

Test Report Issue To:
Greenlam Industries Limited
Vill-Paterh Bhonku, P.O.-Panjehra, Tehsil-Nalagarh,
Distt- Solan (HP). Nalagarh-174101

Test Report No : I230902001-1

Date of Issue: 02/11/2023



Sample Booking/Receipt : 02/09/2023

Date of Start of Testing: 18/09/2023

Date of Completion of Test: 18/09/2023

Customer Relationship Number :

A1120022

Sample Description :
Greenlam Compact 0.8MM (CGF)

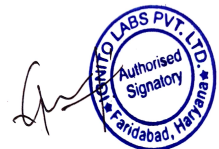
Kind Attention: Mr. Saurabh kalia
E-Mail: saurabh.kalia@greenlam.com
Contact No: 9805099270

Customer Reference Number : PO Number : 4300007844 dated 26.08.2023

Sample Drawn By : Test sponsor



ULR No: TC1038323000000433F




Kaushal Kumar Thakur
Reviewed & Authorized By

This is Digitally Signed Report and hence doesn't require Physical Signature

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Sandeep Kumar Yadav
(Tested By)



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1. INTRODUCTION

Determination of the compliance of **Greenlam HPL 0.8MM (HGF)** for **C S1 D0** classification according to **EN 13501-1:2018**; Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

2. TEST METHODS & REFERENCES

EN 13501-1:2018; Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

BS EN 13823:2020+A12022; Reaction to fire tests for building products. Building products excluding floorings exposed to the thermal attack by a single burning item.



BS EN 13238:2010; Reaction to fire tests for building products. Conditioning procedures and general rules for selection of substrates.

3. DATE OF TEST

Fire Test Date: 18.09.2023

4. SPECIMEN DETAIL

Specimen Detail (Declared by Test Sponsor)	
Product Type	HGF
Manufacturing Unit	Greenlam Industries Ltd. Vill-Paterh Bhonku, P.O.-Panjehra, Tehsil-Nalagarh, Distt-Solan (HP). Nalagarh-174101 - India
Generic Name	Not declared by test sponsor
Product Name	Greenlam HPL 0.8MM (HGF)
Specimen Size	3 specimens of each 500x1500mm (LxW) and 1000x1500mm (LxW)
Thickness	0.8 mm
Mass Per Unit Area	Not declared by test sponsor
Density	1533.3kg/m ³
Color	White
Exposed Face	Both faces were not similar, face with white laminate was exposed to fire
Form of Specimen	Laminate sheet
Substrate Used	Calcium Silicate Board 12.5mm thick

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5. SPECIMEN INSTALLATION

Test specimens of size 500mm in width and 1500mm in length for short wing and 1000mm in width and 1500mm in length were supplied by test sponsor. Test specimen were installed in the test rig as shown in Figure 1. Laminates were fixed mechanically to a calcium silicate board. Mechanical fixing was done using metal screws of size 3X25mm which was fixed through the thickness of the board into the substructure at 300mm center measured along the length of each supporting member. All joints were butted and unfilled. Both faces of specimen were not similar, Face with white color was exposed to fire. Decision regarding exposed face was taken by test sponsor.

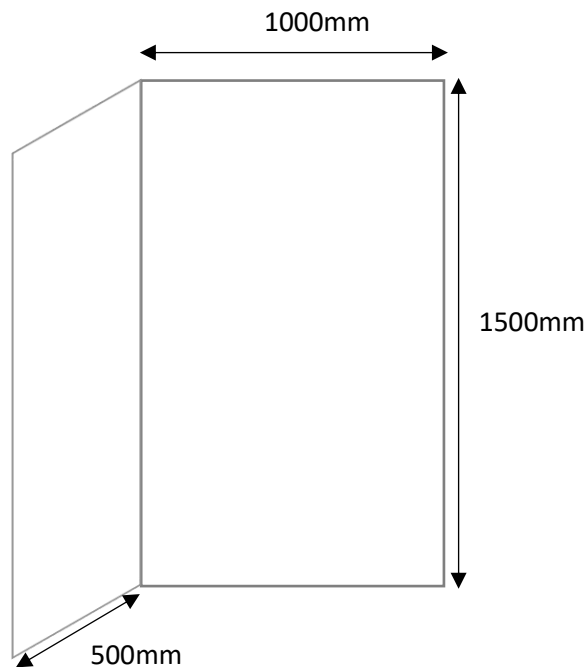



Figure 1


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6. PRE-TEST PROCEDURE

6.1. Verification of the Test Specimen

Ignito Labs was not involved in the selection or sampling of the specimen. Test specimen was supplied by the sponsor of test.

