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PRODUCT TYPE REPORT

Sponsor:	**Gusclad Ltd** Ballyfarnon, Boyle Co. Roscommon Ireland
Prepared by:	**LGAI Technological Center, S.A. (APPLUS)** Campus UAB Ronda de la Font del Carme, s/n E - 08193 Bellaterra (Barcelona)
Notified Body No:	**0370**
Product name:	**Gusclad 40 mm panel**
Report nº:	**20/23913-3134-1**
Date of issue:	**08th January, 2021**

Date at which the sample was received: 25-11-2020

1.- OBJECT OF THE TEST

Test for Determination of the Product Type (DPT) of Reaction to Fire of the construction product UNE-EN 14509-2014 VC-2016: "Self-supporting double skin metal faced insulating panels – Factory made products - Specifications" according to the standard:

- EN ISO 11925-2:2020: "Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test".
- UNE-EN 13823:2012+A1:2016: "Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item".

LGAI TECHNOLOGICAL CENTER, S.A. is notified body nº 0370

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2.–PRODUCT CHARACTERISTICS

Sandwich panels (with Applus code 20/3134) were received with the following indications in accordance with the technical specifications provided by the petitioner:

Product trade name: Gusclad 40 mm panel

PIR panel

The product is composed by 3 layers:

- Layer 1: PVC coated steel (outer sheet), thickness of 0,55 mm, approximate density of 7600 kg/m^3, superficial density of 3602 kg/m^2, olive colour and leather-grain appearance.
- Layer 2: PIR foam (core material), thickness of 40 mm, average density of 41,17 kg/m^3, superficial density of 1,79 kg/m^2 (inc. ribs), yellow colour and light coarse foam appearance.
- Layer 3: Smooth polyester coated steel (inside linear sheet), thickness of 0,38 mm, approximate density of 7600 kg/m^3, superficial density of 2744 kg/m^2, white colour and smooth appearance.

The petitioner did not provide more information.

Fixing system: The test is carried out without substrate.

Manufacturer: Gusclad Ltd, Ballyfarnon, Boyle, Co. Roscommon, Ireland.

3.–MAINTENANCE SPECIFICATION

Not applied.

4. - DESCRIPTION OF THE FINAL CONDITIONS OF USE

The product is intended for use as an exterior building envelope. External wall panel use only.

5. – CONDITIONING

The product conditioning was conducted in compliance with Standard UNE-EN 13238:2011: "Fire Reaction Tests for construction materials. Conditioning procedures and general rules for the selection of substrates".
The samples were stored in a conditioning chamber at 23ºC ± 2ºC, and at 50% ± 5% relative humidity, until a constant weight was reached.

6.–TESTS

6.1. –Small Burner Test in compliance with standard EN ISO 11925-2:2020

Date at which test was performed: Start: 14-12-2020
End: 15-12-2020

During the tests, the environmental conditions of the laboratory were maintained at temperature of (23 ± 5)ºC, and relative humidity of (50 ± 20)%.

6.1.1. - Method specifications according to final use condition

6.1.1. a) - Flame exposure conditions

The product was treated as a multi-layer product, applying the flame on the surface of the sample in accordance with the specifications in section 7.3.3.1 of the test standard.
In addition, the flame was applied to the centre of the width of the bottom edge of the test specimen, to 1,5 mm after the surface, in accordance with the specifications contained in paragraph 7.3.3.2.2. of the test standard. Finally, the flame was applied to the edge placed on 90º sample, in accordance with the specifications contained in paragraph 7.3.3.2.3. of the test standard.

6.1.1.b)- Conditions for flame application: 30 seconds

6.1.1.1.- General procedure based on paragraph 7.

