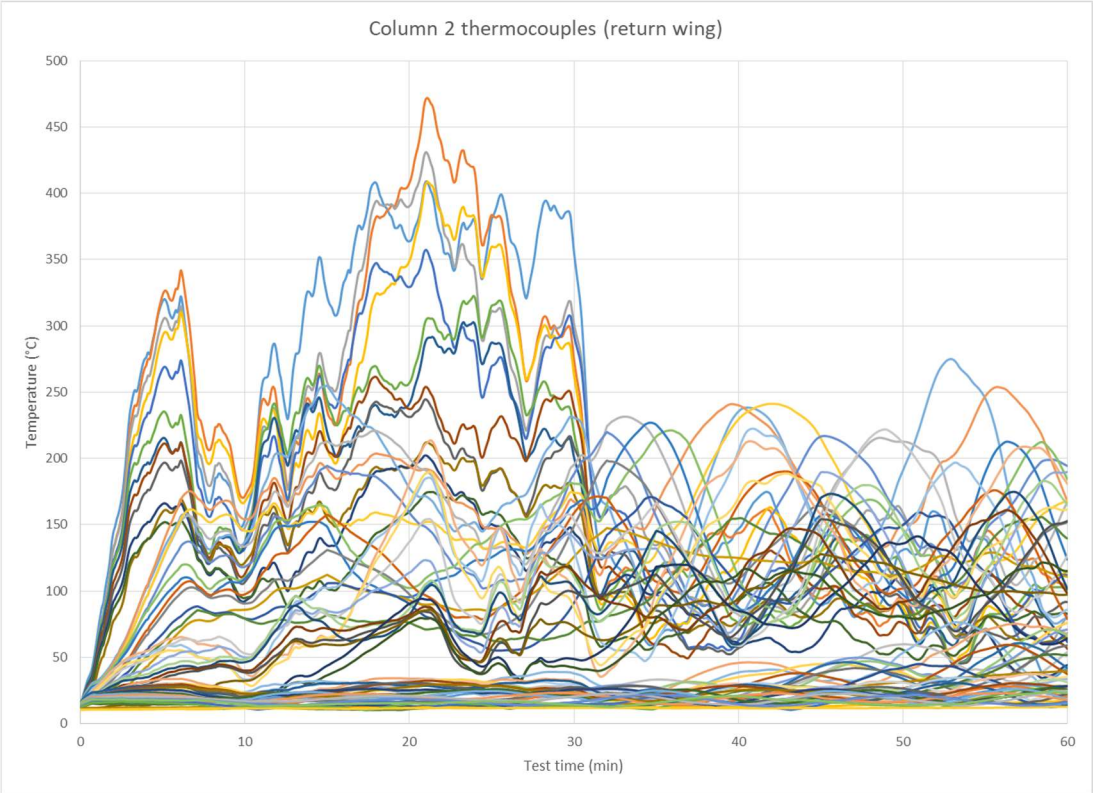



Column 1
Main face
Wing
Column 2
Level 1
CMF12
CMF11
CMF10
CMF9
CMF8
CMF7
CMF6
CMF5
CMF4
CMF3
CMF2
CFM1
L1
L2
L3
L4
L5
L6
L7
L8
CW12
CW11
CW10
CW9
CW8
CW7
CW6
CW5
CW4
CW3
CW2
CW1
Secondary opening
Combustion chamber

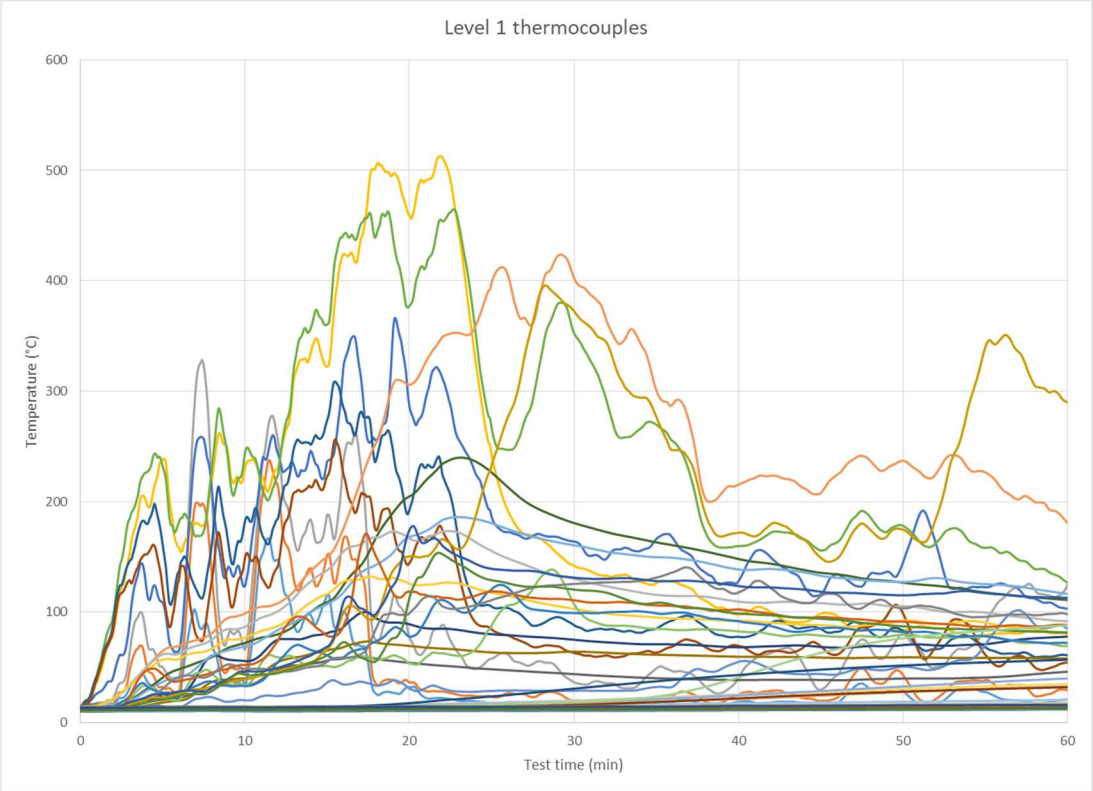
Temperature measurements (Test 1)

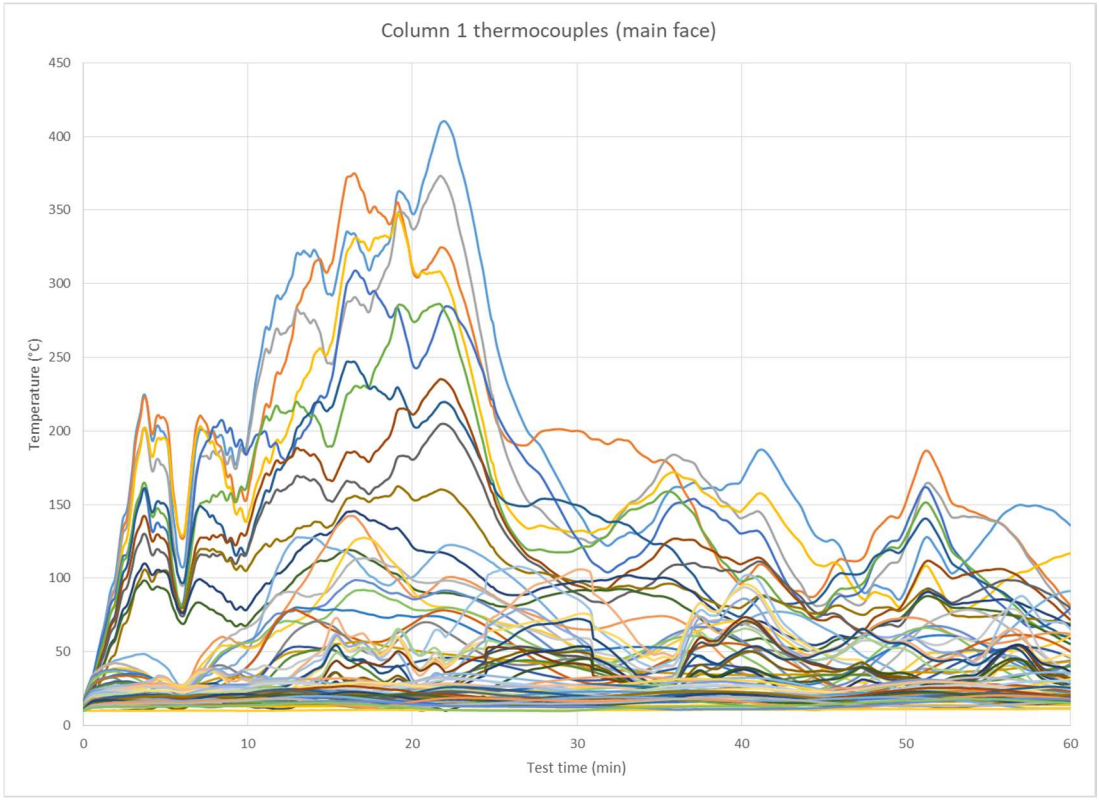


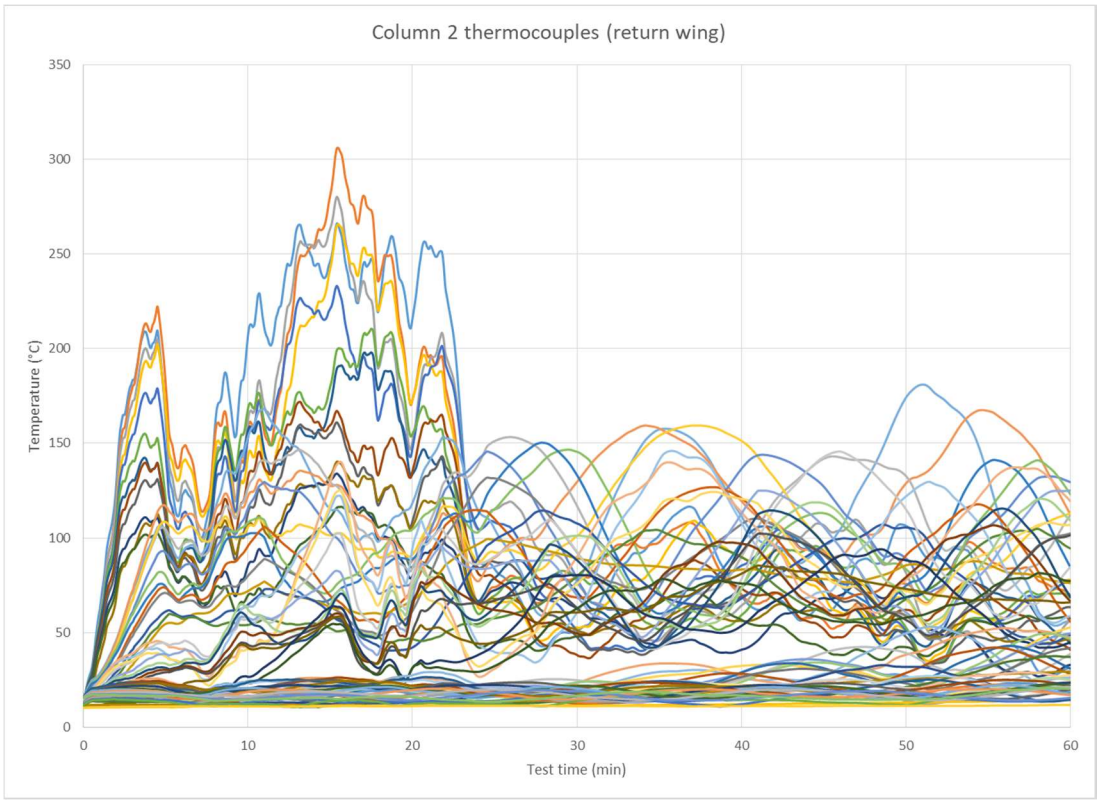




Temperature measurements (Test 2)




Column 1 thermocouples (main face)
Temperature (°C)
Test time (min)
0
50
100
150
200
250
300
350
400
450
0
10
20
30
40
50
60


Column 2 thermocouples (return wing)
Temperature (°C)
Test time (min)
0
50
100
150
200
250
300
350
0
10
20
30
40
50
60

ANNEX C – EXERCISE SHEET

PART 1 - EXERCISES

4 TEST EQUIPMENT

4.3 Structural frame

The Figure 2 of the assessment method shows an example of a structural steel frame. In practice, each lab shall design its own structural frame, complying with the various constraints of the assessment method.

4.3.1 FOR ANY TEST – In this regard, is it problematic if a steel section of your structural frame passes just behind the combustion chamber opening?

Answer: yes / no / I don't know
Explain shortly why (max. 2 lines): …….

4.3.2 FOR ANY TEST – In this regard, is it problematic if a steel section of your structural frame passes just behind the secondary opening?

Answer: yes / no / I don't know
Explain shortly why (max. 2 lines): …….

4.3.3 FOR ANY TEST – In this regard, would you need the assessment method to supply more detail on how the structural frame should be designed?

Answer: yes / no

Only if you have answered "yes", comment on what you would need (max. 3 lines).
Answer: …….

4.5 Combustion chamber

Questions on the combustion chamber are asked below, see questions 7.1.7

5 ENVIRONMENTAL CONDITIONS

5.1 FOR ANY TEST – Declare if the test can be started according to § 5. Use the files "Ambient conditions.xlsx".

Answer: yes / no / I don't know

5.2 FOR ANY TEST – Assuming that it rains on the test specimen from test minute 13 to test minute 21, would you invalidate the test?

Answer: yes / no / I don't know

5.3 FOR ANY TEST – Assuming that it rains on the test specimen from test minute 43 to test minute 45, would you invalidate the test?

Answer: yes / no / I don't know

6 TEST SPECIMEN

6.3 Design

6.3.1 FOR ANY TEST – Explain shortly how you usually manage the test specimen design (if you don't perform tests on façades, please relate your answer to your usual fire resistance - or reaction to fire - activities):
This question is only related to the DESIGN stage of the test configuration (not the manufacturing or the mounting of the test specimen nor any other stage).

- I regard this as the responsibility of the client and I let him perform it alone
  Answer: yes / no
- I discuss with the client about its needs
  Answer: yes / no
- I take into account the whole product range of the test specimen
  Answer: yes / no
- I take into account the direct field of application
  Answer: yes / no

Only if needed, comment on the aspects above and on your answers (max. 5 lines):
Answer: …….

Questions on the horizontal and vertical joints are also asked below, see questions 7.1.7

7 MOUNTING OF THE TEST SPECIMEN

7.1 General

On Figure 1 below, four different proposals to configure the mounting of the façade on the test rig are drawn very schematically (horizontal sections).

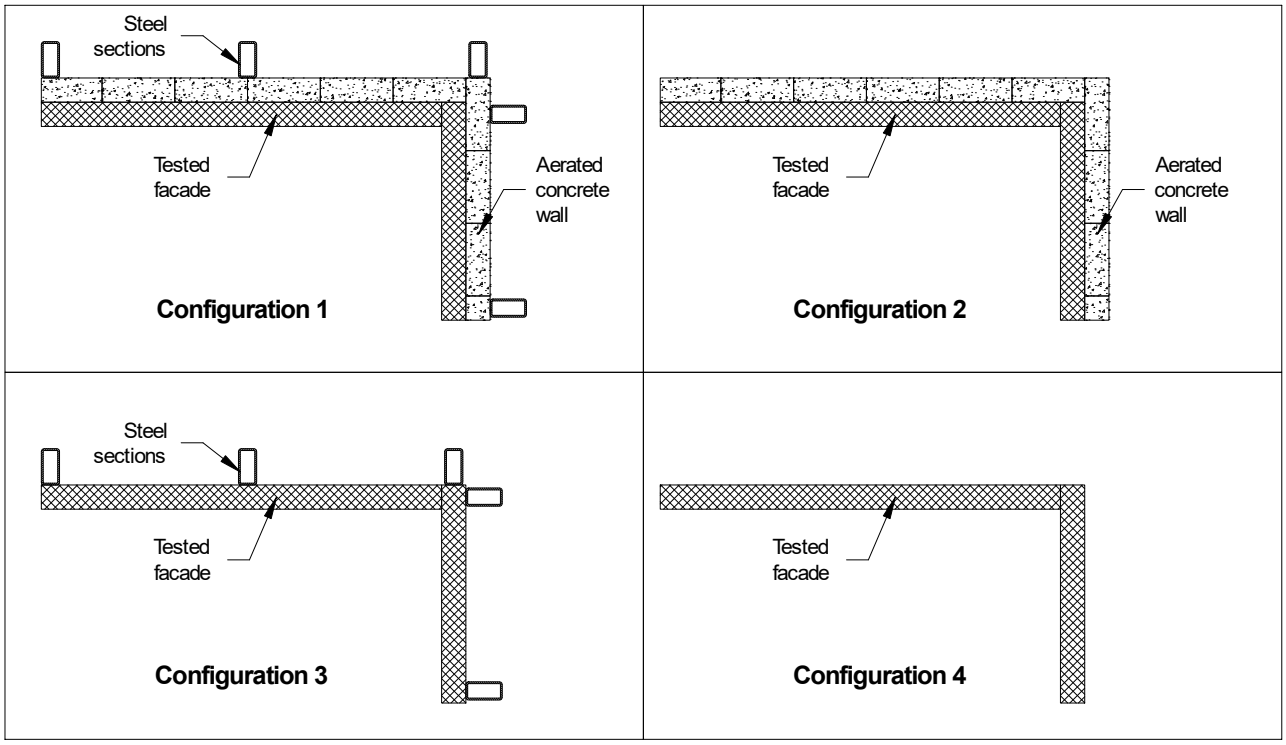


Figure 1

7.1.1 FOR TEST 1– Specify the kind of support on which you would install the Façade 1.

Answer: on a structural frame / on a supporting construction / I don't know

7.1.2 FOR TEST 1– What configuration of test rig does it correspond to in Figure 1?

Answer: Configuration 1 / Configuration 2 / Configuration 3 / Configuration 4 / None of them / I don't know

7.1.3 FOR TEST 1 – Describe shortly how you/the manufacturer should attach/fix/fasten the Façade 1 to the rig (max. 2 lines).

