

CLASSIFICATION OF REACTION TO FIRE IN ACCORDANCE WITH UNE-EN 13501-1:2019

D/F
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Petitioner's reference: **ALUCOIL, S.A.U.**
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C/Ircio, Parc R72-76
09200 Miranda de Ebro (Burgos)

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Product name: **Larson FR[®]**

Classification report n^o: **21/32307652-2**

Date of issue: **30th March, 2022**

1.-INTRODUCTION

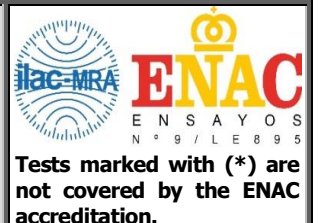
This classification report defines the classification assigned to "Larson FR[®]" in accordance with the procedures given in the UNE-EN 13501-1:2019 standard.

2.- DETAILS OF CLASSIFIED PRODUCT

2.1.-General

The product, Larson FR[®], is defined as a composite Panel composed of two aluminium sheets bonded by means of a mineral FR core, lacquered by one face with HQPE.

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2.2.-Product description

In accordance with the technical specifications provided by the petitioner:

Product trade name: **Larson FR**[®]

Composite Panel composed of two aluminium sheets bonded by means of a mineral FR core, lacquered by one face with HQPE.

Technical details of the sample:

The product is composed of 5 layers:

- Layer 1: Aluminium with a thickness of 0,5 mm, a density of 2720 kg/m³, a superficial density of 1,36 kg/m² (It has been calculated with the values of thickness and density provided by petitioner), RAL9010 colour and smooth appearance.
One side of the aluminium sheet was lacquered with HQPE paint. It was applied 1 layer with a thickness of 23 µm/m², a weight of 70 g/m² and dried extract of 47,5 g/m².
- Layer 2: Glue with a thickness of 0,05 mm, a density of 938 kg/m³, a consumption of 46,9 g/m², transparent colour and smooth appearance.
- Layer 3: Mineral Fire retardant core with a thickness of 3 mm, a density of 1650 kg/m³, a superficial density of 4,95 kg/m² (It has been calculated with the values of thickness and density provided by petitioner), white colour and rough appearance.
- Layer 4: Glue with a thickness of 0,05 mm, a density of 938 kg/m³, transparent colour and smooth appearance.
- Layer 5: Aluminium with a thickness of 0,5 mm, a density of 2720 kg/m³, a superficial density of 1,36 kg/m² (It has been calculated with the values of thickness and density provided by petitioner), green colour and smooth appearance.

Fixing system: The samples were mechanically fixed on particleboard (not fire retardant treated) substrate (Substrate in accordance to specifications indicated on UNE-EN 13238:2011 standard) by means of "44,5 mm edge cassette LCH-1 system + PCI vertical stiffeners" installation system.

The system comprised the following components:

- **Brackets (LCH-2):** 3 mm thick U-shaped folded pieces in EN AW 1050A H24 aluminium alloy, with a length of 50 mm. Brackets are connected to test substrates through DIN 933 M8x80 mm 8.8 hex head screws, DIN 125 M8 8.8 washers and DIN 934 M8 8.8 hex nut.

- **Vertical profiles (LCH-1):** 2/2,5 mm thick omega shape extruded profiles in EN AW 6063 T5 aluminium alloy, fixed to LCH-2 brackets through DIN 933 M8x80 mm 8.8 hex head screws, DIN 125 M8 8.8 washers and DIN 934 M8 8.8 hex nut.
- **Hangers (LC-3):** omega-shaped pieces in EN AW 6063 T5 aluminium alloy (used to support Larson[®] FR cassettes) fitted inside LCH-1 vertical profile and mechanically fixed to LCH-1 by two DIN 7504-K Ø4,8x19 mm A2/50 self-drilling screws.
 - **Elastomer:** every hanging piece will have a flexible PVC piece with 70A-75A SHORE A hardness placed where hanging slots will make contact.
- **44,5 mm edge cassettes:** Larson[®] FR composite panel is machined to obtain a surface with 4 lateral edges bended to form a cassette. These cassettes are shaped using:
 - **3 mm aluminium plates** connected to cassette corners by ISO 15977 Ø4'8x12 mm AIA/A2 (dk=9,5 mm) blind rivets.

Vertical edges of these cassettes are machined with a specific geometry to obtain hanging slots allowing cassette-hangers connection. Cassettes are mechanically fixed to LCH-1 vertical profile using DIN 7504-K Ø4'8x19 mm A2/50 self-drilling screws.

