



TECHNICAL DATA SHEET

# FR-A2/FR-2-ACP

FOR MORE DETAILS +966-920006292





# CONTENTS

General Description03
Fire Classification-Chart
Description of ACP Layers
Third Party Test Results Dimensional, Appearance, Mechanical and Chemical Resistance-Properties
Core Thermal Properties, Weather Resistance, Acoustic-Properties
Third Party Fire Test Results ASTM E84 – 21a:
BS EN ISO-1716:2018:
BS EN 13823:2020:
BS EN 13501-1:2018







**Aluminium Coil** 

Adhesive Film

FR-A2- Core

**Adhesive Film** 

Aluminium Coil

PE Coat

	30m	
Protective Flim		
Top Coat(PVDF)		- AND
Primer		

## **Approved & Certified** by المواصفات السعودية Saudi Standards



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 entranceways. - Toll stations, signage and display boards.

One of the unique features of the A2 core used in this product is its mineral content. While this gives it excellent fire resistance, also has the ability to naturally interact with moisture/water. To enhance the product's performance and ensure its durability, we recommend using silicone during installation. This creates a waterproof barrier, preventing any water from reaching the A2 core and ensuring the panel's integrity over time. This step is a testament to our commitment to providing you with a product that delivers both saf**ety** and durability."



FOR MORE DETAILS

+966-920006292

www.technopanel.com.sa Kingdom of Saudi Arabia-Riyadh-



New Kharj Road-Madain Ind.From 212-217



### A2 S1 d0 Classified as per, BS EN 13501-1:2018 BS EN 13823

Requirement . FIGRA0.2MJ ≤ 120 W/s THR600s ≤ 7.5 MJ LFS< Edge of specimen SMOGRA ≤ 30 m<sup>2</sup>/s<sup>2</sup> TSP600s ≤ 50 m<sup>2</sup> Flaming droplets ≥ 10s within the first 600s Burning droplets ≤10 s within the first 600s

**Actual Test Result** FIGRA0.2MJ = 05W/s THR600s = 0.8 MJ LFS< Edge of specimen SMOGRA =  $0 \text{ m}^2/\text{s}^2$ TSP600s = 16 m<sup>2</sup> Flaming droplets  $\geq$  10s within the first 600s=Nil Burning droplets ≤10 s within the first 600s =Nil

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

**ASTM E84-21A** 

**BS EN ISO-1716** 

Requirement PCS≤ 3.0 MJ/kg (For product as a whole)

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



ared By QC Dept

FOR MORE DETAILS +966-920006292





#### **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 is a fire-retardant material with a unique mineral content. This gives it excellent fire resistance and the ability to naturally interact with moisture/Water.

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.

FOR MORE DETAILS +966-920006292 www.technopanel.com.sa Kingdom of Saudi Arabia-Riyadh-New Kharj Road-Madain Ind.From 212-217



Rev-02-2024/05-24 Prepared By QC Dept



#### 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.

FOR MORE DETAILS +966-920006292





	(Dimens	Third Par ional, Appearance, Mechan	ty Test Results ical and Chemical Re	sistance)-Propertie	S
Para	meter	Test Method	Unit	Result	Specification Limit: SASO 2752:2019
		Dimensi	onal Properties		
	Length	SASO 2752:2019 Cl. 10.3.1	mm	0.86	±3
Dimension	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
Straightn	ess at sides	SASO 2752:2019 Cl. 10.3.4	mm/m	0.31	≤1
Wa	rpage	SASO 2752:2019 Cl. 10.3.5	mm/m	2.01	≤5
Thickness of	aluminium layer	ASTM A 370-04	mm	0.55	-
Mass pe	r unit area	ASTM B 767-02	kg/m2	8.46	-
		Appeara	nce of the panel		
W	/ave		-	Absent	Not allowed
Bu	ıbble		-	Absent	Not allowed
Spo	t-Size		mm	Not observed	≤3
Spot-	Number	SASO ISO 4628 Parts (1 to 5,7,10 /	-	Not observed	≤3/m2
	Cut	2016) part 6 / 2011 & part 8 / 2012	-	Absent	Not allowed
Concav	e-Convex		-	Absent	Not allowed
Sc	ratch		-	Absent	Not allowed
S	tain		-	Absent	Not allowed
Color I	Deviation	SASO ASTM D 2244-2014	-	Pass	Non-obvious in visual observation, ΔE≤2
Glose initial	l Value at 20º	SASO ISO 2813:2015	-	66.9	-
Glose initial	l Value at 60°	SASO ISO 2813:2015	-	89.9	-
Glose initial	l Value at 85°	SASO ISO 2813:2015	-	93.4	-
		Paint/Co	ating Properties		
Coating	thickness	SASO ISO 2360:2012	μm	39.8	≥30
Pencil	hardness	SASO GSO ISO 15184:2015	-	F-3H	≥HB
Coating Flexibi	lity (T- Bent test)	ISO 17132:2007	-	Pass	≤2 Without any cracks damage on the coating
Adhesi	on Grade	SASO ISO 2409:2020	Grade	0*1	≤1
Impact resis	stance(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 re	esistance	SASO ISO 11998:2007	%	2	≤5
		Chemical Re	sistance Properties		
Alkali r	esistance	SASO ISO 2812-1:2014	-	Resistant	Shall be resistant
Acid re	esistance	SASO ISO 2812-1:2014	-	Resistant	Shall be resistant
Oil re	sistance	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