Answer: …….

7.1.4 FOR TEST 2 – Specify the kind of support on which you would install the Façade 2.

Answer: on a structural frame / on a supporting construction / I don't know

7.1.5 FOR TEST 2 – What configuration of test rig does it correspond to in Figure 1?

Answer: Configuration 1 / Configuration 2 / Configuration 3 / Configuration 4 / None of them / I don't know

7.1.6 FOR TEST 2 – Describe shortly how you/the manufacturer should attach/fix/fasten the Façade 2 to the rig (max. 2 lines).

Answer: …….

On Figures 2a, 2b and 2c below, a very schematically drawing of the test specimen mounted on the test rig is shown (plan view and horizontal sections). Note that the drawings are not at scale.

Note: In Figures 2b and 2c, the hatched areas referenced as "test rig" are simplified representations of the main face and the wing of the test rig which – for convenience – have been very schematically reduced to their surrounding rectangular envelope. Depending on the configuration you have selected above in Figure 1, it should be understood that this schematic representation may or may not include a structural frame and may or may not include a supporting construction.

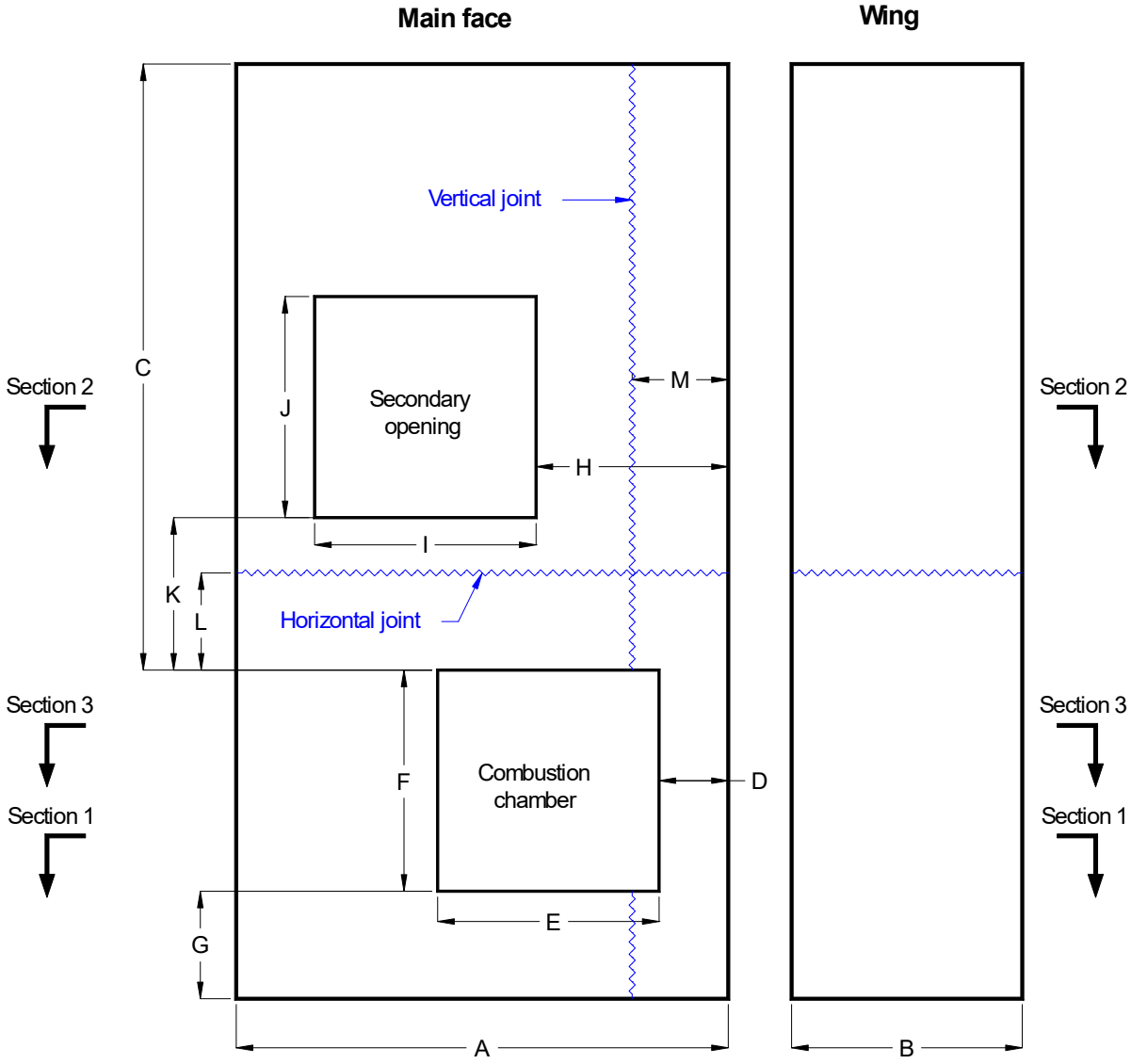


Figure 2a – Plan view showing the exposed face of the test specimen.
Zigzag lines represent horizontal and vertical joints.

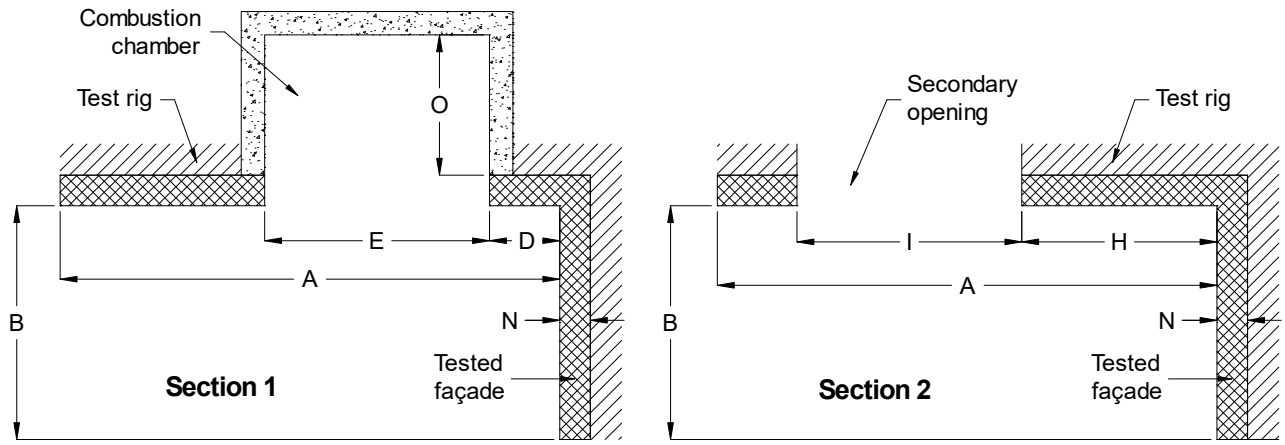


Figure 2b – Horizontal sections 1 (combustion chamber) and 2 (secondary opening).

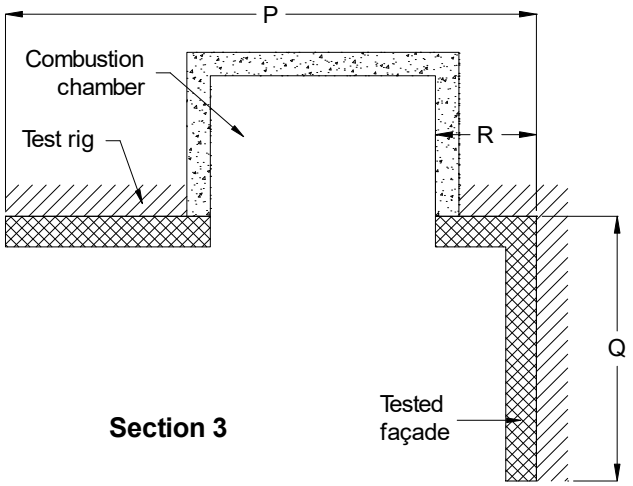


Figure 2c – Horizontal section (combustion chamber)

7.1.7.a FOR TEST 1 – Fill in the list below with the exact dimensions identified by letters on Figures 2a and 2b. Report all dimensions in mm (millimeters).

Note 1: for simplicity, in cases where the Assessment Method allows a range of values for a parameter (rather than a single value)

- *like for instance " ≥ minimum value ": then report only the minimum allowed value*
- *like for instance " nominal value ± tolerances ": then report only the nominal value*

Note 2: if you don't know some value, then leave the field blank

Answer:

	Test 1
A	
B	
C	
D	
E	

F	
G	
H	
I	
J	
K	
L	
M	
N	
O	

7.1.7.b FOR TEST 2 – Fill in the list below with the exact dimensions identified by letters on Figures 2a and 2b. Report all dimensions in mm (millimeters).

Note 1: for simplicity, in cases where the Assessment Method allows a range of values for a parameter (rather than a single value)

- *like for instance " ≥ minimum value ": then report only the minimum allowed value*
- *like for instance " nominal value ± tolerances ": then report only the nominal value*

Note 2: if you don't know some value, then leave the field blank

Answer:

	Test 2
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	

O	

7.1.8.a FOR TEST 1 – What shall be the minimum widths of the front side of the test rig (main face and wing)? Fill in the list below with the exact dimensions identified by letters on Figure 2c. Report all dimensions in mm (millimeters).

Note 1: for simplicity, in cases where the Assessment Method allows a range of values for a parameter (rather than a single value)

- *like for instance " ≥ minimum value ": then report only the minimum allowed value*
- *like for instance " nominal value ± tolerances ": then report only the nominal value*

Note 2: if you don't know some value, then leave the field blank

Answer:

	Test 1
P	
Q	
R	

7.1.8.b FOR TEST 2 – What shall be the minimum widths of the front side of the test rig (main face and wing)? Fill in the list below with the exact dimensions identified by letters on Figure 2c. Report all dimensions in mm (millimeters).

Note 1: for simplicity, in cases where the Assessment Method allows a range of values for a parameter (rather than a single value)

- *like for instance " ≥ minimum value ": then report only the minimum allowed value*
- *like for instance " nominal value ± tolerances ": then report only the nominal value*

Note 2: if you don't know some value, then leave the field blank

Answer:

	Test 2
P	
Q	
R	

7.2 Secondary opening

7.2.1 FOR TEST 1 – When testing the Façade 1, a secondary opening shall be included in the test configuration.

Answer: yes / no / I don't know

7.2.2 FOR TEST 2 – When testing the Façade 2, a secondary opening shall be included in the test configuration.

Answer: yes / no / I don't know

Questions on the secondary openings are also asked above, see questions 7.1.7

7.3 Test specimen / ANNEX C Mounting of test specimen at openings

7.3.1 FOR TEST 1 – Does the Façade system 1 provide any protection to openings?

Answer: yes / no / I don't know

7.3.2 FOR TEST 1 – Only if you have answered "yes", does the Façade 1 correspond to a standard configuration in annex C?

Answer: Case 1 / Case 2 / Case 3 / Case 4 / Case 5 / Case 6 / No standard configuration / I don't know

7.3.3.a FOR TEST 1 – When testing the Façade 1, how can the test specimen be configured regarding the window frame?

Answer : Only without the frame / Only with the frame / Both with and without the frame is possible / I don't know

7.3.3.b FOR TEST 1 – Illustrate clearly on a drawing how you would configure the interface between the test specimen 1 and the edges of the openings, according to your answer in 7.3.3.a. When several configurations are possible, draw all of them. For each configuration, provide a drawing of the interface at the opening of the combustion chamber and a drawing of the interface at the secondary opening. Use the drawing files in support or draw by hand.

Answer: join the drawing in annex and name it "7.3.3"

7.3.4 FOR TEST 2 – Does the Façade system 2 provide any protection to openings?

Answer: yes / no / I don't know

7.3.5 FOR TEST 2 – Only if you have answered "yes", does the Façade 2 correspond to a standard configuration in annex C?

Answer: Case 1 / Case 2 / Case 3 / Case 4 / Case 5 / Case 6 / No standard configuration / I don't know

7.3.6.a FOR TEST 2 – When testing the Façade 2, how can the test specimen be configured regarding the window frame?

Answer : Only without the frame / Only with the frame / Both with and without the frame is possible / I don't know

7.3.6.b FOR TEST 2 – Illustrate clearly on a drawing how you would configure the interface between the test specimen 2 and the edges of the openings, according to your answer in 7.3.6.a. When several configurations are possible, draw all of them. For each configuration, provide a drawing of the interface at the opening of the combustion chamber and a drawing of the interface at the secondary opening. Use the drawing files in support or draw by hand.

Answer: join the drawing in annex and name it "7.3.6"

7.3.7 FOR ANY TEST – Will you configure differently the detailing of the test specimen at the edges of the secondary opening and at the edges of the combustion chamber opening?

Answer: yes / no / I don't know

Only if needed, comment on the aspect above and on your answer (max. 3 lines):
Answer: …….

7.3.8 FOR ANY TEST – Explain shortly (max. 2 lines) the advantage of testing without any frame in cases where testing with a frame is provided by annex C?

Answer: …….

7.4 Junction between façade and floor (optional test procedure)

7.4.1 FOR TEST 1 – Do you consider it possible to assess the façade-to-floor-junction for Façade 1?

Answer: yes / no / I don't know

7.4.2 FOR TEST 1 – Only if you have answered "yes", illustrate clearly on a drawing how you would configure the test specimen 1 in the area of the roof slab of the combustion chamber. Show where you would position thermocouples. Draw the vertical section only. Use the drawing files in support or draw by hand.

Answer: join the drawing in annex and name it "7.4.2"

7.4.3 FOR TEST 2 – Do you consider it possible to assess the façade-to-floor-junction for Façade 2?

Answer: yes / no / I don't know

7.4.4 FOR TEST 2 – Only if you have answered "yes", illustrate clearly on a drawing how you would configure the test specimen 2 in the area of the roof slab of the combustion chamber. Show where you would position thermocouples. Draw the vertical section only. Use the drawing files in support or draw by hand.

Answer: join the drawing in annex and name it "7.4.4"

8 CONDITIONING OF TEST SPECIMEN

8.2.1 FOR ANY TEST – Once the mounting of the test specimen completed, explain shortly (max. 3 lines) how you will condition the test specimen.

Answer: …….

8.2.2 FOR ANY TEST – Regarding the conditioning, explain shortly (max. 2 lines) what criterion you will follow to decide when the test can be started.

Answer: …….

8.2.3 FOR TEST 1 – Is a mock-up needed to monitor the conditioning of the test specimen 1?

Answer: yes / no / I don't know

8.2.4 FOR TEST 1 – Only if you have answered "yes", what would be the dimensions of your mock-up for test specimen 1? Fill in the list below with the exact dimensions identified by letters on the Figure 3 below. Note that the drawings are not at scale. Report all dimensions in mm (millimeters).

Note 1: for simplicity, in cases where the Assessment Method allows a range of values for a parameter (rather than a single value)

- *like for instance " ≥ minimum value ": then report only the minimum allowed value*
- *like for instance " nominal value ± tolerances ": then report only the nominal value*

Note 2: if you don't know some value, then leave the field blank

Answer:

	Façade 1
X1	
Y1	
Z1	

8.2.5 FOR TEST 1 – Only if you have answered "yes", which face(s) of your mock-up for test specimen 1 would you cover in plastic? (see Figure 3 below)

Answer:

- face 1: yes / no / I don't know
- face 2: yes / no / I don't know
- face 3: yes / no / I don't know
- face 4: yes / no / I don't know
- face 5: yes / no / I don't know
- face 6: yes / no / I don't know

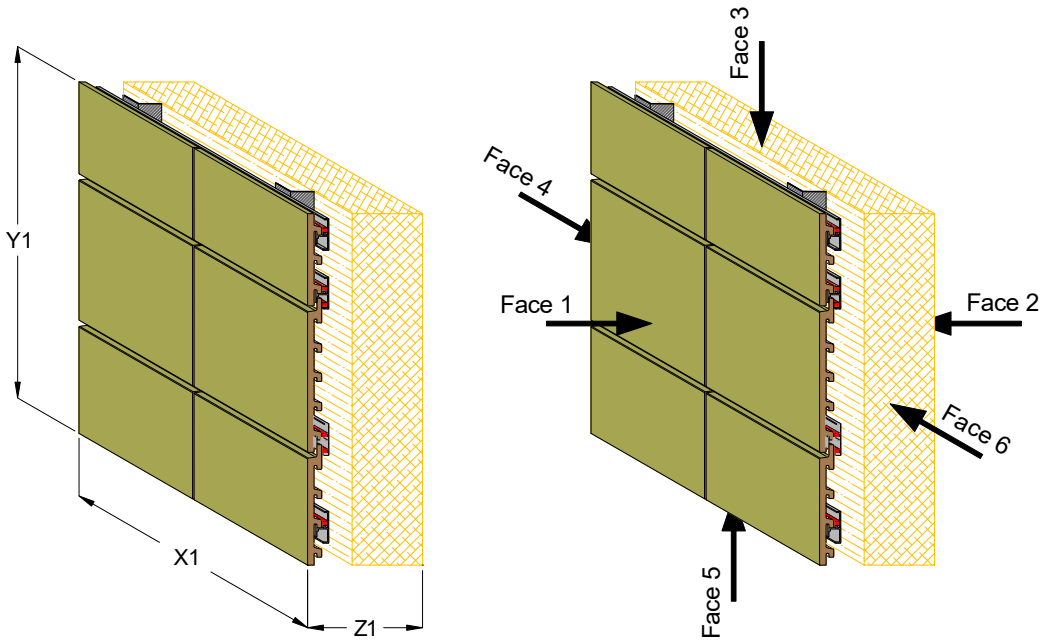


Figure 3 – Possible mock-up for Façade 1

8.2.6 FOR TEST 2 – Is a mock-up needed to monitor the conditioning of the test specimen 2?

Answer: yes / no / I don't know

8.2.7 FOR TEST 2 – Only if you have answered "yes", what would be the dimensions of your mock-up for test specimen 2? Fill in the table below with the exact dimensions identified by letters on the Figure 4 below. Note that the drawings are not at scale. Report all dimensions in mm (millimeters).