Air velocity in compliance with paragraph 4.2 of the testing standard: 0,7 m/s

SAMPLES	Application of the flame on the surface					
	Lengthwise			Crosswise		
	I	II	III	I	II	III
Duration of inflammation (in s)	-	-	-	-	-	-
Time needed to reach 150 mm (in s)	-	-	-	-	-	-
Ignition of the filter paper (yes/no)	NO	NO	NO	NO	NO	NO

(-) no inflammation has occurred during the test

SAMPLES	Application of the flame on the edge at 1,5 mm					
	Lengthwise			Crosswise		
	I	II	III	I	II	III
Duration of inflammation (in s)	-	-	-	-	-	-
Time needed to reach 150 mm (in s)	-	-	-	-	-	-
Ignition of the filter paper (yes/no)	NO	NO	NO	NO	NO	NO

(-) no inflammation has occurred during the test

Remarks
During the test, no inflammation of the product nor fall of inflamed material on the filter paper was observed.

Measurement uncertainty
Not applicable, since it is not measured.

SAMPLES	Application of the flame on the edge at 90º (PIR foam)					
	Lengthwise			Crosswise		
	I	II	III	I	II	III
Duration of inflammation (in s)	3,0	2,0	4,0	3,0	3,0	3,0
Time needed to reach 150 mm (in s)	-	-	-	-	-	-
Ignition of the filter paper (yes/no)	NO	NO	NO	NO	NO	NO

(-) no inflammation has occurred during the test

Remarks
During the test, a small ignition was observed without reaching 150 mm and any fall of material onto the filter paper.

Uncertainty of measurement
± 1,2 s

6.2.–SBI Test based on Standard UNE-EN 13823:2012+A1:2016

Date at which test was performed: Start: 14-12-2020
End: 15-12-2020

During the tests, the environmental conditions of the laboratory were maintained at a temperature of (20±10) ºC.

6.2.1.- General Principles of the Test

To determine the fire reaction behaviour of the construction products when these are exposed to the thermal attack of a single burning item.

The product is tested while installed on a sample support positioned at an angle. Each sample consists of two wings: one 1,500 mm x 495 mm-short wing, and one 1,500 mm x 1,000 mm-long wing, by the thickness of the product.
The assembly and installation of the product on the support must be representative of the final use condition of such product.

A minimum of three samples per test are tested for each condition of use. The product is exposed to the flames for approximately 21 minutes. The relevant measurements are continuously recorded every three seconds.
The sample is exposed to the flame of a propane burner with a nominal power of (30.7 ± 2kW). The burner is located on the base of the angle formed by the corner, at a distance of 40 mm from the surface of the product.

6.2.2.- Expression of the Results

The test makes it possible to assess how much heat and smoke are released by the products subject to the thermal attack. These measurements are the basis to determine the following indexes:

6.2.2.1.-

$FIGRA_{0,2MJ}$ and $FIGRA_{0,4MJ}$ (in W/s)
These are defined as the maximum value of the quotient HRR_{av} (t) / (t-300), multiplied by 1,000. The quotient is only calculated for that part of the exposure time during which the levels of the thresholds for HRR_{av} and THR were exceeded.
If one of the two threshold values of a FIGRA index is not topped during the period of exposure, this FIGRA index equals zero. Two different TRH threshold values are used, which result in $FIGRA_{0,2MJ}$ and $FIGRA_{0,4MJ}$.

THR_{600} (in MJ)
This is the total heat released by the sample during the first 600 s (10 minutes) from the beginning of the exposure to the main burner.

HRR (in kW)
This is the velocity of the heat released.

6.2.2.2.-

SMOGRA (in m^2/s^2)
This is defined as the maximum value of the quotient SPR_{av} (t) / (t-300), multiplied by 10,000. The quotient is only calculated for the part of the time of exposure during which the levels of the thresholds for SPR_{av} and TSP were exceeded.
If one or the two threshold values are not exceeded during the period of exposure, the SMOGRA value equals zero.

TSP_{600} (in m^2)
This is the total amount of smoke released by the sample during the first 600 s (10 minutes) from the beginning of the exposure to the main burner.

SPR (in m^2/s): This is the smoke production velocity.

6.2.3.–Mounting specifications

Each test set consists of two ítems:

1 part measuring 1,500 x 495 mm, which is representative of the short wing, and
1 part measuring 1,500 x 1,000 mm, representative of the long wing, in accordance with the specifications contained in paragraph 5.1.1.