- **Vertical stiffeners (PCI):** L-shaped Larson[®] FR reinforcements glued to cassette inner face using SikaTack[®] Panel 50 (Sika Aktivator, SikaTack[®] Primer and SikaTack[®] Panel 3 previously applied) and mechanically fixed to cassette upper and lower edges through ISO 15977 Ø4,8x12 mm AIA/A2 (dk=9,5 mm) blind rivets. It was used 4 vertical stiffeners on the long wing and 2 vertical stiffeners on the short wing.

Insulation: Mineral wool panels (Commercial reference: Rockwool Alpharock-E 225) with a thickness of 40 mm, a density of 70 kg/m³, a superficial density of 2,8 kg/m² (It has been calculated with the values of thickness and density provided by petitioner) and brown color. The mineral wool panels were fixed to substrate through 70 mm insulation pins.

This constructive system components are installed with an air gap of approximately 50 mm between cassettes inner face and insulation exterior face.

Manufacturer: ALUCOIL, S.A.U. Address: Pol. Ind. de Bayas, C/Ircio, Parc R72-76, 09200 - Miranda de Ebro (Burgos)

3.-REPORT AND RESULTS IN SUPPORT OF THIS CLASSIFICATION

3.1- Reports

Name of Laboratory	Name of petitioner	Report ref. no.	Test method and date
Applus – LGAI	ALUCOIL, S.A.U.	21/32307652-1	UNE-EN ISO 11925-2:2021 04-03-2022
			UNE-EN 13823:2021 02-03-2022

3.2- Results of the Tests

Test Mode	RESULTS – Larson FR®			
	CRITERIA CLASS B	Nº TESTS	AVERAGE	COMPLIANCE
UNE-EN ISO 11925-2:2021	$F_s \leq 150$ mm within 60 s	12	$F_s < 150$ mm	YES
UNE-EN 13823:2021	$FIGRA_{0,2 MJ} \leq 120$ W/s	3	0,00	YES
	LFS < edge of the sample	3	<to edge	YES
	$THR_{600s} \leq 7,5$ MJ	3	0,36	YES
	CRITERIA subclass 's1'	Nº TESTS	AVERAGE	COMPLIANCE
	$SMOGRA \leq 30$ m ² /s ²	3	0,00	YES
	$TSP_{600s} \leq 50$ m ²	3	2,52	YES
	CRITERIA subclass 'd0'	Nº TESTS	AVERAGE	COMPLIANCE
Fall of droplets/particles in flames within 600 s	3	NO	YES	

4.- CLASSIFICATION AND FIELD OF APPLICATION

4.1- Reference of classification

This classification has been carried out in accordance with UNE-EN 13501-1:2019: "Classification in terms of the behaviour to fire of construction products and building elements. Part 1: Classification made from the data gathered during fire reaction tests".

4.2- Classification

The product, Larson FR[®], in relation to its reaction to fire behaviour is classified:

B

The additional classification in relation to smoke production is:

s1

The additional classification in relation to flaming droplets / particles is:

d0

Fire Behaviour		Smoke Production			Flaming droplets	
B	-	s	1	,	d	0

REACTION TO FIRE CLASSIFICATION : B-s1,d0

This classification is only valid for the final conditions of use described in the present report.

4.3- Field of application

- This classification is valid for the following product parameters:

The classification is only valid for the product characteristics shown, with the following parameters being extended:

- Variable parameter 1: Substrate

Having performed the tests with the product applied on the Particleboard, not fire retardant treated substrate, with a density of (680 ± 50) kg/m³, a thickness of (12 ± 2) mm and a class D-s2,d0, the results are valid for substrates for final use based on wood and timber derivatives and also whichever substrate for final use with classes A1 and A2-s1,d0, as it is indicated in the standard UNE-EN 13238:2011.

- Variable Parameter 2: Metallic material (Aluminium, Steel, Stainless Steel and Copper) (*)

After performing the test with aluminium and considering:

- All four components are non-combustible and considered as A1 according to the European Commission 96/603/EC.
- Melting point of aluminium is approximately 660°C.
- Melting point of the steel is approximately 1400°C
- Melting point of stainless steel is approx. 1400°C.
- Melting point of copper is approximately 1085°C.

By extension, it concluded that the products with commercial reference Larson FR® for the four types of metallic material are included with the same Euroclass.

- Variable parameter 3: Paint Finishing(*)

The products with commercial reference Larson FR® are manufactured with different kind of paint finishing.

