KSA Technopanel

TECHNOPANEL - SASO CERTIFIED - APPROVAL NO. 2023046495 -

علامة الجودة SASO QUALITY MARK

TECHNICAL DATA SHEET

FR-A2/FR-2-ACP

TECHNOPANEL

FOR MORE DETAILS
+966-920006292

www.technopanel.com.sa
Kingdom of Saudi Arabia-Riyadh-
New Kharj Road-Madain Ind.From 212-217

Prepared By QC Dept.

CONTENTS

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FR-A2/FR-2-ACP

Approved & Certified by

المواصفات السعودية
Saudi Standards

SASO

SASO 2752:2019

TECHNOPANEL Fire-Retardant Aluminum Composite Panel (FR-A2-ACP) consists of two thin aluminium sheets bonded to a mineral-filled a halogen-free fire-retardant core.

The core contains fire-retardant additives/minerals that enhance the flame resistance of the panel, while the aluminium surfaces are coated with various finishes and colors to suit your design preferences.

Technopanel -FR-A2/FR-2-ACP has many advantages over conventional ACPs, such as:

- It meets the international standards for fire safety and can prevent the spread of flames and smoke in case of a fire.
- It has a high strength-to-weight ratio and excellent rigidity, which makes it easy to form and install.
- It is resistant to extreme weather conditions, UV exposure, pollution, acid, alkali and salt, which ensures its durability and low maintenance.

Fire retardant -FR-A2/FR-2-ACP can be used for various applications, such as:
- Architectural claddings for exterior and interior walls, columns and entrance-ways.
- Toll stations, signage and display boards.

Technopanel Fire Retardant Aluminium Composite panel is a versatile and reliable cladding material that can enhance the safety and aesthetics of your building project.

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FR-A2/FR-2-ACP

A2 S1 d0

Classified as per, BS EN 13501-1:2018

BS EN 13823

Requirement	Actual Test Result
FIGRA0.2MJ ≤ 120 W/s	FIGRA0.2MJ = 05W/s
THR600s ≤ 7.5 MJ	THR600s = 0.8 MJ
LFS< Edge of specimen	LFS< Edge of specimen
SMOGRA ≤ 30 m^2/s^2	SMOGRA = 0 m^2/s^2
TSP600s ≤ 50 m^2	TSP600s = 16 m^2
Flaming droplets ≥ 10s within the first 600s	Flaming droplets ≥ 10s within the first 600s=Nil
Burning droplets ≤10 s within the first 600s	Burning droplets ≤10 s within the first 600s =Nil

ASTM E84-21A

Requirement	Actual Test Result
FSI =26-50; SDI ≤ 450	FSI =05; SDI = 20

BS EN ISO-1716

Requirement	Actual Test Result
PCS≤ 3.0 MJ/kg (For product as a whole)	PCS≤ 1.9 MJ/kg (For product as a whole)

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PVDF - POLYVINYLIDENE FLUORIDE-COATING

At Technopanel, we specialize in providing high-quality coatings for Aluminium Composite Panel.

Our Polyvinylidene Difluoride (PVDF) coating is a type of fluoropolymer coating that offers exceptional protection and performance.

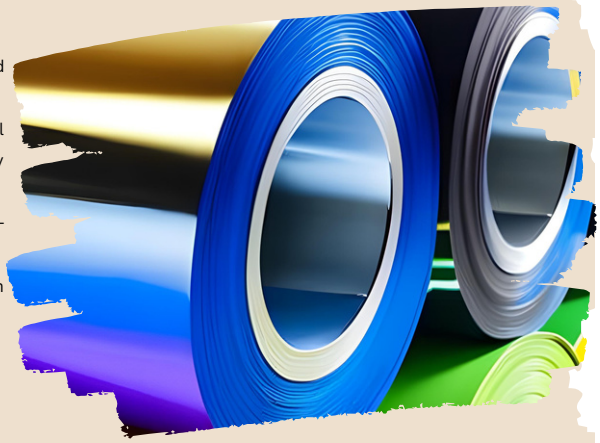
It has several advantages over other types of coatings, including high purity and strength, which allows it to withstand harsh environments and chemicals without corroding or deteriorating.