The samples were assembled by the petitioner, forming a corner according to the specifications of UNE-EN 14509-2014 VC-2016 standard.

The corresponding panel to the long wing, displays vertical joint according to the point 5.2.2. e) of the standard.

The test was carried out removing the lateral bottom plates of the test wagon, according to section 5.2.2 a) of the teste standard and with 40 mm separation between the back of the sample and the backing board.

6.2.4.–Test Results

6.2.4.1. –Sample nº1

Environmental conditions at the beginning of the test:

Temperature: **16 ºC** HR: **53 %** Pressure: **99927 Pa**

Level of exposure of the burner (kW): **31,47**

INDEXES

FIGRA $_{0.2\ MJ}$ (W/s)	59,95
FIGRA $_{0.4\ MJ}$ (W/s)	54,87
LFS	<to edge
THR$_{600S}$ (MJ)	2,33
SMOGRA (m^2/s^2)	14,10
TSP$_{600S}$ (m^2)	91,94
Release of inflamed material in 600 s	NO

Conditions at the end of the test:

Temperature: **16 ºC** HR: **53 %** Pressure: **99967 Pa**

Light transmission (%): **99,29 %** O_2 Concentration (%): **20,94 %**

CO_2 Concentration (%): **0,01 %**

6.2.4.2.-Sample nº 2

Environmental conditions at the beginning of the test:

Temperature: **15 ºC** HR: **53 %** Pressure: **99981 Pa**

Level of exposure of the burner (kW): **31,23**

INDEXES

FIGRA $_{0.2\ MJ}$ (W/s)	74,85
FIGRA $_{0.4\ MJ}$ (W/s)	74,85
LFS	<to edge
THR$_{600S}$ (MJ)	3,41
SMOGRA (m^2/s^2)	19,21
TSP$_{600S}$ (m^2)	114,24
Release of inflamed material in 600 s	NO

Conditions at the end of the test:

Temperature: **14 ºC** HR: **55 %** Pressure: **100159 Pa**

Light transmission (%): **99,56 %** O_2 Concentration (%): **20,94 %**

CO_2 Concentration (%): **0,01 %**

6.2.4.3.-Sample nº3

Environmental conditions at the beginning of the test:

Temperature: **13 ºC** HR: **57 %** Pressure: **99998 Pa**

Level of exposure of the burner (kW): **31,79**

INDEXES

FIGRA $_{0.2\ MJ}$ (W/s)	66,69
FIGRA $_{0.4\ MJ}$ (W/s)	66,69
LFS	<to edge
THR$_{600S}$ (MJ)	3,82
SMOGRA (m^2/s^2)	19,13
TSP$_{600S}$ (m^2)	105,85
Release of inflamed material in 600 s	NO

Conditions at the end of the test:

Temperature: **14 ºC** HR: **57 %** Pressure: **100097 Pa**

Light transmission (%): **99,62 %** O_2 Concentration (%): **20,95 %**

CO_2 Concentration (%): **0,02 %**

6.2.5.- Visual observations

The observation of released material or of inflamed particles during the first 10 minutes of the test lead to the attribution of the identification sub-index "d" to the material, so that:

d0: No release of inflamed material is observed.

d1: release of inflamed material with a ≤ 10 s flame persistence.

d2: Release of inflamed material with a > 10 s flame persistence.

No propagation of the side flame over the long wing, or release of inflamed material is observed in any of the three tested samples.