Note 1: for simplicity, in cases where the Assessment Method allows a range of values for a parameter (rather than a single value)

- *like for instance " ≥ minimum value ": then report only the minimum allowed value*
- *like for instance " nominal value ± tolerances ": then report only the nominal value*

Note 2: if you don't know some value, then leave the field blank

Answer:

	Façade 2
X2	
Y2	
Z2	

8.2.8 FOR TEST 2 – Only if you have answered "yes", which face(s) of your mock-up for test specimen 2 would you cover in plastic?

Answer:

- face 1: yes / no / I don't know
- face 2: yes / no / I don't know
- face 3: yes / no / I don't know
- face 4: yes / no / I don't know
- face 5: yes / no / I don't know
- face 6: yes / no / I don't know

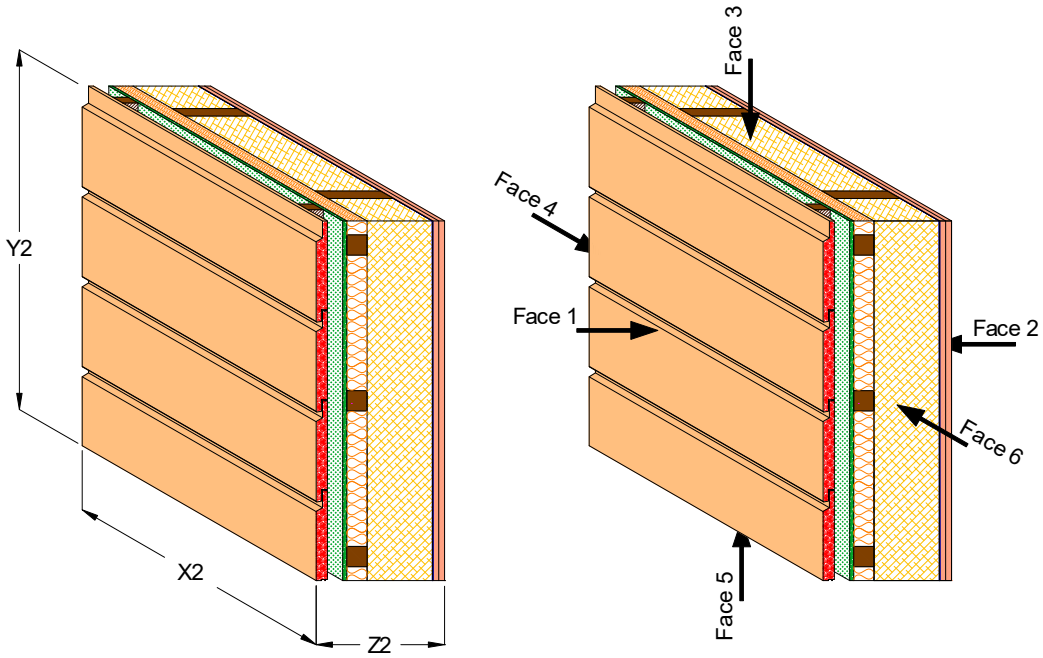


Figure 4 – Possible mock-up for Façade 2

9 APPLICATION OF INSTRUMENTATION

9.1 Temperature measurements

9.1.1 FOR TEST 1 – Using the drawing files in support, illustrate clearly on the horizontal and/or vertical sections the exact locations where you would place the external and internal thermocouples for Façade 1. At each position, write in mm (millimeters) the depth at which you place them in the layer.

Answer: join the drawing in annex and name it "9.1.1"

9.1.2 FOR TEST 1 – According to your answer above, give the total number of thermocouples you would place for Façade 1:

Note: if you don't know some value, then leave the field blank

- on level 1:
  Answer: …….
- on column 1:
  Answer: …….
- on column 2:
  Answer: …….

9.1.3 FOR TEST 2 – Using the drawing files in support, illustrate clearly on the horizontal and/or vertical sections the exact locations where you would place the external and internal thermocouples for Façade 2. At each position, write in mm (millimeters) the depth at which you place them in the layer.

Answer: join the drawing in annex and name it "9.1.3"

9.1.4 FOR TEST 2 – According to your answer above, give the total number of thermocouples you would place for Façade 2:

Note: if you don't know some value, then leave the field blank

- on level 1:
  Answer: …….
- on column 1:
  Answer: …….
- on column 2:
  Answer: …….

12 TEST REPORT

12.1 FOR TEST 1 – Declare the test results for Test 1 according to § 12 l). Use the files "Temperature measurements - Large fire exposure.xlsx" and "Observations of falling parts - Test 1.xlsx". In the temperature measurement file, use only the data related to the thermocouple locations that you have configured in 9.1.1 above (see note 3.4 in the instruction sheet). Report all test results in minutes.

Note 1: since this exercise supplies no fictitious data to assess the façade-to-floor junction performances nor the smouldering performance, these performances criteria cannot be declared
Note 2: if you don't know some value, then leave the field blank

Answer:

Performance	Criterion	Test result

Fire spread		…… minutes
	Vertical fire spread	…… minutes
	Horizontal fire spread	…… minutes
Falling parts		…… minutes
	Solid falling parts	…… minutes
	Burning parts	…… minutes

12.2 FOR TEST 2 – Declare the test results for Test 2 according to § 12 l). Use the files "Temperature measurements - Medium fire exposure.xlsx" and "Observations of falling parts - Test 2.xlsx". In the temperature measurement file, use only the data related to the thermocouple locations that you have configured in 9.1.3 above (see note 3.4 in the instruction sheet). Report all test results in minutes.

Note 1: since this exercise supplies no fictitious data to assess the façade-to-floor junction performances nor the smouldering performance, these performances criteria cannot be declared
Note 2: if you don't know some value, then leave the field blank

Answer:

Performance	Criterion	Test result
Fire spread		…… minutes
	Vertical fire spread	…… minutes
	Horizontal fire spread	…… minutes
Falling parts		…… minutes
	Solid falling parts	…… minutes
	Burning parts	…… minutes

13 DIRECT FIELD OF APPLICATION

13.1 FOR TEST 1 – Among the clauses of § 13, which ones would you include in the direct field of application for the tested Façade 1?

Answer:

a) decrease in distance of fixing centres: yes / no / Not applicable / I don't know
b) increase in the number of horizontal joints: yes / no / Not applicable / I don't know
c) increase in the number of vertical joints: yes / no / Not applicable / I don't know
d) the width of an identical construction may be increased if…: yes / no / Not applicable / I don't know
e) the height of the construction may be increased: yes / no / Not applicable / I don't know
f) an insulation of Euroclass A2 can be replaced by an Euroclass A1 if …: yes / no / Not applicable / I don't know
g) an insulation of Euroclass E can be replaced by an Euroclass B, C or D if …: yes / no / Not applicable / I don't know
h) any kind of frame can be fitted when tested without any frame:
Answer (max. 2 lines): …….

13.2 FOR TEST 2 – Among the clauses of § 13, which ones would you include in the direct field of application for the tested Façade 2?

Answer:

a) decrease in distance of fixing centres: yes / no / Not applicable / I don't know
b) increase in the number of horizontal joints: yes / no / Not applicable / I don't know
c) increase in the number of vertical joints: yes / no / Not applicable / I don't know
d) the width of an identical construction may be increased if…: yes / no / Not applicable / I don't know
e) the height of the construction may be increased: yes / no / Not applicable / I don't know

f) an insulation of Euroclass A2 can be replaced by an Euroclass A1 if …: yes / no / Not applicable / I don't know
g) an insulation of Euroclass E can be replaced by an Euroclass B, C or D if …: yes / no / Not applicable / I don't know
h) any kind of frame can be fitted when tested without any frame:
Answer (max. 2 lines): …….

14 CLASSIFICATION

14.1 FOR TEST 1 – Declare all the possible final classifications for Façade 1 according to Test 1, based on § 14 and on the test results that you have found in 12.1 above.

Answer: LS1 / LS2 / LS3 / LS4 / No classification / I don't know

14.2 FOR TEST 2 – Declare all the possible final classifications for Façade 2 according to Test 2, based on § 14 and on the test results that you have found in 12.2 above.

Answer: LS1 / LS2 / LS3 / LS4 / No classification / I don't know

15 EXPERIENCE OF YOUR LAB

15.1 Does your lab have practical experience with façade testing? Only fire spread tests are considered here, not fire resistance tests (i.e. not EN 1364-3 and -4)

Answer: yes / no

15.2 If yes, which test method(s) do you use, for how many years do you perform such tests and how many tests have you performed up to now (approximately)?

Answer: *(for instance Method ref. BS 8414 – Since year 2009 – Number of tests: 13)*
Method ref. ……. – Since year ……. – Number of tests: …….
Method ref. ……. – Since year ……. – Number of tests: …….
Method ref. ……. – Since year ……. – Number of tests: …….
…

PART 2 - COMMENTS ON THE ASSESSMENT METHOD

ONLY IF NEEDED: explain shortly (max. 5 lines for each chapter below) aspects that you find not sufficiently intelligible (i.e. adequate, unambiguous and clear).

1 SCOPE
Comments: …….

3 TERMS, DEFINITIONS, SYMBOLS AND DESIGNATIONS
Comments: …….

4 TEST EQUIPMENT

Comments: …….

5 ENVIRONMENTAL CONDITIONS
Comments: …….

6 TEST SPECIMEN
Comments: …….

7 MOUNTING OF THE TEST SPECIMEN
Comments: …….

8 CONDITIONING OF TEST SPECIMEN
Comments: …….

9 APPLICATION OF INSTRUMENTATION
Comments: …….

10 TEST PROCEDURE
Comments: …….

11 PERFORMANCE CRITERIA
Comments: …….

12 TEST REPORT
Comments: …….

13 DIRECT FIELD OF APPLICATION
Comments: …….

14 CLASSIFICATION
Comments: …….

ANNEX A DETERMINATION OF FALLING PARTS (INFORMATIVE)
Comments: …….

ANNEX B CALIBRATION OF THE HEAT EXPOSURE (INFORMATIVE)
Comments: …….

ANNEX C MOUNTING OF TEST SPECIMEN AT OPENINGS (NORMATIVE)
Comments: …….

ANNEX D FAÇADE-TO-FLOOR JUNCTION (INFORMATIVE)
Comments: …….

ANNEX D – INSTRUCTION SHEET

Please first read this document carefully.
The following instructions shall be <u>strictly</u> implemented by each participant.

1. Purpose of the round robin

1.1 In the frame of a European Commission project, a Consortium of European laboratories is currently working out a new testing method to assess the fire performance of façades.

1.2 Contrarily to round robins organized within EGOLF in the past, the present exercise does not aim to assess the laboratories performances in implementing this method, but well to assess the intelligibility of this new method. Intelligibility here refers to whether the instructions contained in it are sufficiently adequate, unambiguous and clear.

2. Test method

2.1 The exercises shall be performed in accordance with the requirements of the draft of the assessment method provided in annex.

2.2 IMPORTANT NOTE – The draft of the assessment method is supplied for the only purpose of this round robin. This document is confidential and shall not be spread and used for any other activity.

3. General instructions for the exercises

3.1 <u>Exercise sheet</u>

An exercise sheet **Exercises.docx** is supplied in Word file. This file contains all the questions you are asked to answer to. Most of the answers should be expressed in writing, while a few answers should be expressed in drawing. Each question specifies clearly the format expected for the answer.

Follow this exercise sheet, prepare all your answers and register them:

- in the exercise sheet for the answers expressed in writing, and
- in separate files for the answers expressed in drawing.

Hide all information that could reveal the identity of your laboratory. Just check that your participating lab number appears in the provided field.

Note
For the answers that shall be expressed in drawings, you are free to draw them using a software or to draw them properly by hand and scan them into a file. Whatever, the file format shall be DWG, DXF, or any widespread commercial format like PDF, DOC, DOCX, JPEG…

3.2 <u>Tests in support</u>

Some of the exercises refer to two different fictitious tests:

- Test 1: test performed on Façade 1 submitted to a large fire exposure
- Test 2: test performed on Façade 2 submitted to a medium fire exposure

Be careful not to confuse these two tests, their façades and their fire exposures.

Some questions clearly and specifically refer to one of these two fictitious tests. These questions begin by "FOR TEST 1" or "FOR TEST 2". In these cases, your answers shall be based on this only test.
Contrariwise, some questions do not specifically refer to one of these two fictitious tests. These questions begin by "FOR ANY TEST". In these cases, you shall answer in the most general sense, i.e. independently of any specific façade or test configuration.

3.3 Test specimens

As introduced above, two different realistic façade systems (test specimens) named Façade 1 and Façade 2 are considered in some of the exercises.
Drawings of these façade systems are supplied in annex (in DWG and PDF files), they contain sufficient details for the purpose of these exercises. The specimens are drawn in real size – units being in mm – meaning that each dimension can be directly measured on the drawing using any appropriate tool available in your CAD software, when needed.

3.4 Test data files

Fictitious test data are supplied in annex (in Excel files):

- Ambient conditions: this file shall be used for both Tests 1 and 2
- Temperature measurements resulting from a large fire exposure: this file shall be used for Test 1 only
- Temperature measurements resulting from a medium fire exposure: this file shall be used for Test 2 only
- Observations of falling parts - Test 1: this file shall be used for Test 1 only
- Observations of falling parts - Test 2: this file shall be used for Test 2 only

Note
The temperature measurements files provide data for external thermocouples and internal thermocouples located in the 5 first layers of a fictitious façade (from exposed to unexposed face). It doesn't mean that the Façades 1 and 2 in the present exercise consist of 5 layers. Identifying their actual number of layers will precisely be a part of this exercise. Depending on these numbers of layers, you will have to only use the corresponding data in the files, starting with layer 1 on the exposed face, and then 2, 3… for the next deeper layers. Temperatures in additional deeper layers (layer 6 and more), if any, shall be assumed to range between 10 and 15°C all along the test, and are thus meaningless.

3.5 Structure of the exercises

The numbering of the exercises follows the structure of the assessment method. The symbol "§" refers to the relevant section in the assessment method. Some exercises may however need to search information in other sections of the assessment method too.

4. Personnel

4.1 The personnel carrying out the exercises shall be the ones who usually deal with these questions when managing any real fire test.

5. Submitting your answers

5.1 Once you will have prepared all your answers (see 3.1 above), submit them as follows.

5.1.1 Answers expressed in writing

Enter your answers:

- to the "Part 1 - Exercises" in the online form at https://forms.gle/Jze8XAhGoathiXid8
- to the "Part 2 - Comments on the assessment method" in the online form at https://forms.gle/vpR3UizuhszfgjXw9

Click on the button "Submit" at the bottom of the last page to send your answers to the organizer.

NO OTHER WAY OF DATA SUBMISSION WILL BE ACCEPTED. Don't send us your exercise sheet (Word file), it will systematically be rejected.

Note:
Once you have started entering your answers in this online form, it won't be possible to save your form and to reopen it later to complete the filling. In other words: you will have to fill in the form completely all at once. That's why (see 3.1 above) you should prepare all your answers and register them in the exercise sheet before. Doing so, simple copy-paste will make the encoding easier.

Note:
Any missing answer will be interpreted as "I don't know".

5.1.2 Answers expressed in drawing

Send your drawing files – and only these files – by e-mail to EGOLF Secretary General Christine Roszykiewicz at Christine.Roszykiewicz@egolf.global

5.2 Your answers shall be submitted as explained in 5.1 NO LATER THAN JUNE 26, 2020 (*answers will not be accepted after this deadline*).

5.3 In all cases, the EGOLF Secretary General Christine Roszykiewicz is your only contact. She transfers all information from you to the organizer of this round-robin and vice-versa, so that your confidentiality is guaranteed.

It is not intended to give other special instruction, nor comments or additional information about the method to the participating labs.

In any cases, the rule is:

Do as you would do for any ordinary test with any ordinary client

ANNEX E – ANSWERS RECEIVED TO CLOSED QUESTIONS (PART 1 OF THE EXERCISES)

Legend (see § 1.3.1 and § 2.2.1):

- INFO = informative item, intended to collect open information about the need or the experience of the labs, not assessable
- UNGRADABLE = ungradable item, no correct answer could be defined by the steering group, not assessable
- INACCURATE = inaccurate item, poor wording of the question leading to various acceptable answers, not assessable
- DK = "I don't know"
- * = irrelevant answer (comprehensible response, but not answering the question) or incomprehensible answers
- - = missing answer (no answer was received)

The content of the first column is detailed in § 1.3.2.