Additionally, it has high resistance to heat and fire, meaning it does not melt or burn easily and produces low amounts of smoke in case of a fire. Furthermore, its high resistance to UV light ensures that it does not lose its color or gloss over time due to exposure to sunlight.

Our PVDF coating is an excellent choice for metal architecture projects that require durability, aesthetics, and safety. It is available in a variety of colors and finishes to suit different design preferences and needs.

At Technopanel, we are always innovating and developing new formulations of PVDF coating to meet the changing demands and expectations of our customers and the industry.

ALUMINIUM SHEET/ALUMINIUM ALLOY



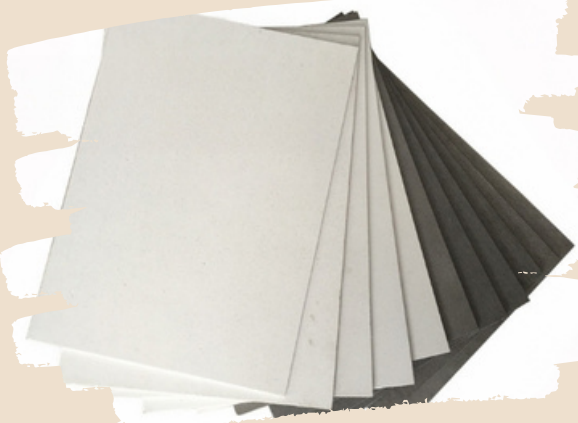
Aluminum is a lightweight and versatile material that is widely used in design and construction for its durability and flexibility.

The 5000 and 3000 series of aluminum are the most popular choices for general construction and fabrication and are recommended by SASO due to their ability to be easily shaped without cracking or breaking and their dependable tensile and impact strength.

Aluminum Composite Panels (ACPs) consist of two aluminum sheets bonded to a fire-resistant core.

ACPs exhibit outstanding tensile and yield strength, elongation rate, and corrosion resistance due to the properties of aluminum.

- Some advantages of using aluminum include.
- increased rigidity for better spanning performance.
- faster and cleaner cutting and routing speeds due to its machinability.
- high corrosion resistance,
- low thermal expansion rate.



FIRE RETRADANT A2-CORE

The A2 core of TECHNOPANEL FR-ACP has the highest fire resistance due to its mineral core.

It is the best choice for use in places where fire protection is very important, such as industrial or very tall buildings, public complexes, hospitals, hotels, underground stations or tunnels.

The A2 core meets the strict requirements of fire regulations and enhances the possibilities for the concept and design of buildings.

It consists of two main components - Magnesium Hydroxide (Mg(OH)2) or Aluminum Hydroxide (AL(OH)3) - that decompose at high temperatures, absorbing considerable amounts of heat in the process.

In addition to its fire-retardant properties, it is also very effective as a smoke suppressant. The A2 core is halogen-free, limiting the use of hazardous substances in the product. This is driven by both the green movement and health concerns.