6.2. Conditioning

The specimens were conditioned till constant mass at a temperature of $23 \pm 2^{\circ}\text{C}$ and relative humidity of $50 \pm 5\%$. Test was performed at ambient laboratory atmosphere.

7. FIRE TEST PROCEDURE

7.1 Parameter: FIGRA_{0.2MJ}, FIGRA_{0.4MJ}, SMOGRA, TSP_{600s}, THR_{600s}

Test Method: BS EN 13823:2020

3 samples were tested, formed from two wings (short wing and long wing), 500 mm x 1500 mm and 1000 mm x 1500 mm with both horizontal and vertical joints.

The tests were performed in the equipment called SBI (Single Burning Item), which consists of a test chamber, a test trolley and the smoke extraction system.



The test principle is to expose the two wings of the test material in a vertical position in right angle to a burner located in the lower corner (main burner). The flames are obtained by combustion of propane gas, injected through a sand bed with an output power (30.7 ± 2.0) kW.

The behavior of the sample is evaluated over a period of 20 minutes, determining performance parameter such as heat emission, smoke production, lateral spread of flame and drop inflamed particles.

A short time before the main burner ignition is used to quantify heat and smoke produced only by the burner, using an identical burner away from the sample and called auxiliary burner. Measurements are taken automatically and by visual observation. The extraction pipe is equipped with sensors for measuring the temperature, attenuation of light, the molar fraction of oxygen and carbon dioxide, and the flow induced by the pressure difference. These parameters are recorded automatically and used to calculate the volume flow, the energy release (HRR) and smoke production rate (SPR).

Parameters recorded

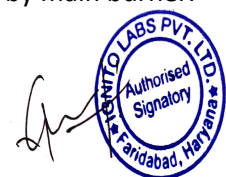
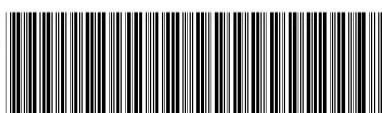
- **FIGRA_{0.2MJ}** (W/s): Maximum value of coefficient of heat release rate for the sample and the moment is started, using a threshold THR (amount of heat evolved) of 0.2 MJ.
- **FIGRA_{0.4MJ}** (W/s): Maximum value of coefficient of heat release rate for the sample and the moment is started, using a threshold THR (amount of heat evolved) of 0.4 MJ.
- **THR_{600s}** (MJ): Total amount of heat released from the sample in the first 600 seconds of the start of exposure by main burner.
- **LSF edge**: Lateral flame spread along the long wing of the sample.
- **Droplets or flamed particles** with inflammation times higher or lower than 10 seconds.
- **SMOGRA** (m^2/s^2): The rate at which smoke production increases during the full 20-minute exposure period.
- **TSP_{600s}** (m^2): Total smoke production during the first 600 s of the start of exposure by main burner.



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7.2 Parameter: Ignitability

Test Method: ISO 11925-2:2020

This test determines the ignitability of a vertically oriented test specimen when exposed to a small flame for 30 seconds, at the edge or the surface of the specimen. The burning behavior of the specimen is observed for flame spread, the occurrence of burning particles and droplets.

8. OBSERVATIONS

8.1. Pre -Test Observations

The specimen was found satisfactory and fit to be tested.

8.2. Test Observations

Parameters	Specimen			Mean
	S-1	S-2	S-3	
FIGRA _{0.2MJ} (W/s)	56.46	50.12	53.24	53.27
FIGRA _{0.4MJ} (W/s)	48.26	46.41	50.20	48.29
THR _{600s} (MJ)	3.32	3.41	4.01	3.58
SMOGRA (m ² /s ²)	0	0	0	-
TSP _{600s}	23.33	19.72	21.45	21.50
LFS to edge	No	No	No	-
Flaming Droplet/ Particles	No	No	No	-
Time of Flaming, s	NA	NA	NA	-

a. Surface Flame Attack

Flame Time: 30 seconds

Parameters	Lengthwise Specimen			Crosswise Specimen		
	S-1	S-2	S-3	S-4	S-5	S-6
Ignition of test specimen(Y/N)	N	N	N	N	N	N
Time to reach 150mm Mark, S	-	-	-	-	-	-
Ignition of Filter Paper(Y/N)	N	N	N	N	N	N

*Y- Ignition Occurred, N- No ignition


b. Edge Flame Attack

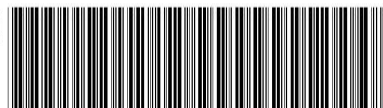
Flame Time: 30 seconds


Parameters	Lengthwise Specimen			Crosswise Specimen		
	S-1	S-2	S-3	S-4	S-5	S-6
Ignition of test specimen(Y/N)	N	N	N	N	N	N
Time to reach 150mm Mark, S	-	-	-	-	-	-
Ignition of Filter Paper(Y/N)	N	N	N	N	N	N