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
4 TEST EQUIPMENT																													
4.3 Structural frame																													
4.3.1 Problem if frame passes behind the combustion chamber opening?																													
yes	DK	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DK	DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
4.3.2 Problem if frame passes behind the secondary opening?																													
INACCURATE	DK	Yes	No	Yes	No	DK	Yes	No	Yes	Yes	Yes	Yes	Yes	DK	DK	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Yes
4.3.3 Need the assessment method to supply more detail?																													
INFO	Yes	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No
If yes, comment on what information you would need																													
INFO																													
5 ENVIRONMENTAL CONDITIONS																													
5.1 Test can be started according to the file of ambient conditions?																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
5.2 Test invalidated if rain on the specimen from test minute 13 to 21?																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5.3 Test invalidated if rain on the specimen from test minute 43 to 45?																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	DK	Yes	Yes	Yes	Yes	DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6 TEST SPECIMEN																													
6.3 Design																													
6.3.1 How do you usually manage the test specimen design?																													
- I let the client perform it alone																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
INFO	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	Yes	No	No	No	Yes	No
- I discuss with the client about its needs																													
INFO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- I take into account the whole product range of the test specimen																													
INFO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
- I take into account the direct field of application																													
INFO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If needed, comment on the aspects above and on your answers																													
INFO																													
7 MOUNTING OF THE TEST SPECIMEN																													
7.1 General																													
7.1.1 Kind of support on which you would install the Façade 1? (Fr = on a structural frame / SC = on a supporting construction)																													
SC	SC	Fr	SC	SC	SC	SC	SC	SC	Fr	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC	SC
7.1.2 What configuration of test rig does it correspond to in Figure 1?																													
1	1	4	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	2	1
7.1.3 How should the Façade 1 be attached/fixed/fastened to the rig?																													
INACCURATE																													
7.1.4 Kind of support on which you would install the Façade 2? (Fr = on a structural frame / SC = on a supporting construction)																													
Fr	Fr	SC	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	Fr	SC	Fr	Fr
7.1.5 What configuration of test rig does it correspond to in Figure 1?																													
3	3	4	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	1	4	3
7.1.6 How should the Façade 2 be attached/fixed/fastened to the rig?																													
UNGRADABLE																													
7.1.7.a Dimensions of test specimen 1 (in mm) - exposed face																													
A																													
3200 mm	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200
B																													
1500 mm	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
C																													
6000 mm	6000	7500	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
D																													
250 mm	250	50	50	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
E																													
2000 mm	2000	1000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
F																													
2000 mm	2000	1000	1000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
G																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
500 mm	500	500	1500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
H																													
1250 mm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
I																													
1200 mm	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
J																													
1200 mm	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
K																													
1500 mm	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
L																													
750 mm	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
M																													
750 mm	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
N																													
196 mm	196	196	198	196	196	198	196	196	196	196	196	196	196	196	196	196	196	DK	196	196	196	196	196	196	DK	196	196	DK	DK
O																													
1000 mm	1000	800	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
7.1.7.b Dimensions of test specimen 2 (in mm) - exposed face																													
A																													
3200 mm	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200
B																													
1500 mm	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
C																													
6000 mm	6000	8500	6000	6000	6000	7000	6000	6000	6000	6000	6000	6000	7000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	7000	6000	6000	6000
D																													
50 mm	50	250	50	50	50	50	50	50	50	50	50	50	50	250	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
E																													
1000 mm	1000	2000	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
F																													
1000 mm	1000	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
G																													
500 mm	500	500	1500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
H																													
1250 mm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
I																													
1200 mm	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
J																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
1200 mm	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
K																													
1500 mm	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
L																													
750 mm	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
M																													
750 mm	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	DK	750	750	750	750	750
N																													
285 mm	285	196	285	285	285	285	285	285	285	285	285	285	285	285	285	285	285	DK	285	285	285	285	285	285	DK	285	285	DK	DK
O																													
800 mm	800	1000	1000	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
7.1.8.a Dimensions of test rig 1 (in mm) - front side																													
P																													
3396 mm	3396	3200	3396	3396	3396	3398	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	3396	DK	3396	3396	3200	4000
Q																													
1696 mm	1696	1500	1696	1696	1696	1698	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	1696	DK	1696	1696	1500	3300
R																													
446 mm	446	50	246	446	446	448	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	446	DK	4460	446	250	1050
7.1.8.b Dimensions of test rig 2 (in mm) - front side																													
P																													
3485 mm	3485	3200	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	3485	DK	3485	3485	3200	4000
Q																													
1785 mm	1785	1500	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	DK	1785	1785	1500	2300
R																													
335 mm	335	50	335	335	335	335	335	335	335	335	335	335	535	335	335	335	335	335	335	335	335	335	335	335	DK	535	335	50	850
7.2 Secondary opening																													
7.2.1 Shall a secondary opening be included in test Configuration 1?																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7.2.2 Shall a secondary opening be included in test Configuration 2?																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7.3 Test specimen / ANNEX C Mounting of test specimen at openings																													
7.3.1 Does the Façade system 1 offer any protection to openings?																													
yes	Yes	No	Yes	Yes	Yes	Yes	Yes	DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7.3.2 If yes, what configuration does it correspond in annex C? (NSC = no standard configuration)																													
4	4		4	NSC	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	DK	4	4	4
7.3.3.a Configuration of specimen 1 regarding the window frame? (1 = Only with the frame / 2 = Only without the frame / 3 = Both with and without the frame is possible)																													
3	3	1	3	1	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	DK	3	3	3

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
7.3.3.b Drawing of the interface between specimen 1 and edges of openings																													
- drawing with frame supplied?																													
UNGRADABLE	yes	yes	no	yes	yes	no	yes	yes	*	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	*	yes	yes	yes	no	no	no	yes	no
+ façade extends below the floor slab of the combustion chamber?																													
UNGRADABLE	yes	yes		yes	yes		yes	yes	*	*	yes	yes	yes	yes	yes	yes	yes	yes		yes	*	yes	yes	yes				yes	
+ what has been removed?																													
* TOP - Window frame																													
UNGRADABLE									*												*								
* TOP - Caulking																													
UNGRADABLE									*												*								
* TOP - Frame fixing lug																													
UNGRADABLE									*												*								
* TOP - Frame edging profile																													
UNGRADABLE									*	x											*								
* TOP - Drip plate																													
UNGRADABLE									*												*								
* TOP - Completion lintel layer																													
UNGRADABLE				x			x		*	x								x			*								
* BOTTOM - Window frame																													
UNGRADABLE									*		-				-						*			-					
* BOTTOM - Caulking																													
UNGRADABLE									*		-				-						*			-					
* BOTTOM - Frame fixing lug																													
UNGRADABLE									*		-				-						*			-					
* BOTTOM - Frame edging profile																													
UNGRADABLE									*	x	-				-						*			-					
* BOTTOM - External window sill																													
UNGRADABLE									*		-				-						*			-					
* BOTTOM - Completion sill layer																													
UNGRADABLE				x			x		*	x	-				-			x			*			-					
* BOTTOM - Internal window sill																													
UNGRADABLE	x			x			x	x	*	x	-				-			x			*			-					
- drawing without frame supplied?																													
UNGRADABLE	yes	no	no	no	yes	no	no	yes	*	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	*	yes	yes	yes	no	no	yes	yes	no
+ façade extends below the floor slab of the combustion chamber?																													
UNGRADABLE	yes				yes			yes	*	*	yes	yes	no	no	yes	yes		yes		yes	*	no	yes	yes			no	yes	
+ what has been removed?																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
* TOP - Window frame																													
UNGRADABLE	x				x			x	*	x	x	x	x	x	x	x		x		x	*	x	x	x			x	x	
* TOP - Caulking																													
UNGRADABLE	x				x			x	*	x	x	x	x	x	x	x		x		x	*	x	x	x			x		
* TOP - Frame fixing lug																													
UNGRADABLE	x				x			x	*	x	x	x	x	x	x	x		x		x	*	x	x	x			x		
* TOP - Frame edging profile																													
UNGRADABLE	x				x			x	*	x	x	x	x	x	x	x		x		x	*	x	x	x			x		
* TOP - Drip plate																													
UNGRADABLE					x			x	*				x	x		x					*	x		x					
* TOP - Completion lintel layer																													
UNGRADABLE	x				x			x	*	x	x	x	x	x	x	x		x		x	*	x	x	x			x		
* BOTTOM - Window frame																													
UNGRADABLE	x				x			x	*	x	-	x	x	x	-	x		x		x	*	x	x	-			x	x	
* BOTTOM - Caulking																													
UNGRADABLE	x				x			x	*	x	-	x	x	x	-	x		x		x	*	x	x	-			x		
* BOTTOM - Frame fixing lug																													
UNGRADABLE	x				x			x	*	x	-	x	x	x	-	x		x		x	*	x	x	-			x		
* BOTTOM - Frame edging profile																													
UNGRADABLE	x				x			x	*	x	-	x	x	x	-	x		x		x	*	x	x	-			x		
* BOTTOM - External window sill																													
UNGRADABLE					x			x	*		-		x	x	-	x					*	x		-					
* BOTTOM - Completion sill layer																													
UNGRADABLE	x				x			x	*	x	-	x	x	x	-	x		x		x	*	x	x	-			x		
* BOTTOM - Internal window sill																													
UNGRADABLE	x				x			x	*	x	-	x	x	x	-	x		x		x	*	x	x	-			x		
7.3.4 Does the Façade system 2 offer any protection to openings?																													
yes	Yes	No	Yes	Yes	Yes	Yes	Yes	DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7.3.5 If yes, what configuration does it correspond in annex C? (NSC = no standard configuration)																													
6	6		5	6	NSC	6	6	6	6	6	6	6	6	4	6	6	6	6	5	6	6	6	6	6	NSC	DK	5	5	6
7.3.6.a Configuration of specimen 2 regarding the window frame? (1 = Only with the frame / 2 = Only without the frame / 3 = Both with and without the frame is possible)																													
3	3	1	1	2	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	DK	3	1	3
7.3.6.b Drawing of the interface between specimen 2 and edges of openings																													
- drawing with frame supplied?																													
UNGRADABLE	yes	yes	no	no	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes	*	yes	yes	yes	no	no	no	yes	no
+ façade extends below the floor slab of the combustion chamber?																													
UNGRADABLE	-	yes			-		yes	yes	yes	no	yes	-	yes	no	-	yes	yes	no		yes	*	no	-	yes				yes	

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
+ what has been removed?																													
* TOP - Window frame																													
UNGRADABLE																					*								
* TOP - Caulking																													
UNGRADABLE																					*								
* TOP - Drip plate																													
UNGRADABLE																					*								
* TOP - Completion lintel board																													
UNGRADABLE										x											*								
* TOP - Completion wall board																													
UNGRADABLE	x							-		x		-		x				x		x	*	x	x						
* BOTTOM - Window frame																													
UNGRADABLE											-				-						*								
* BOTTOM - Caulking																													
UNGRADABLE											-				-						*								
* BOTTOM - External window sill																													
UNGRADABLE											-				-						*								
* BOTTOM - Completion wall board																													
UNGRADABLE	x							-		x	-	-		x	-			x		x	*	x	x						
* BOTTOM - Internal window sill																													
UNGRADABLE								x		x	-				-						*								
- drawing without frame supplied?																													
UNGRADABLE	yes	no	no	yes	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	no	no	yes	*	yes	yes	yes	no	no	yes	no	no
+ façade extends below the floor slab of the combustion chamber?																													
UNGRADABLE	-			yes			yes	yes	yes	no	yes	-	yes	no	no	yes				yes	*	no	-	yes			no		
+ what has been removed?																													
* TOP - Window frame																													
UNGRADABLE	x			x			x	x	x	x	x	x	x	x	x	x				x	*	x	x	x			x		
* TOP - Caulking																													
UNGRADABLE	x			x			x		x	x	x	x	x	x	x	x				x	*	x	x	x			x		
* TOP - Drip plate																													
UNGRADABLE							x	x	x			x	x	x		x					*	x		x					
* TOP - Completion lintel board																													
UNGRADABLE				x			x		x	x	x	x	x	x	x	x				x	*	x	x	x			x		
* TOP - Completion wall board																													
UNGRADABLE	x			x			x	-	x	x	x	x	x	x	x	x				x	*	x	x	x			x		
* BOTTOM - Window frame																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
UNGRADABLE	x			x			x	x	x	x	-	x	x	x	-	x				x	*	x	x	x			x		
* BOTTOM - Caulking																													
UNGRADABLE	x			x			x	x	x	x	-	x	x	x	-	x				x	*	x	x	x			x		
* BOTTOM - External window sill																													
UNGRADABLE				x			x	x	x		-	x	x	x	-	x					*	x	x	x					
* BOTTOM - Completion wall board																													
UNGRADABLE	x			x			x	-	x	x	-	x	x	x	-	x				x	*	x	x	x			x		
* BOTTOM - Internal window sill																													
UNGRADABLE				x			x	x	x	x	-	x	x	x	-	x				x	*	x	x	x			x		
7.3.7 Different configuration at sec. opening and comb. chamber opening?																													
no	Yes	No	Yes	No	No	No	Yes	No	DK	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	DK	DK	DK	Yes	No
7.3.8 Advantage of testing without any frame? (1 = Enlarges the field of application to any frame)																													
1		1	1	1	1				1		1			1	1	1			1	1	1		1	1		1		1	1
7.4 Junction between façade and floor (optional test procedure)																													
7.4.1 Possible to assess the façade-to-floor-junction for Façade 1?																													
no	No	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	DK	DK	No	No
7.4.2 Drawing of specimen 1 at the roof slab of the combustion chamber																													
Proposed configuration?																													
		-				-																							
7.4.3 Possible to assess the façade-to-floor-junction for Façade 2?																													
yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DK	DK	Yes	Yes
7.4.4 Drawing of specimen 2 at the roof slab of the combustion chamber																													
- Floor of the combustion chamber (1 = Replaced by complete floor of test façade 2 / 2 = Concrete slab)																													
1	1		-	1	1	-	1	1	1	1	1	1	1	1	1	2	1	1	-	1	1	1	1	1	-			-	-
- Thermocouples position (1 = At 25 mm from the internal wall (plasterboard) / 2 = At mid-depth and at 15 mm of the beam (considered as a discrete area) / 3 = Inside the floor, at mid-depth and at 15 mm of the beam (considered as a discrete area) / 4 = At 30 mm from the internal wall (plasterboard) / 5 = Below the floor, at 15 mm from the internal wall (plasterboard) / 6 = At 15 mm of the beam (considered as a discrete area))																													
1	1		-	1	-	-	1	1	2	-	3	2	2	4	1	1	5	1	-	2	6	-	1	2	-			-	-
8 CONDITIONING OF TEST SPECIMEN																													
8.2.1 Explain how you will condition the test specimen. What is mentioned by participants?																													
- Protection from adverse environmental conditions																													
yes	yes	no	yes	yes	yes	yes	yes	no	no	yes	yes	yes	no	yes	no	yes	yes	yes	no	yes	no	yes	yes	yes	yes	no	yes	yes	yes
- Follow up of the moisture content																													
INFO	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	yes	yes	no	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
- Storing inside																													
INFO	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	no	no
8.2.2 Conditioning criterion to follow to decide when the test can be started. What is mentioned by participants?																													
- If hygrosc. materials: stabilization of the moist. content in the mock-up																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
yes	yes	yes	yes	yes	yes	yes	yes	no	yes	no	yes	yes	yes	no	yes	yes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	no	yes
- If not: in accordance with the test sponsor's specifications																													
yes	no	no	no	no	no	yes	yes	no	yes	no	yes	no	no	yes	no	yes	no	yes	no	yes	yes	no	no	yes	yes	yes	no	yes	yes
8.2.3 Is a mock-up needed to monitor the conditioning of the specimen 1?																													
no	Yes	Yes	Yes	No	No	Yes	No	No	No	No	DK	Yes	Yes	Yes	No	No	No	Yes	No	No	No	No	No	Yes	No	Yes	Yes	Yes	No
8.2.4 If yes, dimensions of mock-up for specimen 1 (in mm)																													
X1																													
	588	588	588			600						588	588	588				588						588		588	600	700	
Y1																													
	588	588	588			600						588	588	588				588						588		588	600	700	
Z1																													
	196	196	196			198						196	196	396				196						196		196	196	200	
8.2.5 If yes, faces of mock-up for specimen 1 covered in plastic?																													
- Face 1																													
	No	No	No			No						No	No	No				No						No		No	No	No	
- Face 2																													
	Yes	Yes	Yes			DK						Yes	Yes	Yes				No						Yes		Yes	Yes	Yes	
- Face 3																													
	Yes	Yes	Yes			Yes						Yes	Yes	Yes				Yes						Yes		Yes	Yes	Yes	
- Face 4																													
	Yes	Yes	Yes			Yes						Yes	Yes	Yes				Yes						Yes		Yes	Yes	Yes	
- Face 5																													
	Yes	Yes	Yes			Yes						Yes	Yes	Yes				Yes						Yes		Yes	Yes	Yes	
- Face 6																													
	Yes	Yes	No			Yes						Yes	Yes	Yes				Yes						Yes		Yes	Yes	Yes	
8.2.6 Is a mock-up needed to monitor the conditioning of the specimen 2?																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes
8.2.7 If yes, dimensions of mock-up for specimen 2 (in mm)																													
X2																													
855 mm	855	855	855	600	855	855	855		855		855	855	855	855	855	855		855	855	855	855		855	855		855	900	700	855
Y2																													
855 mm	855	855	855	600	855	855	855		855		855	855	855	855	855	855		855	855	855	855		855	855		855	900	700	855
Z2																													
285 mm	285	285	285	285	285	285	285		285		285	285	285	285	285	285		285	285	285	285		285	285		285	285	300	285
8.2.8 If yes, faces of mock-up for specimen 2 covered in plastic?																													
- Face 1																													
no	No	No	No	No	No	No	No		No		No	No	No	No	No	No		No	No	No	No		No	No		No	No	No	No