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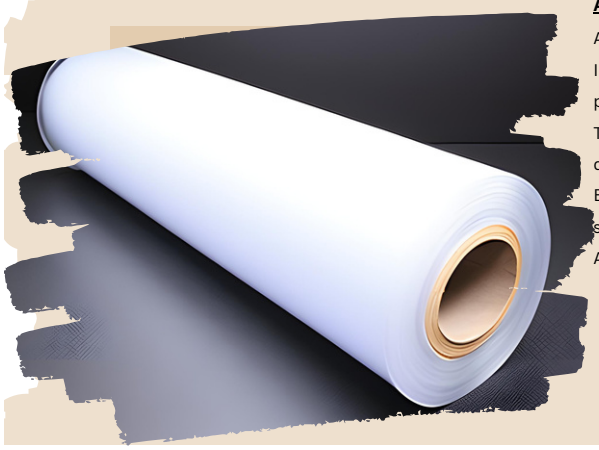
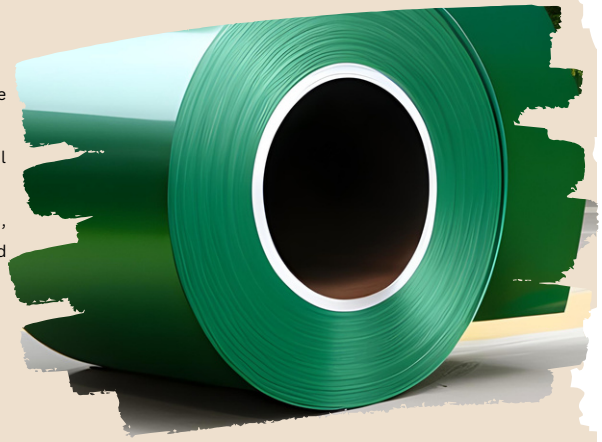


ADHESIVE FILM

Adhesive film is a crucial component of Aluminum Composite Panels (ACPs).
It is used to bond the two aluminum sheets to the fire-retardant core in a continuous process.
The adhesive film provides the structural integrity of the ACP through its strong and durable lamination properties.
By increasing the overall strength, durability of the panel and creating strong peel strength, the adhesive film plays an important role in the production of high-quality ACPs

.POLYESTER COATING –BACK ALUMINIUM SURFACE

One of the features of TECHNOPANEL FR-ACP is the polyester-based coating that covers the back aluminum sheet surface.
This coating acts as a protective layer against corrosion on the back surface of the panel after installation.
Renowned for their anti-corrosive properties and strong adhesion to metal surfaces, polyester-based coatings are an excellent choice for ensuring the panel's quality and durability."



PROTECTIVE FILM

TECHNOPANEL FR-ACP ensures that its decorative surfaces are protected from scratches and damages during processing, storage, and installation.

To this end, the panel is covered by a self-adhesive film with two layers: a white layer on the outer side to deflect ultraviolet rays and a black layer on the inner side to prevent ultraviolet rays from penetrating into the inner surface.

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Third Party Test Results
(Dimensional, Appearance, Mechanical and Chemical Resistance)-Properties

Parameter		Test Method	Unit	Result	Specification Limit: SASO 2752:2019
Dimensional Properties					
Dimension	Length	SASO 2752:2019 Cl. 10.3.1	mm	0.86	±3
	Width	SASO 2752:2019 Cl. 10.3.1	mm	0.31	±2
	Thickness	SASO 2752:2019 Cl. 10.3.2	mm	4.112	±0.2
Deviation of diagonal		SASO 2752:2019 Cl. 10.3.3	mm	1.08	≤5
Straightness at sides		SASO 2752:2019 Cl. 10.3.4	mm/m	0.31	≤1
Warpage		SASO 2752:2019 Cl. 10.3.5	mm/m	2.01	≤5
Thickness of aluminium layer		ASTM A 370-04	mm	0.55	-
Mass per unit area		ASTM B 767-02	kg/m2	8.46	-
Appearance of the panel					
Wave		SASO ISO 4628 Parts (1 to 5,7,10 / 2016) part 6 / 2011 & part 8 / 2012	-	Absent	Not allowed
Bubble			-	Absent	Not allowed
Spot-Size			mm	Not observed	≤3
Spot-Number			-	Not observed	≤3/m2
Cut			-	Absent	Not allowed
Concave-Convex			-	Absent	Not allowed
Scratch			-	Absent	Not allowed
Stain			-	Absent	Not allowed
Color Deviation		SASO ASTM D 2244-2014	-	Pass	Non-obvious in visual observation, ΔE≤2
Glose initial Value at 20°		SASO ISO 2813:2015	-	66.9	-
Glose initial Value at 60°		SASO ISO 2813:2015	-	89.9	-
Glose initial Value at 85°		SASO ISO 2813:2015	-	93.4	-
Paint/Coating Properties					
Coating thickness		SASO ISO 2360:2012	µm	39.8	≥30
Pencil hardness		SASO GSO ISO 15184:2015	-	F-3H	≥HB
Coating Flexibility (T- Bent test)		ISO 17132:2007	-	Pass	≤2 Without any cracks damage on the coating
Adhesion Grade		SASO ISO 2409:2020	Grade	0*1	≤1
Impact resistance(kg.cm)		SASO ISO 6272-2:2014	-	No cracks observed at 50 kg.cm	Shall not be any peel off and cracks
Abrasion resistance		SASO ASTM D 968:2017	Lµm	>2	≥ 2
Stain resistance		SASO ISO 11998:2007	%	2	≤5
Chemical Resistance Properties					
Alkali resistance		SASO ISO 2812-1:2014	-	Resistant	Shall be resistant
Acid resistance		SASO ISO 2812-1:2014	-	Resistant	Shall be resistant
Oil resistance		SASO ISO 2812-1:2014	-	Resistant	Shall be resistant
Solvent resistance		SASO ISO 2812-1:2014	-	Resistant	Shall be resistant
Hot water resistance*		SASO ISO 2812-2:2014	-	Resistant	Shall be resistant

