

INTRODUCTION

ALMAXCO-FR is a high performance fire resistant Aluminium Composite Material used in a wide range of interior and exterior architectural applications.

When fire safety is of utmost importance, Almaxco-FR has been the trusted choice of architects and project owners around the world. It has passed the most stringent fire safety tests demanded internationally such as NFPA 285, BS 476 P6 & P7, ASTM E84, EN-13501 and AS/NZ 1530.3.

Almaxco-FR is most commonly used as an architectural facade panel for wall cladding, roofing coverings and canopies, besides this it is also used in the transportation industry for interiors of RV's, caravans and buses. There are many applications across a wide range of industries where Almaxco-FR is preferred over other materials due to its superior flatness, fire resistance, lightweight and ease of processing and formability.

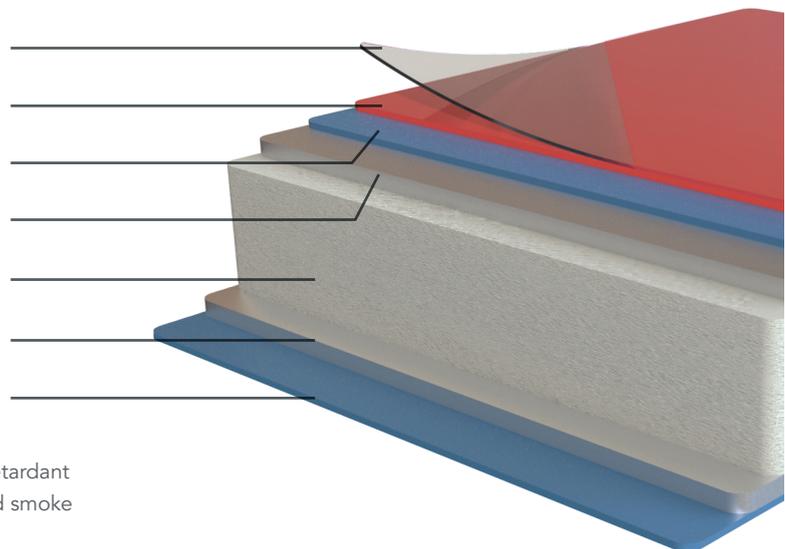
Trusted in over 42 countries and having been an industry player for over 20 years, Almaxco-FR has been installed on hundreds of projects globally and has built a reputation for reliability and quality.

COMPOSITION

ALMAXCO®-FR is composed of a mineral-filled fire-resistant core laminated between two skins of 0.5mm (0.020") thick aluminium skins:

Top/Bottom Skin material	0.50mm (0.020") thick aluminium
Core material	Mineral fire-resistant core
Paint Type	PVDF, FEVE, NANO and HDPE coating

- Protective Film
- Durable Paint Coating
- Pretreatment Primer
- Top Aluminium Skin (0.50mm)
- Mineral Fire Resistant Core (3mm)
- Bottom Aluminium Skin (0.50mm)
- Pretreatment Primer



The core is made from virgin resins and special fire retardant minerals to ensure the highest standards in flame and smoke propagation

The top coil is coated using a roller coating technique with a 2 or 3 coat, high-performance Kynar / Hylar fluorocarbon (PVDF) coating, FEVE (Lumifon) coating, NANO PVDF or HDPE Coating.

The reverse side of the panel is coated with single coat of primer to prevent oxidization of the aluminium surface. ALMAXCO™-FR is available in various paint finishes & Color options.

The coated surface is protected with a self-adhesive peel-off protective film. Under average outdoor conditions, it is recommended that the protection film be removed within 45 days upon installation.

DIMENSION & SIZES

ALMAXCO-FR is most commonly produced in 4mm overall thickness, but can also be produced and supplied in 5mm and 6mm thickness.

Standard Panel Widths	1220 mm (48"), 1250 mm (49.2"), 1500mm (59.05")
Special Widths	1525 mm (60"), 1575 mm (62"), 2000 mm (78.75")
Lengths	As required, (Recommended less than 5700mm for ease of handling and transportation)

ALUMINIUM ALLOY

Standard Alloy	1100, 3003, 3105
Non-Standard Alloy:	5005 & 5052

Almaxco Panel Sheets can be supplied in various widths as required by our customers, however there is a minimum quantity order for per color/per width. Special widths and non-standard alloys are subject to terms and conditions. *(Please inquire with our Sales Representatives on Terms & Conditions)*

Minimum Order Quantities (MOQ): 800m2/ per color/ per width

For most standard product range, there is an MOQ of 800m2/ per color/ per width, however, for certain special product ranges like A2 FR panels, or orders that require a non-standard alloy or special widths, MOQ may be higher. *(Please inquire with our Sales Representatives on MOQ's and other Terms & Conditions for a special product range you would like to order)*

PRODUCT TOLERANCE

Width	±2.0 mm	Squareness	Maximum 5.0 mm
Length	±3.0 mm	Surface defects	Clean surface without swell, scratches & aberration in accordance with general visual inspection rules.
Thickness	±0.2 mm		
Bow	Maximum 0.5% of the length and/or width		