*Y- Ignition Occurred, N- No ignition

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9. SUMMARY OF RESULTS

Specimen has been tested as per **EN 13823** and **EN ISO 11925-2** and evaluated in accordance with **EN 13501-1** for **C S1 D0** classification. Tested specimen of Laminate is meeting the requirements of **C S1 D0** as per **EN 13501-1:2018**

Parameter	Requirements of C S1 D0 Class of EN 13501-1:2018	Observed Results	Conformity (Compliant/Non-Compliant)
A. Single Burning Item Test			
FIGRA _{0.4MJ} (W/s)	≤250W/s	48.29	Compliant
THR ₆₀₀ (MJ)	≤15MJ	3.58	Compliant
SMOGRA (m ² /s ²)	≤30m ² /s ²	0	Compliant
TSP _{600s}	≤50m ²	21.50	Compliant
LFS to edge	No LFS to edge	No LFS to edge	Compliant
B. Ignitability Test			
Flame to reach 150mm Mark	No Flame should reach 150mm mark	No Flame reached 150mm mark (No ignition occurred)	Compliant

Fire behaviour		Smoke Production			Flaming Droplets	
C	-	s	1	,	d	0

Reaction to fire classification: C-s1, d0

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10. CLASSIFICATION CRITERIA

Classes of reaction to fire performance for construction products excluding floorings and linear pipe thermal insulation products are given below

Class	Test method(s)	Classification criteria	Additional classification
A1	EN ISO 1182 ^a and	ΔT 30°C, and Δm 50%, and tf=0 (i.e. no sustained flaming)	-
	EN ISO 1716	PCS 2.0MJ/kg ^a and PCS 2.0MJ/kg ^{b c} and PCS 1.4MJ/m ^{2 d} and PCS 2.0MJ/kg ^e	-
A2	EN ISO 1182 ^{a or}	ΔT 50°C, and Δm 50%, and tf 20s	-
	EN ISO 1716 and	PCS 3.0MJ/kg ^a and PCS 4.0MJ/m ^{2 b} and PCS 4.0MJ/m ^{2 d} and PCS 3.0MJ/kg ^e	-
	EN 13823	FIGRA 120W/s and LFS<edge of specimen and THR600s 7.5MJ	Smoke production ^f and Flaming droplets/particles ^g
B	EN 13823 and	FIGRA 120W/s and LFS<edge of specimen and THR600s 7.5MJ	Smoke production ^f and Flaming droplets/particles ^g
	EN ISO 11925-2 ¹ Exposure =30s	Fs 150mm within 60 s	
C	EN 13823 and	FIGRA 250W/s and LFS<edge of specimen and THR600s 15MJ	Smoke production ^f and Flaming droplets/particles ^g
	EN ISO 11925-2 ¹ Exposure=30s	Fs 150mm within 60 s	
D	EN 13823 and	FIGRA 750W/s	Smoke production ^f and Flaming droplets/particles ^g
	EN ISO 11925-2 ¹ Exposure=30s	Fs 150mm within 60 s	
E	EN ISO 11925-2 ¹ Exposure =15s	Fs 150mm within 20 s	flaming droplets/particles ^h
F	No performance determined		


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- ^a For homogeneous products and substantial components of non-homogeneous products.
- ^b For any external non-substantial component of non-homogeneous products.
- ^c Alternatively, any external non-substantial component having a PCS $2,0 \text{ MJ/m}^2$, provided that the product satisfies the following criteria of EN 13823: FIGRA 20 W/s , and LFS < edge of specimen, and THR600s $4,0 \text{ MJ}$, and s1, and d0.
- ^d For any internal non-substantial component of non-homogeneous products.
- ^e For the product as a whole.
- ^f In the last phase of the development of the test procedure, modifications of the smoke measurement system have been introduced, the effect of which needs further investigation. This may result in a modification of the limit values and/or parameters for the evaluation of the smoke production.
- s1 = SMOGRA $30 \text{ m}^2/\text{s}^2$ and TSP600s 50 m^2 ; s2 = SMOGRA $180 \text{ m}^2/\text{s}^2$ and TSP600s 200 m^2 ; s3 = not s1 or s2
- ^g d0 = No flaming droplets/ particles in EN 13823 within 600 s;
d1 = no flaming droplets/ particles persisting longer than 10 s in EN 13823 within 600 s; d2 = not d0 or d1.
Ignition of the paper in EN ISO 11925-2 results in a d2 classification.
- ^h Pass = no ignition of the paper (no classification); Fail = ignition of the paper (d2 classification).
- ⁱ Under conditions of surface flame attack and, if appropriate to the end-use application of the product, edge flame attack.