Prepared By QC Dept.

Third Party Test Results
(Core Thermal Properties,Weather Resistance,Acoustic)-Properties

Parameter	Test Method	Unit	Result	Specification Limit: SASO 2752:2019
Core Thermal Properties				
Heat Deflection Temperature	SASO ISO 75-2:2014	°C	89	85 Min
Linear Thermal Expansion Coefficient	ASTM D 696:16	µm/m-°C	151	200 Max
Self-ignition temperature	SASO ASTM D1929:2015	°C	>350	343 Min
Temperature Resistance @ -50 to +80	Visual	-	No defect	-
Thermal conductivity of core,Kc	ASTM C 518-17 / BS EN ISO 6946:2007	W/mk	0.4148	-
Thermal resistance of core, Rc		m2K/W	0.0559	-
Internal surface resistance, RSI			0.13	-
External surface resistance, RSE			0.04	-
Total Thermal resistance, RT			0.2259	≥0.06
Thermal transmittance (U value)	ASTM C 518-17	W/m2.K	4.43	≤4.5
Physical and Mechanical Properties				
Drum peel strength	ASTM D1781-98 (2021)	N.mm/mm	107	≥100
180 degrees Peel Strength	SASO ISO 8510-2:2008	N/mm	9.15	≥9.0
Shear Strength	ASTM C393 / C393 M-16	MPa	23	≥22
Bending Strength	ASTM C393/C 393 M-16	MPa	109	≥100
Bend Elastic Module	ASTM C393/C 393 M-16	MPa	21856	≥20000
Weathering /Aging Properties				
Accelerated Weathering at 2000 hours	SASO ISO 16474-2:2015	-	No change observed	Shall have no change
Gloss Deviation*	SASO ISO 2813:2015	-	4	≤10
Salt Fog Resistance at 2000 hours	ISO 11997-1:2017	-	No change observed	Shall have no change
Acoustic Properties				
Sound absorption Factor	ISO 354:2003	-	0.042	-
Sound Transmission loss	ISO 717-1:2020	dB	25	-
Loss Factor	EN ISO 6721 Frequency range 100 - 3200 Hz	-	0.0086	-
Bending and Rigidity Properties				
Section Modulus W	DIN 53293-1982	cm3/m	1.77	-
Rigidity – Poisson's ratio	DIN 53293-1982	kNm2/m	0.31	-
Lacquering	FT-IR	-	Polyester	-