ALMAXCO® FR CORE PANELS, MECHANICAL & TECHNICAL PROPERTIES

NO	Test item	Test method	Test result
1	Flexural Strength & Flexural modulus	ASTM D790-10	Flexural Strength 113 MPa Flexural modulus: 15989 MPa
2	Shear strength	ASTM D732-10	29.0MPa
3	Tensile Strength & Elongation at Break	ASTM E8/E8M-13a	Tensile strength: 44.9 MPa Elongation at break: 5.78%
4	Flexural Shear Strength – 3-point Mid-span loading	ASTM C393/C393M-11	Flexural shear strength (Longitudinal): 1.26MPa Flexural shear strength (Transverse): 1.38MPa
5	Core Shear Stress and Core Shear Modulus	ASTM C273/C273M-11	Core Shear Stress: 5.88 MPa Core Shear Modulus: 4023MPa
6	Flatwise Compressive Strength and Compressive modulus	ASTM C365/C365M-11a	Stress at 10% Deflection: 2.0Pa Compressive modulus: 19.7MPa

NO	Test item	Test method	Test result
7	Impact test	ASTM D2794-93 (2010)	Impact failure end point: 2.95kg m
8	Peel torque	ASTM D1781-98 (2012)	Peel torque (Longitudinal): 9.67mm.kgf/mm Peel torque (Transverse): 11.7mm.kgf/mm
9	Deflection Temperature Under Load	ASTM D648-07	Deflection Temperature Under Load: 96.6 °C
10	Mean Coefficient of linear Thermal Expansion	ASTM E831-2014	Mean Coefficient of Linear Thermal Expansion: 351.7 µm/(m.°C)
11	Pencil Hardness	ASTM D3363-05(2011)	Scratch hardness: H
12	Thermal Conductivity & Thermal Resistance	ASTM C518-10	Thermal conductivity: 0.101 W(m.K) Thermal resistance: 0.038 (m°.K/W)
13	Coefficient of Linear Thermal Expansion	ASTM D696-08	-30°C~30°C : 53.04x10 1/°C

Summary of fire tests that ALMAXCO™-FR has passed:

BS476 Part 6 & Part 7	4/5/6 mm	Class 0 Class
ASTM E84 Flame Propagation	4/5/6 mm	Passed
NFPA 285 Full Wall Assembly	4mm	Passed
ASTM E119-07 (2 hour Fire Rated)	4/5/6 mm	Passed
EN 13501-1: 2007	4/5/6 mm	Passed
AS/NZS 1530.3	4/5/6 mm	Passed
AS/NZS 3837: 1998	4/5/6 mm	Passed
* All Test Reports are available upon request		

PAINT & COATING

Almaxco-FR Aluminium Composite Panel Sheets are coated with best quality paints procured from world-renowned paint suppliers such as PPG®, Nippon, Azko Nobel®, and Valspar®. Our fully automated and continuous coil coating line along with our in-house color stylists and technicians ensure that the quality of our coated coils is always maintained to the highest standards and conform to AAMA 2605-07 "Superior Performance Standard".

(1) Coating Systems & Tolerances

- Almaxco **PVDF** coated panel sheets are coated with a 2 or 3 coat PVDF system. The 2 coat system has a 26µm (+/-2µm) coating whilst the Almaxco **PVDF 3 coat** system has a 30µm (+/-2µm) coating thickness for maximum durability, weatherability and corrosion resistance for the use in external applications.
- Almaxco **FEVE** coated Panel Sheets are coated with a 3-coat system and have a 30µm (+/-2µm) coating thickness for maximum durability, weatherability and corrosion resistance for the use in external applications.

- Almaxco **Nano PVDF** coated Panel Sheets are coated with a 3-coat system and have a 30um (+/- 2um) coating thickness for maximum durability, weatherability and corrosion resistance for the use in external applications. The Nano coat increases the durability and weatherability of panel sheets to reduce the fading and gloss loss of the paint coating.

(2) Paint Options

Almaxco PVDF

Polyvinylidene fluoride (PVDF) coating is a highly durable, UV resistant paint technology made from Kynar 500/Hylar 5000 PVDF resins. This resin based paint coating not only enhances the durability, design versatility and aesthetic possibilities of a project but also protects the metal surface from corrosion. Its extraordinary capability to retain color and gloss keeps the painted aluminum surface looking vibrant and appealing for years and resists chalking, pitting, chipping and premature aging.

Architects around the world prefer to use Kynar 500/ Hylar 5000 PVDF resin-based coatings as it provides the necessary protection and prevents corrosion to the aluminum surface. No other coating system withstands the rigors of nature and time like those based on Kynar 500 / Hylar 5000 PVDF resins.

PVDF coating are recommended for applications where there will be direct exposure of sunlight on the surface of the Panels in exterior applications.