11. LIMITATION

The results only relate to the behavior of the specimen of the element of construction under the particular conditions of test; they are not intended to be the sole criteria of accessing the potential fire performance of the element in use nor do they reflect the actual behavior in fires.


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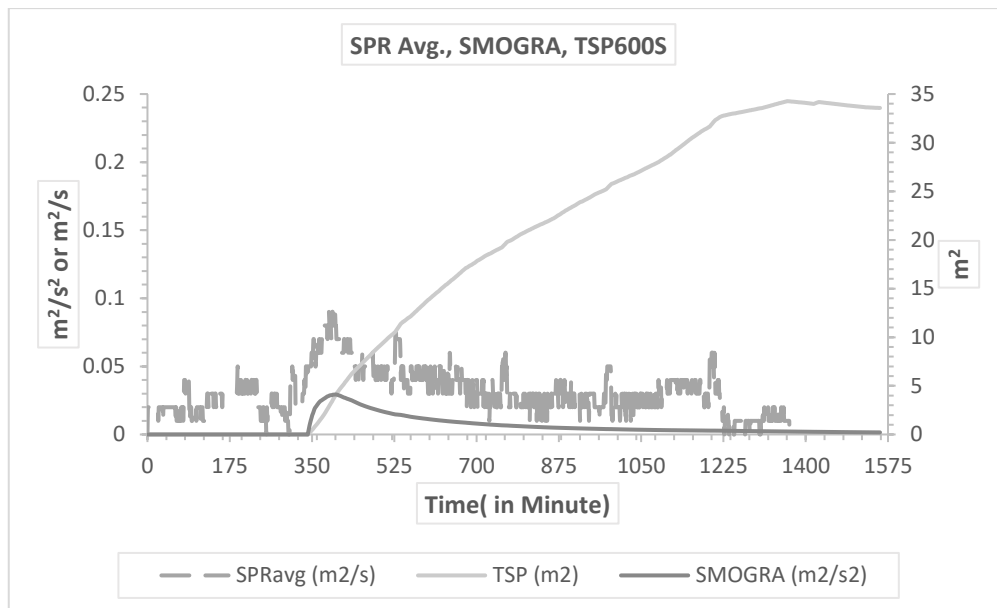
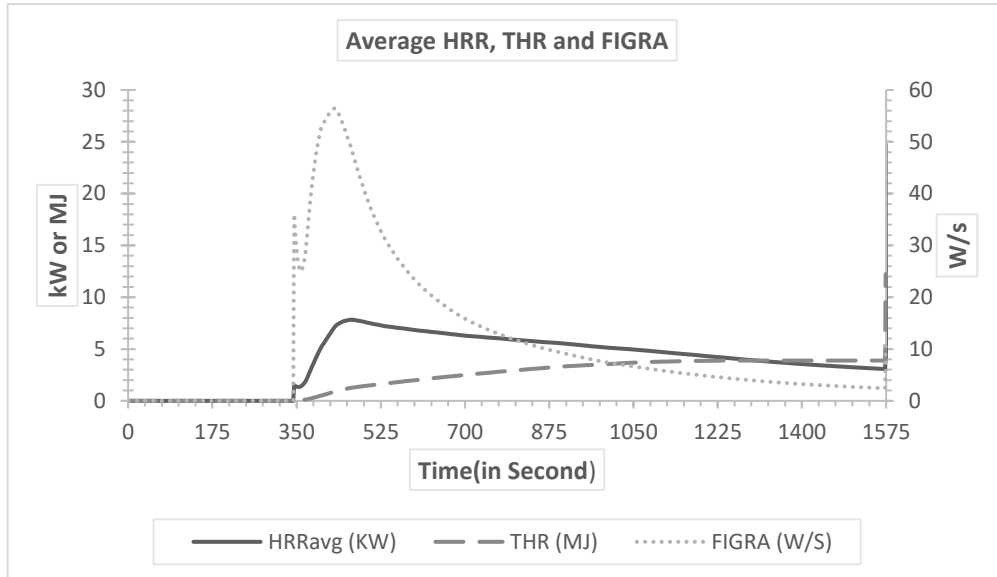


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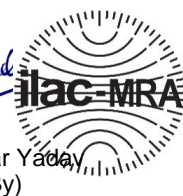


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12. GRAPHS



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13. PHOTOS



Sample Before Test



Sample After Test



Sample Before Test



Sample After Test

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End of Test Report

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