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FR-A2/FR-2-ACP

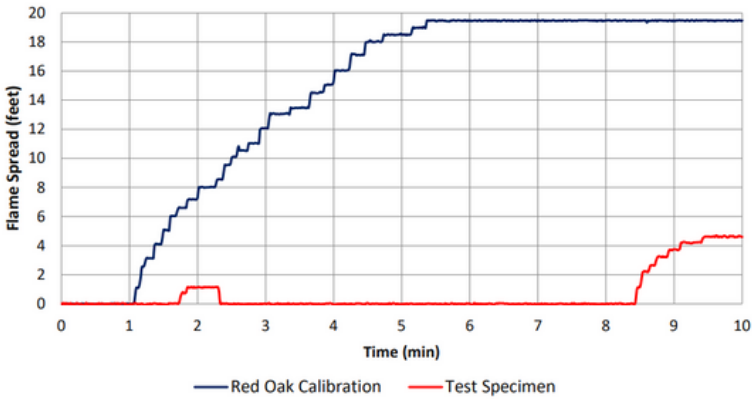
Fire Performance -Properties

ASTM E84 – 21a: Standard Test Method for Surface Burning Characteristics of Building Materials

Observations	Result
Ignition Time (min:sec)	1:30
Time to maximum flame front advance (min:sec)	9:37
Maximum flame spread (ft)	4.7
Time to end of tunnel reached (min:sec)	Not Reached
Maximum temp recorded at the exposed thermocouple located near the end of the tunnel (°F / °C)	594/312
Dripping (min:sec)	None
Flaming on the floor (min:sec)	None
After flame on the top (min:sec)	Extinguished
After flame on the floor (min:sec)	None
Delamination (min:sec)	8:10
Sagging (min:sec)	None
Shrinkage (min:sec)	None
Fallout (min:sec)	None
FS*Time Area (ft*min)	13.92
Smoke Area (%A*min)	17.92
Heptane Smoke Area (%A*min)	85.7
SUMMARY OF RESULTS	
FLAME SPREAD INDEX (FSI)	5
SMOKE DEVELOPED INDEX (SDI)	20

GRAPHS

Graph 1: Flame Spread Index (FSI)



Graph 2: Smoke Developed Index (SDI)

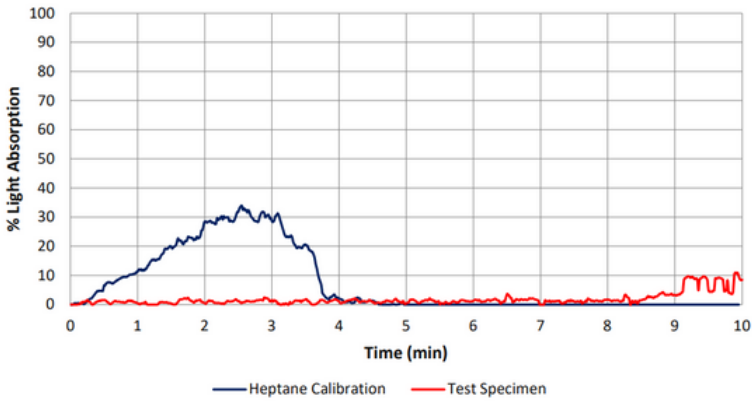


Photo 1: Specimen before the test. (Non-Fire Side)

Photo 2: Specimen before the test. (Fire Side)

Photo 3: Specimen after the test. (As seen from the fire-end)

Photo 4: Specimen after the test. (As seen from the exhaust end)

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BS EN ISO-1716:2018 Reaction to Fire Tests for Products - Determination of the Gross Heat of Combustion (Calorific Value)