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
- Face 2																													
no	No	Yes	Yes	No	No	No	No		No		No	No	No	No	No	No		No	No	No	No		No	No		No	No	No	No
- Face 3																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
- Face 4																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
- Face 5																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
- Face 6																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes
9 APPLICATION OF INSTRUMENTATION																													
9.1 Temperature measurements																													
9.1.1 Drawing of locations of external and internal th. for Façade 1																													
- external is th. present																													
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	DK	yes	yes	yes	yes	yes	yes	DK	yes	yes	DK
- external th. is at 50 mm in front of the exposed face																													
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	DK	yes	yes	yes	yes	yes	yes	DK	yes	-	DK
- number of internal layers of th.																													
2	1	2	3	2	2	2	3	1	1	2	1	1	1	4	1	4	3	2	DK	1	1	2	1	3	3	DK	2	2	DK
+ in ceramic tiles																													
x			x		x		x							x		x			DK					x		DK			DK
+ in air between horizontal sections																													
														x		x	x		DK			x		x	x	DK			DK
+ in air between vertical sections																													
		x				x							x	x	x	x	x		DK			x	x	x	x	DK	x		DK
+ in air between all sections																													
x	x		x	x	x		x	x	x	x	x	x						x	DK	x	x					DK		x	DK
+ in insulation boards																													
		x	x	x		x	x			x				x		x	x	x	DK						x	DK	x	x	DK
+ in supporting construction																													
																			DK							DK			DK
- internal th. are at mid-depth of each layer																													
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	DK	yes	yes	yes	yes	yes	yes	DK	yes	yes	DK
9.1.2 Total number of th. for Façade 1																													
- on level 1																													
24	16	24	32	27	24	24	32	16	16	24	16	16	16	50	16	40	32	24	16	16	16	24	16	32	5	8	24	24	16
- on column 1																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
36	24	36	48	36	36	36	48	24	24	36	24	24	24	60	24	60	48	36	24	24	24	36	24	48	10	12	36	36	24
- on column 2																													
36	24	36	48	36	36	36	48	24	24	36	24	24	24	60	24	60	48	36	24	24	24	36	24	48	10	12	36	36	24
9.1.3 Drawing of locations of external and internal th. for Façade 2																													
- external is th. present																													
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	DK	yes	yes	yes	yes	yes	yes	DK	yes	yes	DK
- external th. is at 50 mm in front of the exposed face																													
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	DK	yes	yes	yes	yes	yes	yes	DK	yes	-	DK
- number of internal layers of th.																													
4	3	1	5	3	3	4	5	3	3	3	3	3	3	5	3	5	3	5	DK	3	3	4	3	4	3	DK	3	3	DK
+ in covering board																													
x	x		x		x		x	x	x		x	x	x	x	x	x		x	DK	x	x	x	x	x		DK			DK
+ in air between vertical laths																													
x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	DK	x	x	x	x	x	x	DK	x	x	DK
+ in wind protection																													
																			DK							DK			DK
+ in outer insulation																													
			x	x		x	x			x				x		x	x	x	DK			x			x	DK	x	x	DK
+ in insulation																													
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	DK	x	x	x	x	x	x	DK	x	x	DK
+ in "invisible" plasterboard																													
																			DK							DK			DK
+ in "visible" plasterboard																													
																			DK							DK			DK
+ between both plasterboards																													
x			x			x	x							x		x		x	DK					x		DK			DK
- internal th. are at mid-depth of each layer																													
yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	DK	yes	yes	yes	yes	yes	yes	DK	yes	yes	DK
9.1.4 Total number of th. for Façade 2																													
- on level 1																													
40	32	24	48	36	32	40	48	32	32	32	32	32	32	60	32	48	32	48	32	32	32	48	32	40	4	8	32	32	24
- on column 1																													
60	48	36	72	48	48	60	72	48	48	48	48	48	48	72	48	72	48	72	48	48	48	72	48	60	8	12	48	48	36
- on column 2																													
60	48	36	72	48	48	60	72	48	48	48	48	48	48	72	48	72	48	72	48	48	48	72	48	60	8	12	48	48	36
12 TEST REPORT																													
12.1 Declare the test results for Test 1 (in minutes)																													

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
- (Performance) Fire spread																													
18 minutes	18	22	18	17	18	18	18	18	18	DK	18	18	18	18	18	18	17	18	DK	18	18	18	18	19	17	DK	18	19	19
+ (Criterion) Vertical fire spread																													
18 minutes	18	22	18	17	18	18	18	18	18	18	18	18	18	18	18	18	20	18	18	18	18	18	18	18	17	18	18	19	19
+ (Criterion) Horizontal fire spread																													
21 minutes	21	DK	22	60	21	22	21	21	21	22	21	21	21	21	21	21	17	21	21	21	21	21	21	21	20	21	21	22	21
- (Performance) Falling parts																													
22 minutes	22	22	22	22	22	22	22	22	22	DK	22	22	22	22	22	22	22	22	DK	22	22	22	22	23	22	22	22	60	23
+ (Criterion) Solid falling parts																													
22 minutes	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	DK	22	22	22	22	22	22	22	22	22	22	60	23
+ (Criterion) Burning parts																													
60 minutes	60	DK	60	60	60	60	60	60	60	0	60	60	60	60	60	61	60	60	60	100000	60	60	60	DK	0	DK	60	60	DK
12.2 Declare the test results for Test 2 (in minutes)																													
- (Performance) Fire spread																													
60 minutes	60	17	60	60	60	60	60	60	60	DK	60	60	60	60	60	61	21	60	DK	100000	60	18	60	DK	21	DK	60	60	DK
+ (Criterion) Vertical fire spread																													
60 minutes	60	17	60	60	60	60	60	60	60	0	60	60	60	60	60	61	60	60	60	100000	60	18	60	DK	21	DK	60	60	DK
+ (Criterion) Horizontal fire spread																													
60 minutes	60	DK	60	60	60	60	60	60	60	0	60	60	60	60	60	61	21	60	60	100000	60	60	60	DK	60	DK	60	60	DK
- (Performance) Falling parts																													
11 minutes	11	11	11	11	11	10	11	11	11	DK	11	11	11	11	11	11	9	11	DK	11	11	11	11	12	11	DK	11	12	12
+ (Criterion) Solid falling parts																													
11 minutes	11	11	11	11	11	10	11	11	11	9	11	11	11	11	11	11	9	11	11	11	11	11	11	11	11	11	11	12	12
+ (Criterion) Burning parts																													
12 minutes	12	DK	11	11	12	18	11	12	11	0	12	11	12	11	12	12	17	12	12	11	12	60	60	17	11	DK	12	12	12
13 DIRECT FIELD OF APPLICATION																													
13.1 Declare the direct field of application for the tested Façade 1. What clauses are included by participants? (NA = Not applicable)																													
a) decrease in distance of fixing centres																													
NA	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	No	Yes	NA	Yes	Yes	Yes
b) increase in the number of horizontal joints																													
NA	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NA	No	Yes	Yes	NA	Yes	NA	Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes	No	NA	Yes	Yes	No
c) increase in the number of vertical joints																													
NA	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NA	No	Yes	Yes	NA	Yes	NA	Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes	No	NA	Yes	Yes	No
d) the width of an identical construction may be increased if…																													
NA	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
e) the height of the construction may be increased																													
NA	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Correct answer	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
f) insulation of Euroclass A2 can be replaced by an Euroclass A1 if …																													
NA	Yes	Yes	Yes	Yes	Yes	DK	Yes	Yes	NA	Yes	Yes	Yes	NA	Yes	NA	Yes	Yes	DK	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
g) insulation of Euroclass E can be replaced by an Euroclass B, C or D if …																													
NA	NA	Yes	NA	NA	Yes	No	NA	NA	NA	No	NA	NA	NA	NA	NA	NA	Yes	DK	NA	NA	NA	NA	NA	NA	Yes	NA	Yes	No	No
h) any kind of frame can be fitted when tested without any frame ("yes/no" = yes if tested without frame, no if tested with frame / "yes..." = yes based on a personal interpretation that is not considered in the assessment method)																													
NA	yes	yes	Yes	No	Yes…	No	NA	yes/no	NA	yes/no	yes	yes	NA	yes	NA	yes	yes/no	no	yes	yes…	yes/no	-	no	yes/no	no	no	yes	*	yes
13.2 Declare the direct field of application for the tested Façade 2. What clauses are included by participants? (NA = Not applicable)																													
a) decrease in distance of fixing centres																													
yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	NA	Yes	Yes	Yes	Yes	Yes	NA	Yes
b) increase in the number of horizontal joints																													
yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	NA	No	Yes	Yes	Yes	No
c) increase in the number of vertical joints																													
yes	No	Yes	NA	Yes	Yes	NA	DK	Yes	No	No	Yes	Yes	Yes	Yes	DK	Yes	NA	Yes	Yes	Yes	Yes	NA	Yes	Yes	No	NA	Yes	Yes	No
d) the width of an identical construction may be increased if…																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	No	Yes	Yes	Yes	Yes	Yes
e) the height of the construction may be increased																													
yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
f) insulation of Euroclass A2 can be replaced by an Euroclass A1 if …																													
yes	No	Yes	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	DK	Yes	Yes	Yes	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes
g) insulation of Euroclass E can be replaced by an Euroclass B, C or D if …																													
no or NA	No	Yes	NA	NA	Yes	No	Yes	NA	No	No	NA	NA	NA	NA	NA	Yes	NA	DK	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	NA	Yes
h) any kind of frame can be fitted when tested without any frame ("yes/no" = yes if tested without frame, no if tested with frame / "yes..." = yes based on a personal interpretation that is not considered in the assessment method / "no..." = no based on a personal interpretation that is not considered in the assessment method)																													
INACCURATE	yes	yes	NA	yes	yes…	no	yes	yes/no	no	yes/no	yes	yes	yes/no	yes	yes	yes	yes/no	no	*	no…	no	-	no	yes/no	no	no	yes	no…	Yes
14 CLASSIFICATION																													
14.1 Declare all the possible final classifications for Façade 1 acc. to Test 1 (NC = No classification)																													
NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	LS1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	LS1, LS2, LS3, LS4	NC	NC	NC
14.2 Declare all the possible final classifications for Façade 2 acc. to Test 2 (NC = No classification)																													
LS4	LS4	NC	LS4	LS4	NC	LS3	LS4	LS4	LS4	NC	LS4	LS4	LS4	LS4	LS4	LS3	NC	LS4	LS4	LS4	LS4	NC	LS4	LS4	NC	LS3, LS4	LS4	LS4	LS4

15 EXPERIENCE OF YOUR LAB	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2
15.1 Does your lab have practical experience with façade testing?														
	yes	No	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No
15.2 If yes:														
+ Method ref.	ISO 13785-1 + DIN E 4102-20 (modified)			LEPIR II		BS 8414-1 + DIN EN 4102-20 + E DIN 4102-24	BS 8414-1	SP FIRE 105 + Ad-hoc.		PN-B-02867	BS 8414 + NFPA 285 + ISO 13785-1	ISO 13785-1 + ISO 13785-2		
+ Since year	2018 + 2018			2014		2018 + 2019 + ?	2020	2020 + 2015		1994	2018 + 2019 + 2019	2009 + 2011		
+ Number of test	3 + 3			9		6 + 2 + 10	1	8 + 12		3000	8 + 6 + 10	68 + 5		

15 EXPERIENCE OF YOUR LAB	D3	D4	E1	E2	E3	E4	F1	F2	F3	F4	G1	G2	G3	G4	H1
15.1 Does your lab have practical experience with façade testing?															
	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
15.2 If yes:															
+ Method ref.	Experimental large scale facade testing based on real case design + BS 8414	NFPA 285 + BS 8414	LEPIR II			DIN 4102-20 + DIN 4102-24 + BS 8414-1	BS 8414		LEPIR 2 + BS 8414				DIBt protocol		DIN 4102-20
+ Since year	2009 + 2014	2014 + 2018	1970			2014 + 2014 + 2016	2017		2013 + 2018				2016		1992
+ Number of test	2 + 2	264 + 25	> 15			40 + 20 + 2	7		50 + 5				4		> 150

ANNEX F – ANSWERS RECEIVED TO OPEN QUESTIONS (PART 1 OF THE EXERCISES)

4.3.1 Is it problematic if a steel section of your structural frame passes just behind the combustion chamber opening? Explain shortly why.

A1	the question isn't clear: behind combustion chamber opening there isn't any steel section? – first horizontal steel section is above combustion chamber in the high of 2500 mm
A2	the portion of steel of the structural frame passing behind the combustion chamber should be protected
A3	You don't want to expose steel to the heat from the combustion chamber. Combustion chamber walls and roof shall be produced by non-combustible aerated concrete blocks and slabs
A4	There are a risk of façade system deformation during the test if the structural frame suffers damage or distortion.
B1	This is not problematic if you take car to design your steel frame to accommodate the volume of combustion chambers. Otherwise, the answer is yes
B2	supporting structure must not interfere (combustion chamber) and must remain load-bearing
B3	If the structural frame passes behind the combustion chamber, it is impossible to build the combustion chamber and the crib.
B4	There should not be anything in or in front of the combustion chamber other than the wood crib, the platform for the wood crib and the 2-3 thermocouples. Anything else will change the flow of the fire and can be damaged during the fire.
C1	The combustion chamber overhangs from the vertical plane of the structural steel frame. The depth of the combustion chamber of 800 mm or 1000 mm cannot be executed this way.
C2	If the structural frame will open the sample fixation may be damaged and the fire may penetrate the sample from the rear side and results can change
C3	Structural frame shall be designed to withstand the effects of the imposed loads and/or the tests performed, but should not obstruct the combustion chamber opening
C4	due to thermal stress of the steel profile, complicated fire protection of the profile
D1	It can also increase the temperature of other areas. And doesn't relate to the building practice.
D3	Perhaps the accessibility to the chamber could pose a problem.
D4	There will be a problem in that case due the impact of fire load onto the structural steel.
E1	Even if it is thermally protected it deflectsthe flame path
E2	Avoid as far as possible that steel profiles warm up because of the heat from the combustion chamber that could cause movement of the structural that could affect to the specimen.
E3	it would not be possible to fit the crib in the opening. If the steel section has any interaction with the flame this may cause a problem too
E4	If steel section crosses the combustion chamber opening, it gets hot and instable, furthermore it reduces the opening of the combustion chamber.
F1	The steel section in the combustion chamber shall be heated which is critical for the stability of the test rig. And this section shall disturb the flame pattern of the flames. Chamber dim. no respect
F2	Design requirements of the combustion chamber would not be fulfilled.
F3	To place and adjust the position of the combustion chamber - ventilation of the chamber
F4	To avoid the intersection between structural frame and combustion chamber, thermocouples, and to protect the structural frame
G1	because the structural frame is behind the cobustion chamber
G2	If the structural fram is behind the combustion chamber, it would not be a problem, there are rear walls.
G3	when passes the opening this frame could be locally heated and will subsequently extend and/or deform. This will influence the behavior of the faced under test.
G4	As the combustion chamber may move left and right, the opening of fan may blocked
H1	Due to heating up distortions can occur

4.3.2 Is it problematic if a steel section of your structural frame passes just behind the secondary opening? Explain shortly why.

A2	to avoid deformations
A3	The backside of the opening shall be covered by a backing board.
A4	There are a risk of façade system deformation during the test if the structural frame suffers damage or distortion.

B1	This is not problematic if you take car to design your steel frame to accommodate the positioning of the backing board. Otherwise, the answer is yes
B2	Does not apply to our test centre
B3	Yes, but it is not critical. It would be difficult to install the 20mm backing board.
B4	No, as long as it doesn't get hot during the fire and is not in the way of the measurements it will not affect the test result.
C1	The backing board must be mounted directly behind the supporting construction resp. behind the specimen.
C2	If the structural frame will open the sample fixation may be damaged and the fire may penetrate the sample from the rear side and results can change
C3	Structural frame shall be designed to withstand the effects of the imposed loads and/or the tests performed, but should not obstruct the secondary opening
C4	due to thermal stress of the steel profile, complicated fire protection of the profile
D1	It lowers the area of the opening, it can also increase the temperature of other areas. And doesn't relate to the building practice.
D3	Probably not, but a problem might arise later.
D4	There will be a problem if the calcium silicate board breaks open and affects the structural steel sections. The breakage of the calcium silicate board depends on the fire load applied to it.
E1	Yes if it is thermally protected in case the board which closes the opening breaks
E2	Avoid as far as possible that steel profiles warm up because of the heat from the secondary opening that could cause movement of the structural that could affect to the specimen.
E3	a structural frame might need fire protection. However, if there is enough space to put the frame behind the boards then this would not be seen as a major issue
E4	If the arrangement of the steel sections guarantees an easy way of mounting and fixing the backing board just behind the secondary opening.
F1	This is no problem if the section is located behind the backing board.
F2	if a mullion or a transom passes just behind the secondary opening, the backing board could not be sufficiently installed.
F3	to place the backing board
F4	No closer than 200mm from secondary opening frame, for backing boards mounting
G1	because the structural frame is behind the secondary opening, closed by backing board
G2	The secondary opening is covered by a board.
G3	the opening is closed by a backboard.
H1	Due to heating up distortions can occur

4.3.3 Would you need the assessment method to supply more detail on how the structural frame should be designed? Comment on what you would need.

A1	steel thickness, grade, cross section of frame elements, optimal frame dimensions, safe position of steel joints of structural frame (prefer in recommendatory manner)
A2	it should give all details in the form of drawings and list all the materials in order all the labs build equivalent frames
B1	Recommendations which are made in answer to 4.3.1. and 4.3.2. could be incorporated into the assessment method
B3	An optional but much more detailed scheme of a suitable structural frame would be very useful.
B4	Not more detailed, it should only mention that the structural system should not affect the exposed side of the façade and the combustion chamber.
C2	More information is necessary because all laboratories must perform tests with same apparatus and configuration of openings
C4	it would be useful, but not necessary, from our point of view, the best way is to put more detailed proposal of the structural frame to the assessment method, which would be the same for all laboratories
D2	The connection between the test rig (structural frame) and the walls of the combustion chamber should be detailed more. It seems that the horizontal member of the frame is flush with the top of the chamber (Large fire) which seems under heat exposure
D3	Perhaps an illustration of a functional frame in the standard would be useful.
D4	In that case a harmonized process could be followed by all parties.
E1	What precautions have to be taken to avoid deformation or collapse of steel frame
E2	It could be useful to include type sections of the steel profiles and details about their junctions taking into account the existent rigs some labs have built for testing according to BS standards.
E3	more detail required about the construction detail of the whole rig and to fire protect the structural frame

E4	we would need: 1) information on how to protect the structural frame from the heat when a test setup fails, 2) a more harmonized design, since the massive steel members can act as a heat sink and could have an influence on the temperature in and in front of the test setup.
F1	The lowest transom of the test rig needs to be positioned higher than 2500 mm so that the roof of the combustion chamber passes underneath this transom. This is important in cases where a floor junction has to be tested.
F2	mullion/transom connections; min. steel section dimensions
G1	clarification of which structure is which structure is which, drawings
G2	Cannot find the height for the round hole for the fan for test 2.