www.technopanel.com.sa

Kingdom of Saudi Arabia-Riyadh-



02-2024/05-24 Prepared By QC Dep



Third Party Test Results (Core Thermal Properties, Weather Resistance, Acoustic) - Properties							
Parameter	Test Method	Unit	Result	Specification Limit: SASO 2752:2019			
	Core The	ermal 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		W/mk	0.4148	-			
Thermal resistance of core, Rc			0.0559	-			
Internal surface resistance, RSI	ASTM C 518-17 / BS EN ISO 6946:2007		0.13	-			
External surface resistance, RSE		m∠k/w	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 M	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	g /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				
		www.tochno	nanal com ca				



www.technopanel.com.sa

+966-920006292 Now Khari Pe

Kingdom of Saudi Arabia-Riyadh-New Kharj Road-Madain Ind.From 212-217



Rev-02-2024/05-24 Prepared By QC Dept.



#### 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)

MONA ESA





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





FOR MORE DETAILS +966-920006292



#### 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
Tost 1	Specimen weight (g)	0.1004	0.1005	-	0.1013	0.2001	0.1000
Test T	Gross calorific value (MJ/kg)	19.6	17.1	-	44.8	1.3	15.8
Tost 2	Specimen weight (g)	0.1005	0.1006	-	0.01014	0.2006	0.1000
Test 2	Gross calorific value (MJ/kg)	19.6	16.1	-	44.8	1.6	15.7
Tost 2	Specimen weight (g)	0.1004	0.1013	-	0.1005	0.2017	0.104
Test 3	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 o	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 I Combust (MJ/	Heat of ion QPCS ′m² )
1	Component 1 (External non-	Top coat	0.018	0.021	19.5	0.4	0.7
I	substantial layer)	Primer	0.013	0.015	16.8	0.3	0.7
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 C						0.	.2
(A) Sum of calorific values, MJ/m <sup>2</sup>							
(B) Sum of Area weights, kg/m <sup>2</sup>							
	Gross h	eat of combustion of the	whole product (PC	S), in MJ/kg: QPCS	(A/B)		1.9







#### 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	Specimen 1	Specimen 2	Specimen 3	Average
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, m²/s²	0	0	0	0
TSP600s, m²	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 $\geq$ 10s within the first 600s	Nil	Nil	Nil	Nil
Burning droplets/particles ≤10 s within the first 600s	Nil	Nil	Nil	Nil







FOR MORE DETAILS

+966-920006292











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



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



Fire Growth Rate Index (FIGRA 0.2MJ) ġ Specimen : FIGRA (W/S) 4 3 2 1 0 150 300 450 900 1050 1200 1350 1500 600 750 Time (Seconds)

#### Graph 6

Graph 5



Graph 7





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

	Test Method Parameter		No. of	Results		
Test Method			tests	Continuous parameter- mean (m)	Compliance parameters	
	PCS≤ 4.0 MJ/m² (for External	Topcoat + Primer	3	0.7	Compliant	
	Non-Substantial component)	Back coat	3	0.2	Compliant	
BS EN ISO- 1716:2018	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	r product as a whole)	•	1.9	Compliant	

		No. of	Results			
Test Method	Parameter	tests	Continuous parameter- mean (m)	Compliance parameters		
	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		
DS EN 13823-2020	CRITERIA for subclass "s1"					
D3 EN 13023.2020	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			oduction		Flaming droplets		
A2	-	S	1	-	d	0	

#### Reaction to fire classification: A2 - s1, d0

FOR MORE DETAILS +966-920006292 www.technopanel.com.sa Kingdom of Saudi Arabia-Riyadh-New Kharj Road-Madain Ind.From 212-217



Rev-02-2024/05-24