Table 1: Gross Calorific Value of Each Layer

		TopCoat	Primer	Aluminium Skin	Adhesive	A2 Core	Back coat
	No. of Tests:	3	3	0	3	3	3
Test 1	Specimen weight (g)	0.1004	0.1005	-	0.1013	0.2001	0.1000
	Gross calorific value (MJ/kg)	19.6	17.1	-	44.8	1.3	15.8
Test 2	Specimen weight (g)	0.1005	0.1006	-	0.01014	0.2006	0.1000
	Gross calorific value (MJ/kg)	19.6	16.1	-	44.8	1.6	15.7
Test 3	Specimen weight (g)	0.1004	0.1013	-	0.1005	0.2017	0.104
	Gross calorific value (MJ/kg)	19.4	16.8	-	44.5	1.4	15.6
Average Gross calorific value (QPCS) in MJ/kg		19.5	17.3	-	44.0	1.2	15.2
Area Weight (kg/m²)		0.021	0.015	1.180	0.080	6.5	0.014
Average Gross calorific value in MJ/m²		0.4	0.3	-	3.6	9.1	0.2

Table 2: Gross Calorific Value of the Whole Product

Layer	Component		Thickness (mm)	Area density (kg/m²)	Gross Heat of Combustion QPCS (MJ/kg)	Gross Heat of Combustion QPCS (MJ/m²)	
1	Component 1 (External non-substantial layer)	Top coat	0.018	0.021	19.5	0.4	0.7
		Primer	0.013	0.015	16.8	0.3	
2	Component 2 (Substantial layer)	Aluminium Topskin	0.5	1.180	0.0	0.0	
3	Component 3 (Internal non-substantial layer)	Adhesive	0.08	0.08	44.5	3.6	
4	Component 4 (Substantial layer)	Core	3.2	6.5	1.4	9.1	
5	Component 5 (Internal non-substantial layer)	Adhesive	0.08	0.08	44.5	3.6	
6	Component 6 (Substantial layer)	Aluminium Bottom skin	0.5	1.170	0.0	0.0	
7	Component 7 (External non-substantial layer)	Back coat	0.012	0.014	15.6	0.2	
(A) Sum of calorific values, MJ/m²							17.2
(B) Sum of Area weights, kg/m²							9.061
Gross heat of combustion of the whole product (PCS), in MJ/kg: QPCS (A/B)							1.9

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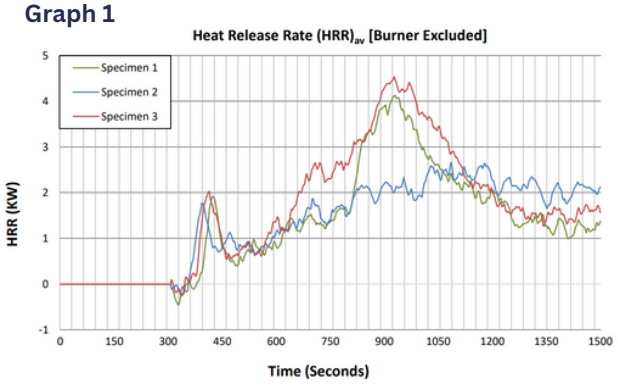
BS EN 13823:2020 Reaction to Fire Tests for Building Products — Building Products excluding Floorings exposed to the Thermal Attack by a Single Burning Item

Observations			
Occurrence of sustained flames reaching the far edge of long wing specimen at any height between 500-1000mm at any time during the test - LFS	Nil	Nil	Nil
Flaming droplets/particles within the first 600s	Nil	Nil	Nil
Burning droplets/particles ≥10 s within the first 600s	Nil	Nil	Nil
End of test, s	1560	1560	1560