6.3.1 Additional comment on how you usually manage the test specimen design. This question is only related to the DESIGN stage of the test configuration (not the manufacturing or the mounting of the test specimen nor any other stage).

B1	Design of the test specimen must be in line with chapter 6.3 of assessment method. So, in this part of the test process, you have to establish a relationship with the manufacturer to obtain the maximum information to obtain the widest applicability of test results.
B2	For inexperienced customers, the necessity and procedure of a test must be explained and agreed upon; the selection of test samples is based on the customer's product range
B4	We should inform the client beforehand, what is covering if the tests passes. In addition, the test specimen should be designed to fulfil the client's needs.
C1	Advice is provided exclusively with regard to the performance of the test, standard requirements and structure, as well as extensive usability of the results. No advice is given with regard to product development, the detailed design and materials used.
D2	We haven't perform any tests on façades but for fire resistance and reaction to fire tests, when the customer has several designs in one product scope we inform customer about the possibility of covering several designs by testing specific ones
E3	It is the responsibility of the client but we would not let them undertake this alone. We would directly advise the client to construct the product as the best representative of end practise. While also incorporating the requirements of the standard such as joints location. Moreover if they need any other field of application we would advise them based on the standard
E4	Often the clients come with detailed instructions from the certification body and no more consulting is needed. When the client does not have information from the certification body we do consult him. Since there are no DIAP-rules available at the moment, we do not take it into account.
F1	The design of the façade system is the clients responsibility. The lab informs him on the requirements of the standards concerning the design and configuration of the test specimen eg. dimensions, position of joints, … and the DIAP rules.
F4	The laboratory staff must verify the conformity of test specimen with documentation
G4	For this test, it is not the test on materials like those in EN 13501-1, but it is a test on a system, with the assessment on fixings, present of cavity barrier etc. Also how the façade in practice, (may be irregular in shape, curved, not only the horizontal or vertical joints) converted to the flat-shaped specimen. Definitely after the test, there will be a question on how this flat, L-shaped specimen represent the complicated design in practice.
H1	We would also take into consideration a possible extended application (e.g. the maximum density of the insulation EPS used in an ETIC is also covering EPS with lower density)

7.1.3 Describe shortly how you/the manufacturer should attach/fix/fasten the Façade 1 to the rig.

A1	steel angles are anchored to the supporting construction on to which vertical base substructure after will be fastened…
A2	masonry
A3	Mount as in "Façade 1 - mounting instructions" onto an aerated concrete wall. The aerated concrete wall should be fastened to the steel frame of the test rig.
A4	Fixing of the façade system directly on the supporting construction (aerated concrete blocks) according to manufacturer's recommendations (fixing, distance of fixing centres, layout plan, …)
B1	steel angles are anchored to the building wall in statically required intervals with approved anchors
B2	On behalf of the manufacturer, a specialist company should dowel the substructure to the supporting wall in a practical manner, according to the manufacturer's instructions.
B3	With the same anchors as in practice. See step 01 of "Façade 1-Mounting instructions"
B4	The facade should be attached to the aerated concrete. It can be reinforced with a bolt though if the anchor in the aerated concrete is not strong enough and is normally intended for concrete.

C1	The fastening should be carried out as in practice (see "Mounting instructions")
C2	as the first consoles are attached to the test wall then mineral wool is laid then the intermediate structure is mounted and the cladding elements are attached to it
C3	Chemical anchors would be used to fix the façade onto the supporting aerated concrete blocks, as in practice
C4	through steel angles fixed to the building wall, on them there are mounted vertical aluminium profiles and horizontal rails
D1	The manufacturer should use the mounting instructions and attach the steel angles to the aerated wall.
D2	The Façade 1 should be fixed in line with the mounting instructions onto a supporting construction
D3	A supporting construction of 200 mm thick aerated concrete should be erected and mechanically fixed to the steel structural frame. The facade should be made on the supporting construction.
D4	Space and install the brackets along with insulation. Thereafter install both vertical and horizontal profiles and rails respectively. Once completed the tiles are hooked along with an EPDM spacer.
E1	Answer: with special anchors for aerated concrete or by the mean of threaded rods through the thickness of the wall with nuts and steel plates
E2	By using the steel angles seen in the horizontal and vertical section although it may be necessary to adapt the screws employed taking into account that the density of the aerated concrete wall
E3	as in practice and mounted with access only from areas accessible in practice with the main and wing walls assembled as one. The fixing shall be suitable for the type of construction
E4	Façade 1 will be fixed to the supporting structure with screws and anchors.
F1	The steel angles of the façade are fixed onto the aerated concrete supporting construction with suitable anchors for aerated concrete. As close as possible as in reality.
F2	Installation shall follow real application (end use; details/material; components etc.) and mounting separately on the main face and on the wing is not allowed.
F3	with appropriate anchors in the supporting construction
F4	In this order: the steel angle anchor on the supporting construction, insulation board, vertical aluminium profile on the steel angle, horizontal rails support, the tiles and the spacers
G1	As stated in the instructions Facade 1
G2	With lightweight Concrete screws and plugs.
G3	possible with glue and anchors, but choice by manufacture as in practice
G4	The aerated concrete wall will be provided and the manufacturer shall fix that according to the drawings or in practice.
H1	As it is made in end use application e. g. use the same steel angles etc.

7.1.6 Describe shortly how you/the manufacturer should attach/fix/fasten the Façade 2 to the rig.

A1	2 layers of plaster board are fastened to supporting frame, then vertical wall studs are fastened, insulation are inserted, horizontal wall studs are fastened to vertical wall studs...
A2	mechanical fastening
A3	Mount plasterboards onto the steel structure. Install studs and insulation inbetween studs. Install outer insulation and windbarrier. Fasten laths. Install covering boards.
A4	Fixing of the internal covering on the structural frame. Then, successive fixing of the other elements according to manufacturer's recommendations (fixing, distance of fixing centres, layout plan, …)
B1	structural frame replace joist in the system. Fixing has to be adapted if structural frame is not made of wood
B2	Screwing through stud frame into "wall studs" integrated into insulation boards, according to manufacturer's specifications
B3	A timber sub-structure would be screwed to the rig. Then the façade would be attached to this sub-structure as in practice.
B4	It should be attached to a steel construction behind it eg. By adding wooden studs that can be mounted to fit at the correct cc of the façade. or how is is done in real situations
C1	The vertical wall studs should be connected to the steel section.
C2	two layers of drywall are attached to the test frame then vapour insulation is laid wood construction with insulation and cladding elements
C3	Mechanical fixings would be used to fix the façade onto the structural steel frame, as in practice
C4	through steel angles / U profiles fixed to the structural frame
D1	The façade should be mounted directly on the test rig.
D2	The wood studs are fixed to the structural frame and all the layers from inside to outside are fixed on the studs respectively

D3	Plaster boards with a vapour barrier should be pressed to the structural frame, a wooden frame of the facade should be mechanically fixed to the structural frame and the facade finished.
D4	(from inside to outside)–2 layers of plaster board+Vapor Barrier+insulation with vertical studs+outer insulation with horizontal wall stud+wind protection boards+vertical lath+Covering Board.
E1	Directly with proper anchors on the steel columns if spacing of timber posts is the same than that of steel frame. If not on a secondary frame made of horizontal beams.
E2	The specimen must be attached in the same manner that it does to the structure of the building.
E3	We would design to recreate the ceiling/floor assemblies as in practice and mount them to the horizontal structural steel members using suitable fixation methods, then as per 7.1.3.
E4	it's a is a self-supporting system and does not need to be fixed to the structural frame. For safety reasons we would fix the system with e.g. screw clamps to the frame along the outer edges/top egde.
F1	The timber vertical wall studs shall be fixed onto the horizontal steel sections of the structural frame by means of eg. steel corner profiles and suitable screws. As close as possible as in reality.
F2	Installation shall follow real application (end use; details/material; components etc.) and mounting separately on the main face and on the wing is not allowed.
F3	with appropriate fixings to the horizontal beams of the frame
F4	plasterboards with vapour barrier on the structural frame, vertical wall stud, insulation 1, horizontal wall stud, insulation 2, wind protection, vertical wood lath, covering board
G1	As done on site
G2	Screws and nuts.
G3	possible with anchors, but choice by manufacture as in practice
G4	Only the top and bottom beam of the framework to fix the timber studs wall with the cladding
H1	As it is made in end use application

7.3.7 Will you configure differently the detailing of the test specimen at the edges of the secondary opening and at the edges of the combustion chamber opening? Comment on your answer.

A1	secondary opening with frame and additional elements; combustion chamber – without frame and additional elements except drip plate and window sill
B1	Edges of combustion chamber and secondary openings are not attacked by fire in the same way. In consequence, it is not useful to test two configurations because both configurations are not under the same conditions.
B3	Only If needed to attach the backing board at the secondary opening.
B4	It depends on the frame system, in most cases we believe that testing without the “frame is worst case” Because in most cases the frame will protect the seam/facade above it. However, of course it could also contribute to the fire when placed in the secondary opening.
C3	The detailing around the openings (both combustion chamber opening and secondary opening) are expained in Annex C. The figures apply for both openings (but in the combustion chamber opening no backing board shall be placed)
D2	The window sill should be cut to flush to the surface at the backing board installation area
E3	depends on whether they want to test the floor junction
F1	See introduction Annex C: This annex explains how the detailing around openings shall be implemented, namely the combustion chamber opening and the secondary opening.
F4	The upper edge of the combustion chamber (for Test 2) shall be built-up with the juncion façade-to-floor, where exist
G3	depends highly on the design of the façade system to be tested
G4	For test 2 only. If the floor joints needs to be assessed, then the top edge of combustion chamber opening will be configured.

7.3.8 Explain shortly the advantage of testing without any frame in cases where testing with a frame is provided by annex C?

A1	in case of testing without frame test specimen lose usually combustible parts of frame with it‘s detailing which can lead to failing of higher classification
A2	any kind of frame can be used
A3	Any kind of frame can be fitted around openings if the test has been performed without any frame
A4	Testing without any frame is the worst case and give the maximum application field.
B1	Wilder field of application if test without any frame
B2	Add-on parts influence the fire behaviour of the façade
B3	Easier, cheaper and faster installation by the test sponsor

B4	If it is a burnable frame it could contribute to the fire and continue burning after the fire is extinguished in the secondary opening. The frame or parts could also fall down during the fire
C1	According to DIAP: If the test is performed without any frame any kind of frame can be fitted around openings
C2	A windowless test makes the edge treatment more vulnerable to fire and is worse case
C3	The field of application would be wider, according to section 13, if no frame is installed in the test specimen (any kind of frame could be fitted in practice)
C4	easier assembly of the specimen, no requirement for window frame from the customer
D1	Testing without a frame is the worst case for the test, meaning it is most likely to fail. In that regard it is the best for safety, since in practice you have a frame.
D2	Testing without the frame may allow the customer to use different type of framing members
D3	In general the frame can improve (affect) the test results. Testing without a frame enables the use of different frames in practice.
D4	If tested without the frame, results provide wider range of application.
E1	The frame may protect the opening
E2	Materials from the frame could fall to the ground and it may be considered a failure.
E3	provides a greater range of application
E4	Acc. §13 h) any kind of frame would be classified, but considering note in §13, it is too early to define any DIAP rules, especially with regard to wooden or plastic frames increasing the fire load.
F1	DIAP rules says that all types of frame can be used when tested without. When tested with frame the field of application is limited.
F2	I do not know
F3	Every types of windwows will be allowed
F4	If the test is performed without frame, the results cover the test setup using a frame
G1	unclear point
G2	If you perform the test with a frame, you are bound to use the same frame later in practice.
G3	I don't see any advantages
G4	In case if no frame was incorporated during the test, then any frame with the fire class same as the tested protection material can be used after.
H1	1. Easier to prepare the test specimen. 2. According to clause 13 the test result without frame is valid for any kind of frame used in end use application.

8.2.1 Once the mounting of the test specimen completed, explain shortly how you will condition the test specimen.

A1	test specimen shall be condition at (+5¸35)ºC, protected from water and wind load
A2	in case of hygroscopic materials: see point 8.2 (measure moisture on mock up until difference < 0.1% in 24 hrs, maximum 28 days). Otherwise in accordance to sponsor specification
A3	5 – 35 °C, protected from adverse environmental conditions. According to sponsors specs, or if it contains hygroscopic materials then create mockup with same thickness as test specimen and measure weight each 24 h until stable (<+/- 0,1% change in weight).
A4	The test specimen is left for a period of time which is sufficient for all components to cure (if necessary, measured of moisture stabilization of mock-up). The test rig with the mounted test specimen are protected from adverse environmental conditions (water, wind load and ambient temperatures).
B1	Conditioning will be done according to assessment method. Test specimen will be protected from adverse environmental conditions. We think that these conditions nearly oblige an indoor mounting and testing to fulfil these requirements.
B2	Dry conditions by Manufacturer specifications; at least frost-free (5 °C)
B3	- We will protect the sample from adverse environmental conditions - If the sample has hygroscopic materials a mock-up will be built to control the moisture. If not, we will wait in accordance to the sponsor's specifications.
B4	We would follow section 8. We think it would be better to use the same method as described in EN 1363-1. There is no need to make a new method especially for façade testing, this will just complicate things.
C1	If the specimen contains hygroscopic materials, a mock-up should be made. If no materials with relevant moisture content are used, testing can be done immediately.
C2	if specimen is outside after preparing the specimen I secure the edges (top and side) against rain and snow and wait two weeks
C3	The specimen would be installed on the rig, inside our facilities and protected from adverse environmental conditions (water, wind load and ambient temperatures outside 5 to 35ºC), always in accordance with test sponsor's specifications

C4	assembly of mock-up test specimen, covering of some sides in plastic foil, drying at 105 °C (or some specific temperature by gypsum plasterboards etc.), protect against water, wind, temperatures other than (5; 35 °C), measuring of moisture content
D1	With a mock-up specimen.
D2	The specimen shall be kept against wind-temperature-water effect of the ambient between 5-35°C.The duration of the conditioning shall be in accordance with the sponsor's specs. when there is no hygroscopic material exists in specimen
D3	Left for curing for a sufficient amount of time or if hygroscopic materials are included a mock up should be made for weighting until constant mass (0,1%) up to 28 days and after that the moisture content of each hygroscopic material should be determined.
D4	The mounted specimen & mock-up shall be protected from environmental conditions such as moisture, wind load and temperatures outside the range of +5°C to +35°C during mounting, conditioning & testing. The mock-up (for hygroscopic materials) shall be stored together with the façade specimen.
E1	No special conditionning if needed, be sure working with dry material and protect the specimen from moisture and excessive heat
E2	For indoor testing, controlling the temperature. For both indoor and outdoor testing, recording the temperature daily to verify that it is between 5 and 35 ºC. The period of time for conditioning may be that specified for the applicant depending on the materials used
E3	When the tested façade system includes hygroscopic materials, in which case the fire performance is affected by the moisture content, the moisture content shall be measured during the conditioning period up to the time of testing by means of a small size mock-up of the facade
E4	Conditioning in a protected environment with room temperature 5-35 °C and for a period of time according to test sponsor's specifications. if applicable, follow section 8.2.
F1	Conditioning for a period sufficient for all components to cure. If the façade contains hygroscopic materials, it is conditioned until constant mass, otherwise in accordance with sponsor's specifications.
F2	The test specimen shall not be exposed to water (rain/snow/etc) and/or high wind load and/or temperature unter 5°C / above 35°C.
F3	protect the specimen from adverse environmental conditions such as water, wind… and ambient températures outside the range +5 to +35°C
F4	Is necessary to meet the environmental conditions during mounting and conditioning, at same time to mounting a mock-up of the façade in case of hygroscopic components
G1	according to sposor specification, if hygroscopic material the 8.2, check moisture and amb moisture, no rain, heat, wind, frost, keep amb +/- constant
G2	It should be conditioned following the requirements of 8.2, otherwise it shall be conditioned in accordance with the test sponsor's specifications.
G3	Test is performed indoors and the lower parts of the façade will be protected for water. The indoor temperatures and humidity are monitored.
G4	Assume outdoor mounting, prevent the specimen from water and wind as far as possible. Everyday, check the moisture content of the hygroscopic materials and check with the client if that is the same as practice, start test after agreement with client and stated in report the condition.
H1	Protect the test specimen from rain, wind and temperatures outside 5 - 35 °C. Clarify with the sponsor what curing time is necessary. When hygroscopic materials are used follow the procedure according to clause 8.2

8.2.2 Regarding the conditioning, explain shortly what criterion you will follow to decide when the test can be started.

A1	when mock-up weight change between two measurements, carried out at an interval of 24 h, do not differ by more than 0,1 %
A2	in case of hygroscopic materials, <0.1% variation of moisture in 24 hrs or max 28 days, otherwise according to the information of the Sponsor
A3	Strength and moisture content shall approximate the normal service levels. In hygroscopic specimens, the weight of the mockup shall be stable (<+/- 0,1 % change in weight over 24 h interval).
A4	the strength and the moisture content of the test specimen shall approximate to those expected in normal service (moisture stabilization, particularly if it includes hygroscopic materials).
B1	All component cured. Strength and moisture content shall approximate to those expected in normal service. To fulfil these requirements, follow up of hygroscopic components is performed (mock up).
B2	air speed max. 3 m/s; temprature 5 °C till 35 °C; weight change less than 0.1 % for hygroscopic materials
B3	- With no mock-up, we will wait according to the sponsor's specifications. - With mock-up, we weight it daily until the mass loss is less than 0,1%