Gloss Range: 20% - 40% (Standard is 30% Gloss)

Almaxco FEVE

Fluoroethylene vinyl ether (FEVE) resins were developed in Japan in the early 1980's. It is a second-generation fluoropolymer coating with a similar resin based paint technology as Kynar 500/Hylar 5000 and it offers similar levels of durability, weatherability, adhesive force, flexibility, and color and gloss retention as PVDF coatings. The main difference between these two exterior coating technologies is that PVDF resin based coating has a limitation on the maximum gloss it can achieve of 20%-40%, FEVE coatings on the other hand, can achieve a wider gloss range of 20%-70%. The primary applications for panels sheets coated with FEVE resins are for architectural and outdoor signages, where high gloss and durability are important. FEVE coatings also offer excellent chalking and corrosion resistance.

Gloss Range: 20% - 70%

Almaxco NANO

Almaxco's NANO Coated Aluminium Composite Panels sheets are produced using a new and exciting NANO PAINT technology. A Clear water soluble Nano Coat is applied over our 2 or 3 Coat PVDF or FEVE coating to enhance the performance of the coated panels weatherability and durability resulting in longer color and gloss retention. The Nano coat changes the molecular structure of the paint by sealing off any air gaps between connecting molecules making the surface both lipophobic and hydrophobic (Oil & Water Resistant). This prevents dirt, water, permanent spray paint (Graffiti), carbon monoxide, grease, oil or any foreign particles to penetrate through the paint surface. In addition, the NANO Coating is a non-toxic, VOC EMISSION FREE coating system, which makes the surface self-cleaning and repellent to air-borne pollutants.

Gloss Range: 30% - 50%

(3) Custom Colours

Almaxco offers its customers with the ability to match any color a customer, architect or client desires. We can match any RAL, Pantone or other custom colors to make your projects stand out from the rest of the pack in most of the paint types we supply.

All we require of our customers is to send us a color sample coated on any metal surface and we can get our paint suppliers to match that particular color to 99% accuracy. We would require a physical coated sample to custom match a color or to receive a RAL or Pantone code.

The turn around time for custom color matching is usually 5 to 7 days from the time we receive the sample, plus the courier transit time to send the sample back to the customer.

Color matches are made on aluminium skin only (not the aluminium composite panel sheet) and are meant for color approval only. Once the color is approved by the customer and the order is placed with us, we can then produce the actual order with approved custom color.

Paint Coating Standard

Test item	Criteria
Gloss: (ASTM D532-89)	20% - 45%
Weather-o-metre test	
Colour retention: (ASTM D2244-87(85))	E<5
Gloss retention: (ASTM D2244-93)	84.20%
Chalk resistance: (ASTM D4214-89)	No chalking. Max value: 8 unit
Pencil hardness: (ASTM D3363-00)	2H

Test item	Criteria
Adhesion (ASTM D3359-87) Dry / Wet / Boiling water:	No change
Abrasive resistance: (ASTM D968-81)	50-80 KTR No Crack
Impact resistance: (NCCA 11-5)	No picking off after reverse impact test with cross-cutting
Salt spray resistance:	4000hr No blister
Humidity resistance: (ASTM D714-87)	4000hr No blister

Cleaning

Fluorocarbon coatings are smooth thus do not retain much dirt, therefore the dirt and soil depends largely on the surrounding atmospheric conditions where the building exists. In order to remove light soil, it is recommended to do a small area first to determine the degree of cleaning actually necessary to accomplish the task.

A forceful water rinse from the top to down is recommended as an initial step of tests. The low water volume with moderate pressure is much better than the considerable water volume with little pressure. A mild detergent or 5-10% IPA solution is used for removing soil, it should be used with soft sponges an/or soft rags. The washing should be done with uniform pressure, and normally the operation is done with a horizontal motion first and then with a vertical motion. After washing, the surface should be thoroughly rinsed with clean water, and the rinsed surface left to dry or wiped with squeegee or lint-free cloth.

A mild solvent such as IPA or ethanol may be used to remove stubborn stains as those caused by sealant and caulking compounds. When alcohol is used, it is safe to dilute less than 50% with water. If undiluted solution is required, pre-tests should be done at the small invisible area, to confirm no damage to the finish. Cleaner containing abrasives cannot be used

Do not use strong organic solvents, such as MEK (Methyl Ethyl Ketone), MIBK (Methyl Iso butyl Ketone), Triclene and paint thinner. Do not use strong alkali, strong acid and/or abrasive cleaners. If these solvents and cleaners be used, the paint may be removed.

Make sure that cleaning sponges or rags are grit-free, to prevent the coated surface from scratch. Avoid over cleaning or excessive rubbing.

Warranty

The manufacturer shall warrant the Aluminium Composite Panel (ACP) finishes under normal atmospheric conditions for a period of between 3 to 20 years depending of the location of the project and type of paint selected. The warranty will be subject to terms and condition set out in the Manufacturers standard warranty. Request a copy of the full warranty from our Sales Team.

9. Manufacturer's Details

ALMAXCO-FR is proudly manufactured by :

Maxgrow Pte Ltd

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Singapore 179094.
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