After performing the test according to UNE-EN ISO 1716:2011 standard for paints with commercial reference PVDF 2L COASTAL, PVDF 3L COASTAL, PVDF 2L, PVDF 3L, HQPE and FEVE, it was obtained the following results :

- PVDF 2L COASTAL: 19,88 MJ/kg with a maximum application consumption 1,39 MJ/m² (Values obtained from test report 16/12641-1471, issued on 29th September, 2016)
- PVDF 3L COASTAL: 13,80 MJ/kg with a maximum application consumption 0,97 MJ/m² (Values obtained from test report 16/12641-1471, issued on 29th September, 2016)
- PVDF 2L paint: 19,52 MJ/kg with a maximum application consumption 1,48 MJ/m² (Values obtained from test report 21/22639-1004-1, issued on 4th August, 2021)
- PVDF 3L paint: 17,46 MJ/kg with a maximum application consumption 1,33 MJ/m² (Values obtained from test report 21/22639-1004-1, issued on 4th August, 2021)
- HQPE paint: 19,61 MJ/kg with a maximum application consumption 1,49 MJ/m² (Values obtained from test report 21/22639-1004-1, issued on 4th August, 2021)
- FEVE paint: 19,06 MJ/kg with a maximum application consumption 1,45 MJ/m² (Values obtained from test report 21/22639-1004-1, issued on 4th August, 2021)

After carrying out the complete test with HQPE paint, the most unfavorable paint finishing due to it is the product with the highest PCS, by extension, it concludes that the product Larson FR® with the other paints finishing are included at the same Euroclass.

- Variable parameter 4: Thickness (*)

The products with commercial reference Larson FR[®] are manufactured with different thicknesses.

After performing the test with the minimum thickness (303 FR – aluminium 0,3 mm and mineral core 2,4 mm), and with the maximum thickness (605 FR – aluminium 0,5 mm and mineral core 5 mm), by extension it is concluded that the following products:

- 303 FR – aluminium 0,3 mm and mineral core 2,4 mm
- 304 FR – aluminium 0,4 mm and mineral core 2,2 mm
- 305 FR – aluminium 0,5 mm and mineral core 2 mm
- 403 FR – aluminium 0,3 mm and mineral core 3,4 mm
- 404 FR – aluminium 0,4 mm and mineral core 3,2 mm
- 405 FR – aluminium 0,5 mm and mineral core 3 mm
- 503 FR – aluminium 0,3 mm and mineral core 4,4 mm
- 504 FR – aluminium 0,4 mm and mineral core 4,2 mm
- 505 FR – aluminium 0,5 mm and mineral core 4 mm
- 603 FR – aluminium 0,3 mm and mineral core 5,4 mm
- 604 FR – aluminium 0,4 mm and mineral core 5,2 mm
- 605 FR – aluminium 0,5 mm and mineral core 5 mm

Are included in the same Euroclass:

REACTION TO FIRE CLASSIFICATION : B-s1,d0

This classification is only valid for the final conditions of use described in the present report.

The study was carried out in the reports with file number 17/15103-1906-2 M3, issued on 2nd May, 2018.

- Variable parameter 5: Fixing System (*)

The products with the commercial reference Larson FR[®] are manufactured with different types of fixing system.

After carrying out the most unfavourable fixing system tests, by extension, it is concluded that Larson FR[®] product for both fixing systems:

- Vertical riveted
- Cassette system

They are included with the same Euroclass:

REACTION TO FIRE CLASSIFICATION : B-s1,d0
This classification is only valid for the final conditions of use described in the present report.

The study was carried out in the reports with file number 16/12641-1552 issued on September 29, 2016 and file number 18/16240-82 issued on January 18, 2018.

- Variable parameter 6: Gluing material (*)

Larson[®] FR 45mm edge cassettes with vertical stiffeners (PCIs) have been tested applying SikaTack[®] Panel 50 and SikaTack[®] Panel 3 in the assembly of vertical stiffeners (PCIs). The following table shows the PCS values of the glues:

Gluing Product	Product PCS (MJ/Kg)	Product at Sample Tested (ml/m²)	Product PCS (MJ/m²)	Total PCS (MJ/m²)
SikaTack [®] Panel 50	14,16	4	2,97	3,96
SikaTack [®] Panel 3	45,63	1,20	0,99	

After carrying out the tests applying the products SikaTack[®] Panel 50 and SikaTack[®] Panel 3, whose total PCS value is 3,96 MJ/m², by extension, it is concluded that any set of glues would be valid if their total PCS does not exceed 3,96 MJ/m².