B4	We would make sure that the materials used is in equilibrium, preferable by receiving them in good time before mounting. So that on the day of the fire testing the condition of the test specimens was similar with respect to its moisture content as the test specimen would be in normal service. For hygroscopic materials we would measure the materials and make sure that they are in equilibrium. And we will make sure it has dried a minimum of what the sponsor has declared to have it nominal strength. Eg. for cement based materials we will wait a minimum of 28 days before testing even though equilibrium is reached before this period.
C1	In accordance with the sponsor´s specifications or if a mock-up was made until there are a constant weight resp. less than 0.1% between two daily measurements. Time can also be limited to 28 days.
C2	two weeks without rain and snow and with temperature from 6 to 34 degree
C3	If hygroscopic materials are used, the test can start if the difference between the mock up weight differs <0.1% between 2 measurements 24h apart. Otherwise, sponsor's specifications must be followed.
C4	The whole mock-up shall be weighted daily until the weight change between two measurements, 24 h apart, is less than 0.1 %.
D1	mass loss
D2	The strength and the moisture content shall be approximate to those expected in normal service
D3	The time of curing or, in the case of hygroscopic materials, the weight change.
D4	The test is started once all the components are cured as per the test sponsor's specifications and once the difference between the weight of the mock-up measurement 24hr apart is less than 0.1%
E1	be sure that the temperature is between 5 and 35 °C, protect it from heavy rain with a tarpaulin
E2	If the system includes hygroscopic materials then when the measurements of two weighs of the materials used to check the mock-up differ less than 0,1 % (limited to a maximum of 28 days)
E3	The whole mock-up shall be weighted daily until the weight change between two measurements, 24 h apart, is less than 0.1 %. the conditioning can be limited to 28 days.
E4	For non-hygroscopic materials: after the period of time according to test sponsor's specifications. For hygroscopic materials: when change between 2 weight measurements is < 0.1 % or 28 d.
F1	The materials and mock-up shall be conditioned and weighted daily until the weight change between two measurements, 24 h apart, is less than 0.1 %.When materials that need long curing times, 28d limit
F2	Curing time of 28 days, weight of the mock-up test specimen (if any), outside temperature, weather conditions (wind speed + rain/snow/etc.).
F3	When tested, the strength and the moisture content of specimen shall approx. to those expected in normal service When mock up : weight change between 2 measurements, 24h apart, is less than 0.1%
F4	According with the sponsor specifications with mock-up weight monitoring in case of hygroscopic components or after a period of maximum 28 days
G1	moinsture content, amb temp, change in value specimen to amb condition for moisture content, differene between ambient conditions and specimen, requiered conditions (standard) reached or not
G2	When the weight change between 24 h apart is less than 0.1 %
G3	weight loss in 24 h is less than 0.1%
G4	Check with the client if that is the same as practice, start test after agreement with client and stated in report the condition.
H1	Easiets way is to wait at least 28 days. Alternatively the mass loss of the used materials is less than 0.1 % determined according to the instructions given in clause 8.2.

13.1 Among the clauses of § 13, would you include "h) any kind of frame can be fitted when tested without any frame" in the direct field of application for the tested Façade 1, and how?

A1	since facade system acc. to 14.1 can't get classification, so yes, any kind of frame can be fitted
A2	yes
A3	Yes
A4	No, because the test has been performed with a frame to protect the edge of the façade system as such openings
B1	OK if secondary opening include protection to openings made of window frame
B2	no
B3	Not applicable. Is tested with frame
B4	Any kind of frame can be fitted around openings (like windows) if the test has been performed without any frame to protect the edge of the façade system at such openings (see Annex C)
C1	Not applicable
C2	Need more information about test if was tested without frame yes if was tested with frame no
C3	Yes, if mounted according to specifications in Annex C
C4	it is possible

D1	Since we cannot give any field of application, since the facede didn't cover any criterion for 60 minutes.
D2	It is possible to use any kind of frame at the borders of the openings
D3	not applicable
D4	Yes, it gets covered
E1	Yes if tested without any frame
E2	Not possible, testing with frame may be more onerous.
E3	because the test was conducted without a frame then the result will be applicable with a frame
E4	yes, because a frame made of combustible material would not have a significant influence on the test result.
F1	Possible if the test has been performed without a frame
F2	-
F3	NO
F4	if the test has been performed without any frame to protect the edge of the façade system at such openings
G1	no, frame can fail
G2	No
G3	yes
G4	An opening can be incorporated in the cladding system, but no windows shall be installed within the aperture of the cladding.
H1	Yes, as testing without frame gives the lower protection in comparison to testing with frame.

13.2 Among the clauses of § 13, would you include "h) any kind of frame can be fitted when tested without any frame" in the direct field of application for the tested Façade 2, and how?

A1	since facade system acc. to 14.2 anyway failed falling parts criterion, so yes, any kind of frame can be fitted
A2	yes
A3	Not applicable
A4	Yes, because the test has been performed without any frame to protect the edge of the façade system as such openings
B1	OK if secondary opening include protection to openings made of window frame
B2	no
B3	Yes
B4	Any kind of frame can be fitted around openings (like windows) if the test has been performed without any frame to protect the edge of the façade system at such openings (see Annex C)
C1	Not applicable, because a frame was fitted (see Observations)
C2	Need more information about test if was tested without frame yes if was tested with frame no
C3	Yes, if mounted according to specifications in Annex C
C4	it is possible
D1	If the given fictitious data is for a test without any frame, it is applicable and should be allowed.
D2	It is possible to use any kind of frame at the borders of the openings
D3	yes
D4	Yes, it gets covered
E1	Yes if tested without any frame
E2	Not possible, testing with frame may be more onerous.
E3	limited to use with the frame
E4	no, only any kind of non-combustible frame can be used, wooden or plastic fames should be tested.
F1	In this case not possible as the observations clearly indicate that the test has been performed with a frame
F2	-
F3	NO
F4	if the test has been performed without any frame to protect the edge of the façade system at such openings
G1	no, frame can fail
G2	No
G3	yes
G4	Any wooden frame window can be installed. Provided that the same mineral fiber caulking are used.
H1	Yes, as testing without frame gives the lower protection in comparison to testing with frame.

ANNEX G – FREE COMMENTS RECEIVED ON THE ASSESSMENT METHOD (PART 2 OF THE EXERCISES)

1 SCOPE

B4	Maybe add that it also assesses dropdown of parts of the façade. The part about the medium fire exposure scenario does not make that much sense and it makes it seem useless, which maybe it is.
C3	- Are BIPV façades and glazed curtain walls included in the scope?
E4	addition of optional measurements with regard to heat transmission through façade; add explanation for necessity of secondary opening; explanation, if secondary opening is optional or obligatory.
H1	This test method is used additioanlyy to the requirements that can be addressed and classified according to EN 13501-1 (it is not going beyond). There is no relation to EN 13501-2.

3 TERMS, DEFINITIONS, SYMBOLS AND DESIGNATIONS

A1	it isn't clear, essentially, what difference between "external cladding system", "external wall assembly", "facade" and "facade system"
B1	There is a need to define window frame especially to clearly make a difference with structural frame
B4	Maybe add under "Euroclass", that it has to be the "reaction to fire" for each individual material and not a composite material like for example an insulation with foil on that reduces its reaction to fire from eg. C to B or a steel plate in front of another burnable material that again helps it to get a better Reaction to fire class.
C4	Is there some system without opening protection? We think there will be always some profile, window sill etc.
E4	definition of "finished corner" is identical with "inner corner"; definition of "Euroclass" mentions "… D, E, F, …" what lower classification as F is possible?
F1	Definition of hygroscopic material is missing
F2	Please give definitions or references to other standards - where they are defined - to all products and systems which are listed in the scope. (rain screen, ETICS, etc.) Additionally 'hygroscopic materials' shall be also defined.F
F2	Definition of hygroscopic material is missing
G1	are sometimes unclear, ie structural frame, protecting the opening
H1	Supporting construction: ... mounted on the structural frame (not test rig) onto which...

4 TEST EQUIPMENT

A1	1) Is specimen (main face and wing) the equipment??? 2) In Figure 4 (first drawing) isn't marked depth of combustion chamber (1000 mm) like in Figure 3 (800 mm) 3) in Figure 4 and 6 (first drawings) shown that base layer should consist of 15 short wood sticks, but in the description (4.6.3 7 line) written 10 long sticks (i.e. the sticks of the layer at the bottom are parallel to the rear wall of the combustion chamber, like in case of medium fire exposure). Drawing correction required.
B1	In case of medium fire exposure, distance of combustion chamber opening from finished corner (50 mm) is very small. It could cause problem for the setup of the protection to opening of the combustion chamber.Chapter 4.4. note says : It is recommended to fix the supporting construction on the structural frame for safety reasons. This should not be a simple note, it shall be mandatory
B4	1. It would be a lot better to change the distance called D in figure 2b above to 250 mm for the medium scale fire so it is the same for the two sizes. It will make it a lot easier to make and change the combustion chamber for the two setups and the wing will not have to be able to move an extra 200 mm for a medium fire test. 2. The distance from the top of the combustion chamber to the bottom of the secondary opening is 1.5m. In our experience, this is a bit too big. In existing buildings, this height is normally 1.2-1.3m, which is a "worst case" scenario. We would suggest changing the wording to "The secondary opening shall be 1200 mm width, 1200 mm height. It shall be located 1200 mm above the top of the combustion chamber and 1250 mm from the finished corner. See figure 9."

C1	4.4 Also it should be allowed to mount the facade system to an associated supporting construction, if the facade is intended for this mounting. In this case there should be different rules in DIAP. 4. 7.1 A detailed description of the design of the thermocouples (external and internal) would be useful.
C3	- Are horizontal steel elements of the rig positioned as they were on site floor slabs? Distance between floors could be part of the definition for the actual test specimen - Is a Light Steel Frame external wall ever considered as a supporting wall (i.e. LSF wall placed between floors) or do you consider it always as part of test specimen? Fire scenario for walls mounted between floors, according to the relative distance between the crib and the exposed face of façade, seem to be less favourable
C4	4.7.4 the number of cameras during the test could be difficult to fulfil in our conditions, but we understand this recommendation 4.7.5 Is it necessary to use the load cell platform during the test? It is only information about the course of the test, but it is not used in the assessment. 4.7.6 We can't imagine much how to weigh it, it can be a subjective evaluation that the customer will try to have questions and it is a space for speculation.
D2	Test rig and the combustion chamber connection detail could be more in detail
D4	Explanation required on structural design of the frame. Details required on the specification of load cell, its placement and protection. Drawings of load cell platform has to be provided. Specification and arrangement of fan to be used in the medium fire exposure. Number of sticks for crib to be specified in medium exposure. Explanation on method of mass measurement of falling parts using load cell is required and clear definition.
E2	I think that concrete blocks (not only aerated concrete) could be used for supporting construction. Detailed examples of steel frames may be incorporated.
E3	. inclusion of the load cell for the timber crib will add to the difficulty of the test. 2. An example or schematic drawing of testing rig would be beneficial; 3. The lower beam at 2.5m is coinciding with the chamber's roof. Therefore, this position needs to be modified. Also this will have a direct impact on tests where floor joints are going to be tested; 4. The method of measurements of the falling parts need further clarification because the current given method is not precise.
E4	Supporting structure belong to test specimen or is it part of test stand? How should air flow of fan be determined? The setting of fan or measurement of air flow must be made uniform. How should cribs be stacked? Stacking according to DIN 4102-20, Fig. A.4? Density for spruce is ca 450 kg/m³, pine 350-500 kg/m³. How should 400 +- 25 kg/m³ be achieved? Define the base frame for the crib more precisely. Grating? Surrounding frame? Closed sheet metal? 3 mm TC is more practical
F1	: The load cell below the heat source is technically complex and expensive without creating important added value. Well defined timber crib specifications should be sufficient. Test rig shall continue 500 mm ± xx mm below the lower edge of the combustion chamber instead of at least 500 mm. Details concerning fan for medium source test.
F2	The load cell below the heat source is technically complex and expensive without creating important added value. Remove load cell. Well defined timber crib specifications should be sufficient. Test rig shall continue 500 mm ± xx mm below the lower edge of the combustion chamber instead of at least 500 mm. Details concerning fan for medium source test.
F4	At figure 2 "Secondary opening (see 7.2)" instead "7.3"
G1	questioning the practicabillity of the load cell
G4	For the Forced Ventilation at the back of the combustion chamber? And requirement about the exact location? It should be at the centre of the back of wall? Since it is forced ventilation, the location seems important

5 ENVIRONMENTAL CONDITIONS

A1	on page 18 - …test hall shall be large enough…, maybe it's possible to set any minimal distance?
B4	It should not be necessary to measure the air velocity for an inside test for 15 minutes before each test. Only when changing the test rig should it be verified that the air flow is below 3 ms-1. An airflow of 3m/s seems like a lot for an inside test even though the ventilation is running on full speed. We would prefer if the demand was lowered to maximum 1 ms-1 to insure similarly results at all labs.

	Ambient should just be measured during the test at a place not affected by the radiation. It should just follow the same rules as in EN 1363-1, no need to invent something new here.
C3	- Is it necessary to measure humidity or pressure conditions before the test? Or are those measurements in the "Ambient conditions" file for the exercise for information only? - Which is the reference line for the measurement angle for air velocity? Orthogonal or parallel direction regarding the main wall?
C4	5.4 The dimensions of the hall must be such that there is no back radiation - how to judge it? It is quite complicated.
D4	Ambient temperature range for the commencement of test, installation, and curing has to be extended considering countries with extreme climatic conditions.
E4	5.1 Measurement over 15 min necessary? Is 1 min not enough? 5.1 How should anemometers be aligned? Vertical to the main face to the wing or to the floor? 5.4 Size of the test chamber is very spongy - specify more precisely.
F1	Indoor testing: ventilation is allowed, not obligatory? Too less ventilation may cause a reduction in burning velocity of the crib as not enough O2 present.
F2	Indoor testing: ventilation is allowed, not obligatory? Too less ventilation may cause a reduction in burning velocity of the crib as not enough O2 present.
G1	maybe given ranges could be more praticable, ie for wind spead
H1	Why is the vertical component of the air speed not measured? That seems to be the parameter of more interest especially when using an extraction system (indoor testing)

6 TEST SPECIMEN

B4	Maybe you would be better to just refer to EN 1363-1 like the other standards and only add the parts that is not mentioned there: “The test specimen shall be constructed as described in EN 1363-1” “Verification of the test specimen shall be carried out as described in EN 1363-1”
C3	- Fire barriers may have a relevant influence in the outcome of the test and there is no provision for them in the definition of the specimen - Vertical edges shall be sealed to prevent any ventilation. Which type of seal shall be used? A1 material? - If LSF is assembled on site between floors, would it be considered as supporting wall or as tested façade? The positioning of the crib if LSF were considered supporting wall or tested façade could have a relevant influence in the final test results
C4	we consider it appropriate to place Figure 2a from “Exercises.docx” file also in the assessment method, where the joints are well represented
D4	More clarity is required on the requirement of additional test specimen, it should be instead additional tests or probably a worst case scenario identification. Workmanship might not be a controlled procedure since we don't monitor once they have left the laboratory.
E3	1. A fixed height of a test rig will allow more harmonized test method. Therefore, it is recommended that the test rigs to have a fixed height with some tolerances. Also, adding a round of thermocouples 200mm to 300 below the top of the rig with allow for more harmonized testing procedure. 2. Info about structural frame and wall is not very clear: what about eg. concrete buildings; the steel supporting construction needs to cover all types of buildings.
E4	6.1 Main face width -> 3200mm necessary for medium? According to experience 2000mm are sufficient 6.3 Vertical joint for large and medium always centered above fire chamber
F1	Comments: Implement a fix height of the structural frame. Info about frame and wall is not very clear: - § 4.1 General “The rig utilizes a vertical structural frame, representative of a structural steel framed building” -> what about eg. concrete buildings; - § 4.3 Structural frame “Other structural frames such as timber or concrete can be employed for specific applications.” -> Which design required?From our point of view the steel supporting construction needs to cover all types of buildings.
F2	Implement a fix height of the structural frame. Info structural frame and wall is not very clear: § 4.1 “The rig utilizes a vertical structural frame, representative of a structural steel framed building” -> what about eg. concrete buildings; § 4.3 “Other structural frames such as timber or concrete can be employed for specific applications.” -> Which design required? From out point of view the steel supporting construction needs to cover all types of buildings.