6.2.6.- Uncertainty associated to the measurement equipment

Set of thermocouples of the extraction pipe	± 2ºC
Pressure transmitter of the pipe	±2 Pa
Smoke measuring device	± 5%
Ambient pressure measuring equipment	± 5%
Ambient humidity measuring device	± 5%
Ambient temperature measuring device	± 2ºC

6.3.–<u>Results</u>

6.3.1.- EN ISO 11925-2:2020

	Flame propagation	**Paper inflammation**
Application of the flame on the surface	Fs < 150 mm in 60 seconds	NO
Application of the flame on the edge – 1.5 mm	Fs < 150 mm in 60 seconds	NO
Application of the flame on the edge – 90º	Fs < 150 mm in 60 seconds	NO

6.3.2.- UNE-EN 13823:2012+A1:2016

SAMPLES	I	II	III	Average
FIGRA $_{0.2\ MJ}$ (W/s)	59,95	74,85	66,69	**67,16**
FIGRA $_{0.4\ MJ}$ (W/s)	54,87	74,85	66,69	**65,47**
LFS	<to edge	<to edge	<to edge	**< to edge**
THR$_{600S}$ (MJ)	2,33	3,41	3,82	**3,19**
SMOGRA (m^2/s^2)	14,10	19,21	19,13	**17,48**
TSP$_{600S}$ (m^2)	91,94	114,24	105,85	**104,01**
Release of inflamed material in 600 s	NO	NO	NO	**NO**

The test results correspond to the behaviour of test samples of a product under the testing conditions themselves. They do not intend to be the only evaluation criterion to assess the potential fire hazard involved in the use of the product.

The Euro class to which the tested product belongs is defined in the Classification Report.

Digitally signed by Salvador Suñol Gálvez

Laboratory Manager
LGAI Technological Center S.A. (APPLUS)

Digitally signed by Vanessa Tutusaus Domingo

Technician Responsible of Euroclasses
LGAI Technological Center S.A. (APPLUS)

The results refer exclusively to the samples tested at the time and under the conditions indicated.

The uncertainties expressed in this document pertain to the expanded uncertainty, which has been obtained by multiplying the typical measurement uncertainty by the coverage factor k=2 which, for a regular distribution, corresponds to a coverage probability of approximately 95%.

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ANNEXES

7.-PHOTOGRAPHS

8.-CHARTS

7.-PHOTOGRAPHS

Photo nº1: Detail of the corner assembly, upper view.

Photo nº2: Detail of the vertical side edge of the long wing, some 500 mm from the bottom of the support.

Photo nº3: View of the corner and anchoring system.

PHOTO Nº4: View of the product prior to starting the test.

PHOTO Nº5: Sample 1 – Flame attack approx. 10 minutes after the start of the test.

PHOTO Nº6: Sample 1 – State of the product upon completion of the test.

PHOTO Nº7: Sample no. 2 - Flame attack approx. 10 minutes after the start of the test.

PHOTO Nº8: Sample 2 – State of the product upon completion of the test.

PHOTO Nº9: Sample 3 – Flame attack approx. 10 minutes after the start of the test.

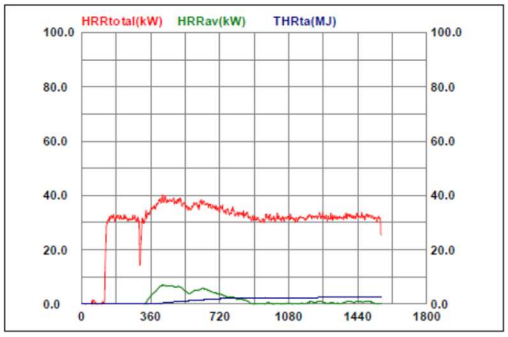
PHOTO Nº10: Sample 3 – State of the product upon completion of the test.

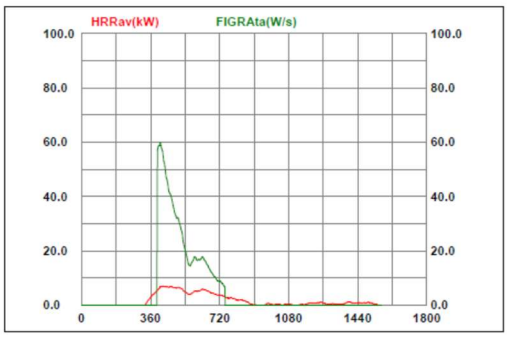
8.- CHARTS

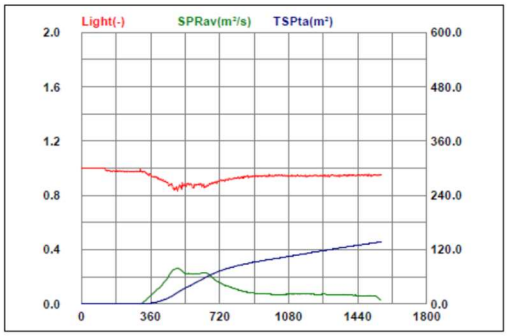
Sample nº1 – Ratios related to the release of heat and smoke