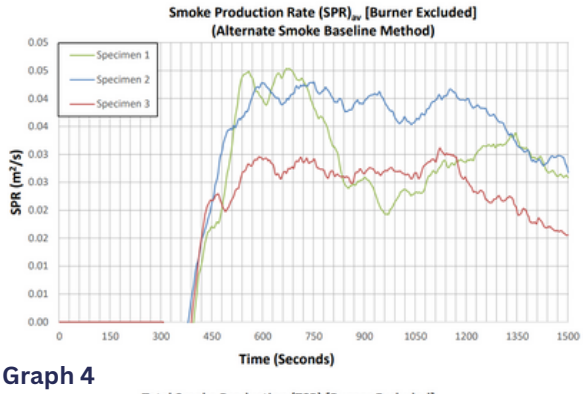
Test Results

TEST PARAMETERS	TEST RESULTS			Average
	Specimen 1	Specimen 2	Specimen 3	
FIGRA0.2MJ (W/s)	7	0	7	5
FIGRA0.4MJ (W/s)	7	0	7	5
THR600s, MJ	0.8	0.7	1.0	0.8
SMOGRA, m^2/s^2	0	0	0	0
TSP600s, m^2	17	18	13	16
Occurrence of sustained flames reaching the far edge of long wing specimen at any height between 500-1000mm at any time during the test - LFS	Nil	Nil	Nil	Nil
Flaming droplets/particles ≥ 10s within the first 600s	Nil	Nil	Nil	Nil
Burning droplets/particles ≤10 s within the first 600s	Nil	Nil	Nil	Nil

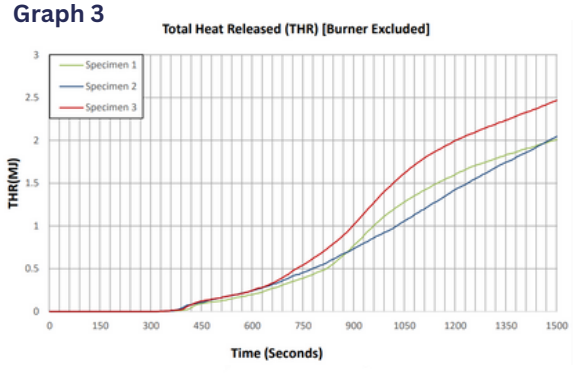
Graph 1



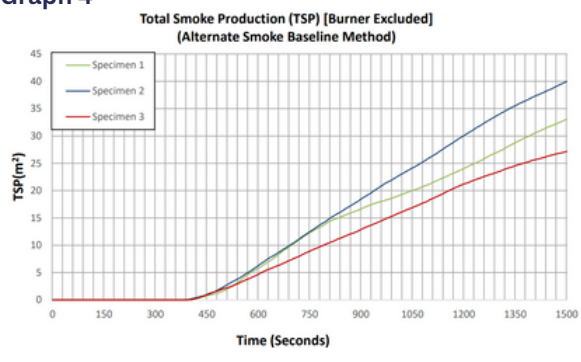
Graph 2



Graph 3



Graph 4



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BS EN 13823:2020 Reaction to Fire Tests for Building Products — Building Products excluding Floorings exposed to the Thermal Attack by a Single Burning Item