7 MOUNTING OF THE TEST SPECIMEN

A1	additional point to 4 (it was to much symbols there) 4) in 4.3 are mentioned alternative structural frames (timber, concrete) it isn't clear – in what cases are they needed (for example, Specimen 2 of this RR is wooden construction which was tested on steel structural frame, but in end use application no structural frame is used).
A2	Give detailed instruction with examples
B4	If the façade overlap the combustion chamber as on Figure 10 where is the size of the combustion chamber measured at, the height on 1000/2000mm? At the roof of the combustion chamber or at the bottom of the overlapping façade? The same goes for the sides The backing board should not be a water releasing material like gypsum, but more like a CaSi board.
C1	7.3 There should be a difference in the materials used for the frames. If they are made of combustible materials, mounting them could have a negative effect on the results. Different rules for the different materials should be added in DIAP. In this regard, can the frame at combustion chamber and at secondary opening be different?
C4	our answers in 7.1.2 and 7.1.5 in "Exercises.docx" file apply provided that the steel sections in the figure = structural frame, but this is not entirely clear from the figure
E3	Since the framing system could be different to end use, suitable type of fixation should be used to connect cladding systems to framing systems
E4	7.2.1 secondary opening is not within reach of the flames (normally) would have to be moved closer to the fire chamber (see large-config.)
F1	Fig. 10 does not match with fig. 2: 1st transom is located at approx. 3000 mm instead of 2500 mm in fig. 2. This solution seems to be better. - "When only a part of the external wall is tested, such as an ETICS, a supporting construction is necessary onto which the test specimen can be mounted. See 7.1 for more rules." -> When it is allowed to test only a partly external wall and when not? No indication on the location of fire stops
F2	"When only a part of the external wall is tested, such as an ETICS, a supporting construction is necessary onto which the test specimen can be mounted. See 7.1 for more rules." -> When it is allowed to test only a partly external wall and when not? No indication on the location of fire stops. Fig. 10 does not match with fig. 2: 1st transom is located at approx. 3000 mm instead of 2500 mm in fig. 2. This solution seems to be better
G1	unclear, floor to facade junction, which structures protect the facade opening, which opening, the one framing the window or the opening to the facade ie where flames could enter into the facade struture. The diagrams in the annex C are hard to understand. More clear detailed drawings are needed.
H1	In clause 7.2.1 it is said that the second opening shall be incorporated. In clause 12 "Test report" you can get the impression that the second opening is not madatory (as you have to state in the report the presence of the second opening). What about prefabricated ETICS. Then the main face and the wing have to be mounted separately.

8 CONDITIONING OF TEST SPECIMEN

B1	Assessment method say : The test rig with the mounted test specimen shall be protected from adverse environmental conditions such as water, wind load and ambient temperatures outside the range +5 °C to +35 °C during the mounting, conditioning and test period. These conditions nearly obliged to test indoor. When tested outdoor, it will be difficult for the laboratory to guaranty to sponsor a reasonable test date.
B4	It will be much better and more future proof if you just do as in all the other fire standards and refer to EN 1363-1. We suggest that the complete chapter 8 is change to: The test construction shall be conditioned in accordance with EN 1363-1.
C3	- Maximum curing of 28 days for i.e. ETICS systems? - Which criteria would be used to determine if a material is hygroscopic (i.e. water absortion)? - If only a component of the whole system were hygroscopic, the mock up should be made up of all the components of the façade or just with the hygroscopic one? (i.e. in stone cladding rainscreen façades, the weight variation related to the the insulation moisture content could be insignificant compared to the total weight of the mock up)
C4	8.2 taking individual parts from the mock-up specimen and drying should be described more precisely, when to assemble it, it is not certain what exactly the hygroscopic material is (we understand that it is not e.g. mineral wool for these cases)
D4	More details on the requirement of mock up for conditioning. Hygroscopic nature of the material has to quantified to avoid variation. A list of standard hygroscopic materials can also be included in the

	standard. Presence of supporting construction for masonry application in the mock up has to be mentioned. Accuracy of measurements in weight of the mock up shall be provided or else if it is referring back to BS EN 13238 that has to be specified.
E3	Consideration to limit the maximum curing period of 28days. Or alternatively, preconditioning of the materials to be allowed.

9 APPLICATION OF INSTRUMENTATION

B1	Internal and external thermocouples should be positioned on same specific locations. In case, you have a lot of layers (more then 4) you have to face the situation to install external thermocouples within 10 mm on each locations with a lot of internal thermocouples in the same area. In addition, knowing that you install thermocouples by drilling from the backside of the façade system, it will be difficult to maintain the distance tolerance of 10 mm for external thermocouples.
B4	The suggested solution for mounting thermocouples in the façade is very hard and not possible for many façade systems. Especially for the unexposed thermocouples. You have to drill a 2 mm hole “The diameter of the holes shall be the minimum required to allow the thermocouples to be inserted from the rear to the exposed face of the tested façade”. It has to go through 200 mm aerated concrete then trough the test specimen and out the exposed side through the a façade board in the example here for test 1 an ceramic tile. This is not possible.
C3	- Which direction (angle) is considered for the measurement of ambient air velocity? - In Figure 11 it should be clarified that internal thermocouples located at mid depth of the external cladding and insulation layers are needed only when they are defined as combustible according to chapter 3 - It should be clarified the position of the façade-floor junction thermocouples in an additional vertical section to define the height at which they are installed (mid depth? unexposed side?)
D1	In 9.1.3 of the method we find the text "...In each location, internal thermocouples shall be positioned at the mid-depth of each combustible layer (see definition in chapter 3) and air cavity within the test specimen with a depth ≥10 mm..." not clear enough if the 10 mm are only for the air cavity, or for both the air cavity and the combustible layer. For our results we have read it as both air cavity and combustible layer.
D4	Position of the first thermocouple in Column 1 & 2 has to be mentioned. From the drawing provided one has to guess it is in line with the head of the combustion chamber. Figure 11 is misleading and giving an idea that the internal Tc’s can be placed at a distance from the external Tc or specified locations. The concept of measuring the mass loss of wooden crib has to be explained in the standard.
E2	It seems to me that too many thermocouples are employed. Thermocouples for smouldering criterion may be incorporated without referring to DIN standard.
E3	some of the thermocouples on column 1 and 2 are located at close proximity of the chamber (located about 500mm apart). Thus, when the temperature of the chamber is about 1000oC, temperature at those positions will be over 500oC regardless of the cladding. Hence, it is suggested to not to take the first two rows of thermocouples on those columns into account.
E4	Ext. TCs through entire test specimen -> destroy test specimen + prevent falling parts from falling down; place ext. TCs in front of test specimen Move C1&C2 closer to fire chamber with medium fire expo. fixed TC arrangement - see EDIN4102-24 - is better. Paragraph 3 -> formulate more precisely. Insert explaination of area "A" for PTs. Specify TE pos. as test stand differs from DIN4102-20
F1	Some thermocouples are located close to the chamber. Can they cause a failure due to the heat of the burning crib? 9.4 Checking of smouldering (optional) - “When the smouldering criterion is required, additional thermocouples in accordance with DIN 410220 shall be installed within the facade system.” -> information in the standard itself instead of reference to a national standard.
F2	Some thermocouples are located close to the chamber. Can they cause a failure due to the heat of the burning crib? 9.4 Checking of smouldering (optional) - “When the smouldering criterion is required, additional thermocouples in accordance with DIN 410220 shall be installed within the facade system.” -> information in the standard itself instead of reference to a national standard.

10 TEST PROCEDURE

A1	10.8.3 in all three rows it would be clearer if instead of for example “failure of more than 2 thermocouples…” is written “failure of 3 or more thermocouples…”
A4	Extinguishing timber crib doesn’t allow to observe the influence of a higher calorific load when an additional combustible mass is present during the test (example : timbers joints, CLT, ….). However, this can influence the test and the fire behavior of the façade.
B1	In chapter 10.8 invalidation of test, it could be useful to: - declare that the point listed are in addition to all other request of the assessment method (they are not the only points which invalidate the test) - find a rules about problems that occurred during extinguishing of the fire source
B4	Why do there have to be two methods for igniting the wood crib for the large and medium scale, please remove one to make it more simple and logical. The extinguishing of the fire source with water will be hard to do and not affect the façade with steam/moisture that will go up the façade. Would it not be a better idea to just close the combustion chamber with a small board or wall that is put as a front of the chamber. This could be done without having to go in front of the façade by mechanically closing the front or having the wall/board on wheels and pulling it closed with wires.
C1	10.2 Definition of the start of the test (ignition source / crib) should be made clearer. Inserting a section between 10.5 and 10.6 for "Smouldering" would be useful 10.6 For clarification it should be mentioned that the specimen shall not be extinguished after the test. 10.8 Can thermocouples be exchanged during the test if they are defective to avoid invalidation of the test?
C3	- Invalidation of tests due to wind loading conditions considered? Shouldn’t it be an extra criteria to stop the test? Direction and velocity of the wind has a clear influence on the test. A prodecure and assessment criteria could be determined for air measurements to be made in the surroundings of the rig (i.e. 3-4 m away from the crib) during the whole test, invalidating the test if a certain value (i.e. 9 m/s during 30s) is exceded
E4	10.3 Defining start more precisely (test starts with ignition 1st or 2nd pool/wood strip?) 10.3.1/2 Specifying exact positions of pools/wooden parts 10.8.1 Define invalidity due to weather (What is meant by "significant" in paragraph 5.3?) 10.8.2 It would be very unreasonable to state after the test that it was invalid because the heat input was too low, for example 0.5 MJ. If the wooden crib is precisely defined, it can nevertheless be assumed that the corresponding heat input is correct.
F1	Invalidation due to heat exposure: the heat exposure should be OK, if the heat source (timber crib) is within the prescriptions of the standard.
F2	Invalidation due to heat exposure: the heat exposure should be OK, if the heat source (timber crib) is within the prescriptions of the standard.
H1	Think about pulling away the crib instead of trying to extinguish it.

11 PERFORMANCE CRITERIA

B4	We think it would be a good idea to also have a criterion for the total mass of fallen material eg. If the total mass from fallings parts reach 10 kg it fails. If a client just makes a façade of 0.9 kg heavy tiles they can all fall down and it can pass but it would still be more dangerous than one piece of 1.1 kg falling down.
C4	shouldn’t radiation be also performance criterion? (it is not much described in the method yet, but it will be probably added after the tests as written in Annex B)
D4	Calculation of the weight of falling particles and its area is unclear, need to be explained further.
E3	After re-reviewing the performance criteria, mass of falling part should be the danger whether determined by mass or area (using area density). The criteria should not be failed by area alone. Would a falling piece of 100 mm × 1000 mm tape be dangerous?
E4	procedure for burning/falling parts isnt practical. Molten parts cant be weighed, number of drops of burning/molten EPS cant be counted with reasonable effort When weighting falling&burning parts ? (burning wood is gone at end of test) Evaluation of molten parts (e.g. plaster+EPS melt)? use temp. eval. analogous to EN16733. TCs show >50C directly after exting. fire, so test have failed. Time should be changed to 6h after ignition or to 5h after exting. fire, otherwise test would be impractical
G1	The temperature criterion is unclear. Is it a rise in temperature during a duration of 30 seconds or is it the moment the temperature exceeds the threshhold of 500°C.

12 TEST REPORT

A1	l)… and the time of failure…, so in case when specimen passes 60 min test and we write that test result is 60 min does it mean that criterion fails? indeed no, so in the standard should be written “test result 60 min means that criterion didn’t failure”
B1	point n same remark that the one given for chapter 10.8
B4	The chapter should begin with ”In addition to the items required by EN 1363-1 the report shall contain the following:
C3	- Is it possible to issue a separate classification report? Similar to the reports issued according to EN 13501 series?
E4	(e) Point 4: is it not sufficient for the inspection body to confirm that the product has been conditioned accordingly? (l) How should the table be completed if the failure criteria have not been met?

13 DIRECT FIELD OF APPLICATION

A1	h) illogical application, see. 7.3.8 of main answers list
B4	Section F) and G) should be replaced by; “When tested with an insulation of either Euroclass E, D, C, B or A2 it can be replaced with an insulation of an better Euroclass with the same thickness and density, when appropriate in regards to the stability of the system“
C3	- Increasing the number of joints (vertical or horizontal) could negatively affect fire performance. Decrease of joints seems to be safer scenario
C4	is it possible replace insulation e.g. class D by B or C? It is not described exactly in DIAP.
D4	Include the extension of the test results when test was conducted in a different environmental condition (For high humidity/temperature ranges)
E3	1. Direct field of application should allow for alternative mechanical fixings; 2. In line with EN13501-1 produces can be only tested to ISO 11925-2 and obtain Euroclass E while the product if tested to EN13283 and ISO11925-2 could obtain higher classes. As such, extend of application of insulation with Euroclass E to higher class could potentially be unsafe. 3. DIAP: The allowed change in dimensions of cladding panels needs to be defined
E4	Are DIAP rules agreed with the national certification bodies, as they must also support the DIAP rules? Are flammable window frames really covered when tested without frames?
F1	What about size of boards. Only limited change in dimensions should be allowed. Bigger boards can result in less mechanical stability while smaller boards can result in more (critical) joints. Range of allowed fixations (different from these used for the test supporting construction) have to be described. A reaction class E is not Always less fire-safe than a class B, C or D(if the SBI test is not performed on a potential class B product). Increase in number of joints when open joints are used?
F2	What about size of boards. Only limited change in dimensions should be allowed. Bigger boards can result in less mechanical stability while smaller boards can result in more (critical) joints. Range of allowed fixations (different from these used for the test supporting construction) have to be described. A reaction class E is not always fire-safer than a class B, C or D (if the SBI test is not performed on a potential class B product). No DIAP rules for façade-floor junction available.

14 CLASSIFICATION

A1	unclear what conclusion should be written in case when no classification is possible, in what form
B4	It should mention that EN 13501-2 supersedes this section when it has been updated. The classification should not be in the test standard in the later versions but is of course needed for now.
E3	When floor joint is tested, what sort of classification should be assigned to the tested joint? Also, if the floor joint fail, how would that affect the overall test?
E4	Both a puddle with a diameter of 50 mm and the fall of the entire façade are rated equally. Therefore a grading for low/medium/many falling parts would be better, e.g. LS1- d0/d1/d2 and LS2-d0/d1/d2.
F1	Which classification is obtained if the façade-to-floor junction succeed? EI 30 or EI 60? There is only 30 minutes fire exposure. What if the façade-to-floor junction test fails on integrity? Is further testing for fire spread classification possible? The criteria for falling parts are very severe.

F2	Which classification is obtained if the façade-to-floor junction succeed? EI 30 or EI 60? There is only 30 minutes fire exposure. What if the façade-to-floor junction test fails on integrity? Is further testing for fire spread classification possible? The criteria for falling parts are very severe.
G1	Has to give more detail and be more defined. Maybe more classes have to be made.
G2	Should not the order be like LS1 not falling parts that cover all the classes. The same with LS3 not falling parts, should cover LS 4 falling parts. LS1 not falling parts (best class), LS2 not falling parts, LS3 not falling parts, LS4 falling parts (worst class)?

ANNEX A DETERMINATION OF FALLING PARTS (INFORMATIVE)

B4	This section mentions that in case of other kind of falling parts (3D falling parts) an expert evaluation is necessary. It is not clearly defined by the test methodology how the falling parts are to be measured and evaluated. An expert evaluation cannot be part of the test protocol and therefore any reference to expert evaluations shall excluded from the tested methodology.
D4	More clarity required. Will be easier if it shows a sample calculation.
E3	This method may be imprecise. It also implies that area of a falling part is dangerous and not area of a falling part linked to a mass. Would a falling piece of 100 mm × 1000 mm tape be dangerous?
E4	The procedure is not practicable. How should plaster and molten EPS be separated in ETICS? What should be the procedure at ventilated façade systems with molten aluminium substructure and facade panels?
H1	Too complicated and not practible

ANNEX B CALIBRATION OF THE HEAT EXPOSURE (INFORMATIVE)

B4	A good idea to insure more consistent in the test results. But it will also make testing more expensive for the client, so it has to be done only if it makes sense.
C3	- Which is the idea for such calibration? Monthly, yearly?
E3	It needs further clarification in the document.

ANNEX C MOUNTING OF TEST SPECIMEN AT OPENINGS (NORMATIVE)

B4	We are not convinced that testing without the window frame is worst case for all cases. If the frame is burnable, it could increase the fire load at the window and continue after the combustion chamber is put out. And if it eg. is made of steel it could damage the construction during expansion and create a crack or opening in the protection system. However, we agree that test without a window frame would make it a lot easier and allow for different types of window frames to be used afterwards.
D4	Need to include more detailed explanation.
E2	It is not easy to understand.
E3	The provide description can potentially lead to different interpretation compare to the system which is on site. As such this Annex while it is informative, it would need further clarification.
F1	Too complex.
F2	Futher drawing shall be made to provide an overview of the combustion chamber details as well - see Annex C 1st line.
F2	Too complex.
F4	How can we mount the feature frame on the lower edge of the combustion chamber opening (on the load cell platform)?
G1	Unclear, maybe examle structures could help. Definition of what covers and protects what made clearer, see point above.

ANNEX D FAÇADE-TO-FLOOR JUNCTION (INFORMATIVE)

B4	Remove this “A mobile extinguishing system shall be prepared before the test in case where the fire would develop at the junction.” Or rephrase it to eg. “Care should be taken in the possible failure of the junction during the test” It should be up to the labs themselves how they deal with this challenge, this is a test standard not a course in safety ;)
E3	When floor joint is tested, what sort of classification should be assigned to the tested joint? Also, if the floor joint fail, how would that affect the overall test?

F1	Too complex.
F2	Too complex.
G1	unlcear, hard to determine when applicable when not

ANNEX H – LIST OF PARTICIPANTS

Lab.	Country
AFITI-LICOF	Spain
CERIB	France
CNSIPC	Romania
CSTB	France
DBI Fire & Security	Denmark
Efectis ERA Avrasya	Turkey
Efectis France	France
Efectis Nederland	Netherlands
Fire Research Centre (GTC)	Lithuania
IBS	Austria
ift Rosenheim	Germany
ITB	Poland
LAPI	Italy
LGAI Technological Center S.A.	Spain
MA 39	Austria
MFPA LEIPZIG GMBH	Germany
MPA DRESDEN GMBH	Germany
MPA NRW	Germany
PAVUS a.s.	Czech Republic
Research Engineering Development Façades Consultants Ltd.	Hong Kong
RIFS	Bulgaria
RISE Fire Research AS	Norway
RISE Research Institutes of Sweden	Sweden
TECNALIA	Spain
Thomas Bell-Wright International Consultants	UAE
Université de Liège	Belgium
Warringtonfire	UK
WFRGENT	Belgium
ZAG	Slovenia