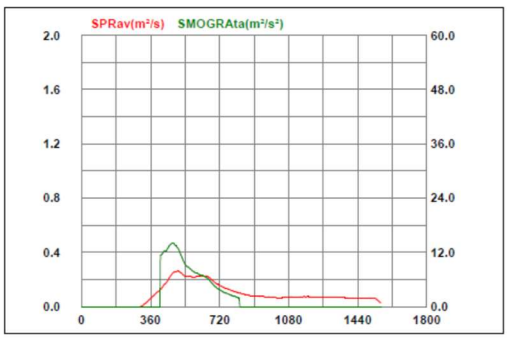
Sample nº2 – Ratios related to the release of heat and smoke

Sample nº3 – Ratios related to the release of heat and smoke









NORMA: UNE-EN 13823:2012 + A1:2016
STANDARD

Data del test: 15:12:20 20:04
Test date

Nom del fitxer: 3134mostra1
File name

Descripció: -
Description

Client: GUSCLAT
Client

Material: -
Material

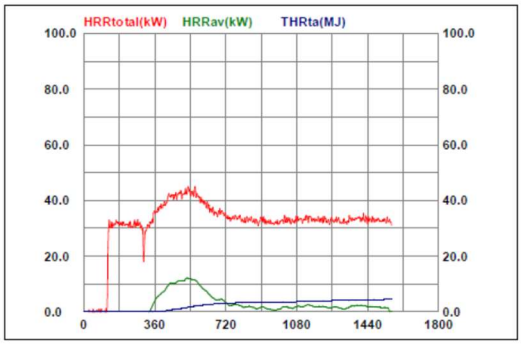
Pes (kg/m²): -
Weight(kg/m²)

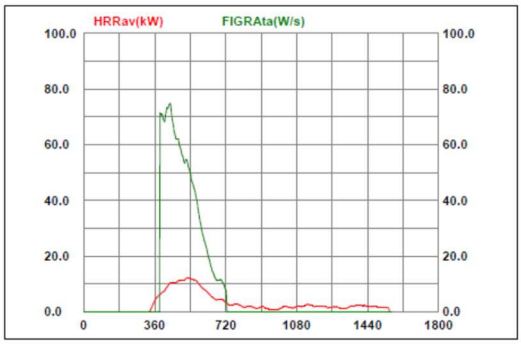
Gruix: -
Thickness

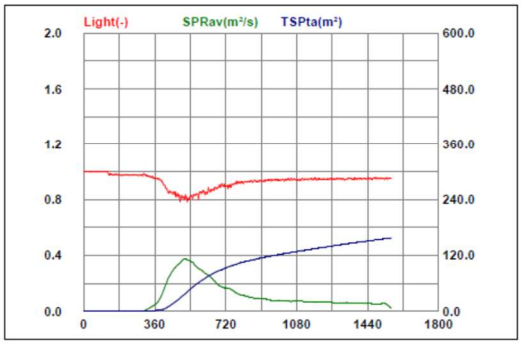
HRR av: 31.47 kW

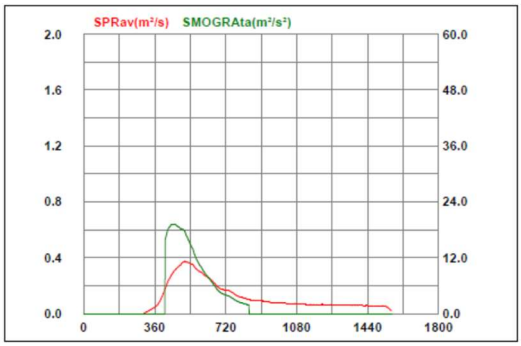
THR 600s: 2.33 MJ
FIGRA 0,2MJ: 59.95 W/s
FIGRA 0,4MJ: 54.87 W/s