Sample 1

Before Fire Test

After Fire Test

Sample 2

Before Fire Test

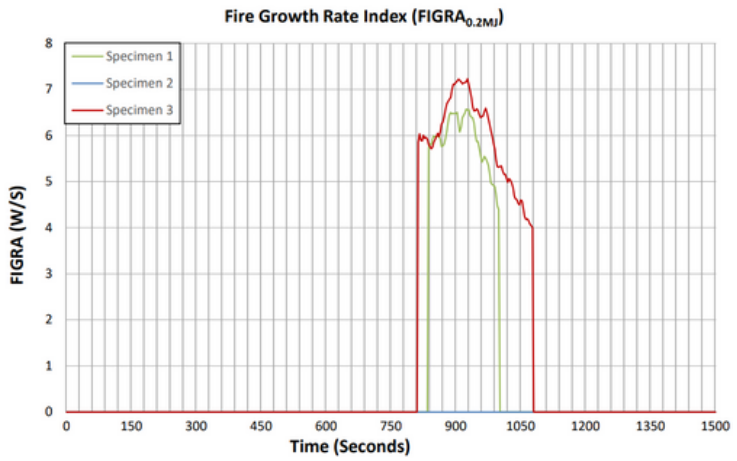
After Fire Test

Sample 3

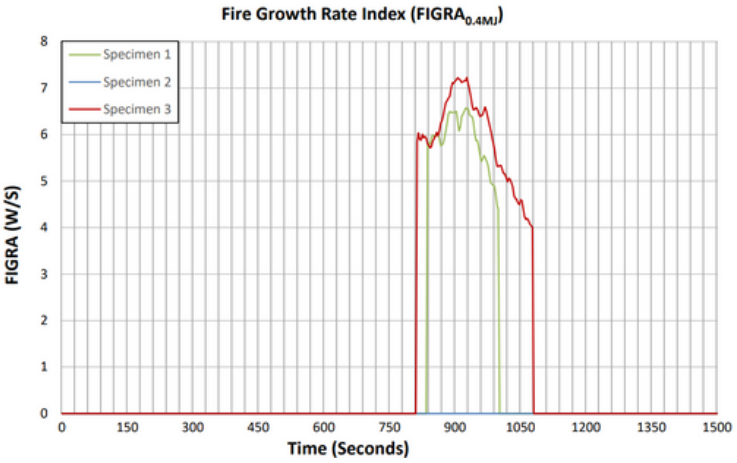
Before Fire Test

After Fire Test

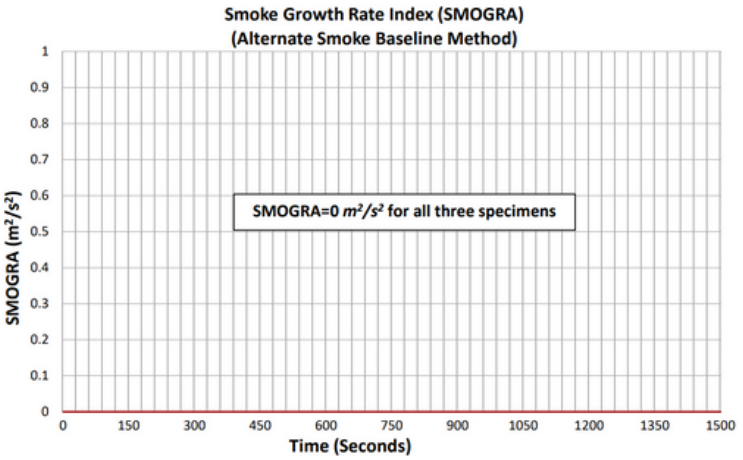
Graph 5



Graph 6



Graph 7



CLASSIFICATION OF REACTION TO FIRE PERFORMANCE IN ACCORDANCE WITH BS EN 13501-1:2018

Test Method	Parameter		No. of tests	Results	
				Continuous parameter- mean (m)	Compliance parameters
BS EN ISO-1716:2018	PCS≤ 4.0 MJ/m² (for External Non-Substantial component)	Topcoat + Primer	3	0.7	Compliant
		Back coat	3	0.2	Compliant
	PCS≤ 3.0 MJ/kg (for Substantial component)	Aluminium Skin	0	0.0	Compliant
		A2 Core	3	1.4	Compliant
	PCS≤ 4.0 MJ/m² (for Internal Non-Substantial component)	Adhesive	3	3.6	Compliant
	PCS≤ 3.0 MJ/kg (For product as a whole)			1.9	Compliant

Test Method	Parameter	No. of tests	Results	
			Continuous parameter- mean (m)	Compliance parameters
BS EN 13823:2020	FIGRA0.2MJ ≤ 120 W/s	3	5	Compliant
	THR600s ≤ 7.5 MJ	3	0.8	Compliant
	Lateral Flame Spread < Edge of specimen	3	< Edge of specimen	Compliant
	CRITERIA for subclass “s1”			
	SMOGRA, m²/s²	3	0	Compliant
	TSP600s ≤ 50 m²	3	16	Compliant
	CRITERIA for subclass “d0”			
	Flaming droplets/Particles within 600s	3	Nil	Compliant

Classification						
Fire behavior		Smoke Production		Flaming droplets		
A2	-	S	1	-	d	0

Reaction to fire classification: A2 – s1, d0

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