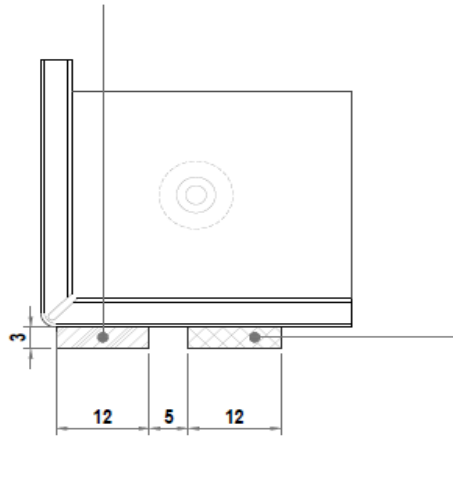
- Variable parameter 7: Stiffeners (*)

The products with the commercial reference Larson FR[®], depending on the panel modulation and the loads applied, can be manufactured with two different types of stiffeners:

- Vertical stiffeners (PCI)
- Horizontal stiffeners (LC-RH)

Vertical stiffeners (PCI): L-shaped Larson FR[®] stiffeners glued to the inner face of the cassette applying Sika Aktivator, SikaTack[®] Primer, SikaTack[®] Panel 3 and SikaTack[®] Panel 50, and also mechanically fixed to upper and lower horizontal edges of the cassette with blind rivets ISO 15977 Ø4,8x12mm AIA/A2 (dk=9,5mm). Used in both vertical and horizontal panel modulations.

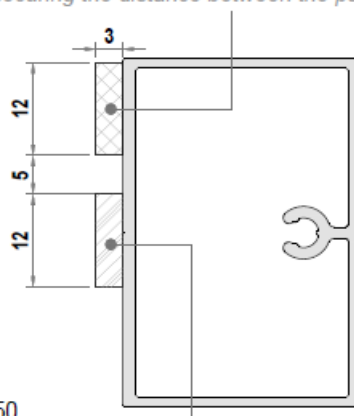
SIKATAACK PANEL 50
(Silicona estructural que asegura la unión panel - rigidizador vertical)
(Structural silicone to ensure panel bonding - vertical stiffener)



SIKATAACK PANEL 3
(Cinta de doble cara que asegura la distancia entre el panel y el rigidizador)
(Double-sided tape securing the distance between the panel and the stiffener)

Horizontal stiffeners (LC-RH): 30x45mm section and 1,25-1,65mm thick profile made of extruded aluminum alloy EN-AW 6060 T6. Glued to the inner face of the cassette applying Sika Aktivator, SikaTack® Primer, SikaTack® Panel 3 and SikaTack® Panel 50, and also mechanically fixed to lateral edges of the cassette with flat head self-tapping screws Ø4,2x22mm A2/50. Used in vertical modulations.

SIKATAACK PANEL 3
(Cinta de doble cara que asegura la distancia entre el panel y el LC-RH)
(Double-sided tape securing the distance between the panel and the LC-RH)



SIKATAACK PANEL 50
(Silicona estructural que asegura la unión panel - LC-RH)
(Structural silicone to ensure panel bonding - LC-RH)

NOTA:

Utilizar para la fijación del LC-RH un tornillo de cabeza extraplana
Use an extra flat head screw to fix the LC-RH.

After carrying out the most unfavourable stiffener configuration (Vertical stiffeners (PCI)), by extension, it is concluded that Larson FR® product for both stiffeners:

- Vertical stiffeners (PCI)
- Horizontal stiffeners (LC-RH)

They are included in the same Euroclass.

- The classification is valid for the following final use applications:

Making architectural facades.

Substrate	Particleboard, not fire retardant treated, (UNE-EN 13238:2011)
Fixing method	Mechanically fixed
Joints	Horizontal and Vertical
Air gap	40 mm separation and ventilated
Others	-

5.- LIMITATIONS

This classification document does not represent type approval or certification of the product.

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

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 results refer exclusively to the samples tested at the time and under the conditions indicated. At the customer's request, the agreed decision rule to declare conformance to the specification or standard, is by following a simple binary decision rule. In this case, the upper limit of the probability value of false acceptance or false rejection, according to ILAC G8, is 50%.

Uncertainty associated to the Small Burner Test: No Inflammation occurs, thus, Time= N.A. Uncertainty associated to the Single Burned Item (SBI) Test: FIGRA0,2MJ=±7,90W/s; THR600s=±1,85MJ; SMOGRA=±6,73m²/s²; TSP600s=±10,85m²; Time (Fall of droplets/particles)=N.A.

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