TSP 600s: 91.94 m²
SMOGRA: 14.10 m²/s²









NORMA: UNE-EN 13823:2012 + A1:2016
STANDARD

Data del test: 15:12:20 21:04
Test date

Nom del fitxer: 3134mostra2
File name

Descripció: -
Description

Client: GUSCLAT
Client

Material: -
Material

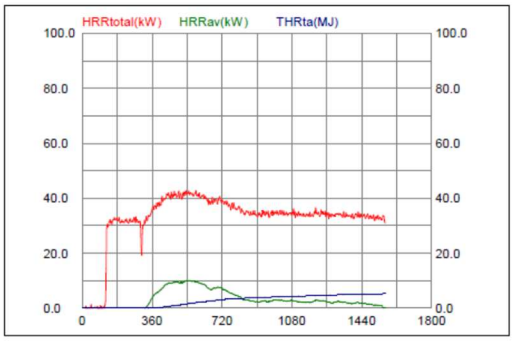
Pes (kg/m²): -
Weight(kg/m²)

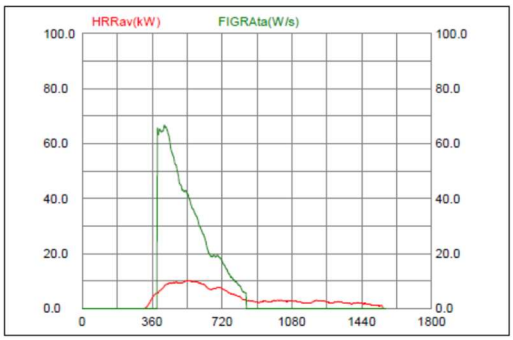
Gruix: -
Thickness

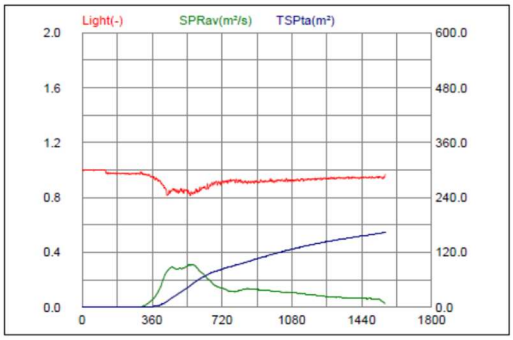
HRR av: 31.23 kW

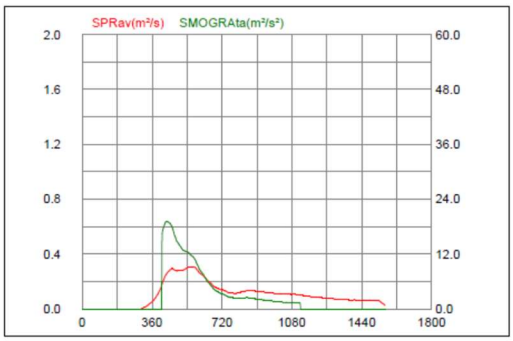
THR 600s: 3.41 MJ
FIGRA 0,2MJ: 74.85 W/s
FIGRA 0,4MJ: 74.85 W/s

TSP 600s: 114.24 m²
SMOGRA: 19.21 m²/s²









NORMA: UNE-EN 13823:2012 + A1:2016
STANDARD

Data del test: 15:12:20 22:04
Test date

Nom del fitxer: 3134mostra3
File name

Descripció: -
Description

Client: GUSCLAT
Client

Material: -
Material

Pes (kg/m²): -
Weight(kg/m²)

Gruix: -
Thickness

HRR av: 31.79 kW

THR 600s: 3.82 MJ
FIGRA 0,2MJ: 66.69 W/s
FIGRA 0,4MJ: 66.69 W/s

TSP 600s: 105.85 m²
SMOGRA: 19.13 m²/s²