



Fire  
Resistant

Aluminium Composite Panels

**ALSTRONG™**  
*always looks new*





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*always looks new*



Alstronng is a part of the prestigious Worlds Window Group, an assemblage of progressive companies engaged in diverse businesses. The portfolio of business activities includes manufacturing, infrastructure, logistics, trading and mining. The operations of various companies of WWG are spread across the globe through its offices in India and 22 other countries. The group employs 2500 employees across the world and has a turnover of US \$ 1 Billion.

**Leading the way.** Alstronng products are helping create the vibrant new face of the Indian millennium. Leading the way since 2001, we have partnered with leading architects, builders, designers, contractors and fabricators in changing the landscape of the country for the better.

Alstronng is driven by its vision of creating a rich visual palette through its range of architectural decor material - Aluminium Composite Panels, Metal Laminates and Partition Panels.

We believe that our brief is to create products that help unlock distinctive, long-lasting and edgy creativity. Reason why, our products are designed for years of durable, maintenance-free, performance across a variety of demanding environments and help create a visual aesthetic that 'always looks new'. A promise vividly fulfilled across signature landmarks that proudly stand the test of time, and come out with flying colors.

**We have gone great lengths to be close by,** anywhere across the country. Our 20 Company Offices, 17 Warehouses, more than 300-strong, pan-India network of Sales Persons and more than 500 Distributors & Dealers ensure that we are just a call away, wherever be your project location.

Delivery on time is our unswerving motto. Alstronng Products reach you amazingly fast, backed by the efficiencies of our Group-owned logistics company, which has more than 500 company-owned trucks crisscrossing the length & breadth of the country.



**Alstrong is the leader in the ACP Industry.** The ever-growing confidence of our clients is reflected in the increased production and off take of our products. Today, ACP production is 50 million sq. ft. per year through our 5 ACP lines up from 1,00,000 sq. ft. in 2001.

**Sound Fundamentals. Outstanding Quality** Anticipating the curve of demand and staying one step ahead of expectations is what drives us on a daily basis at Alstrong.

We use **leading-edge Korean and Japanese technology** to create products that are at par with the best in the world. Our specially designed, state-of-the-art FR grade ACPs are built to resist fire. Another example of our commitment to innovative products that address specific requirements.

Our strong emphasis on R & D and intrinsic quality control at every step ensure innovative products that are engineered to uphold our motto of 'always looks new'.

Underscoring this perpetually strong saga of product quality, choice and performance are our state-of-the-art manufacturing plants and a laboratory equipped with modern analytical machines like DSC, AAS, FTIR that keep an eagle eye on uncompromising quality standards. Best practices are a norm at our ISO 9001: 2008 & Indian Green Building Council certified plant. Seamless production efficiency and delivery timelines are ensured through our integrated SAP system.

**Coil Coating Integration. To Respond Faster** Having our own coil coating unit helps us control every aspect of the production process; and respond to the needs of architects, builders & designers...fast.

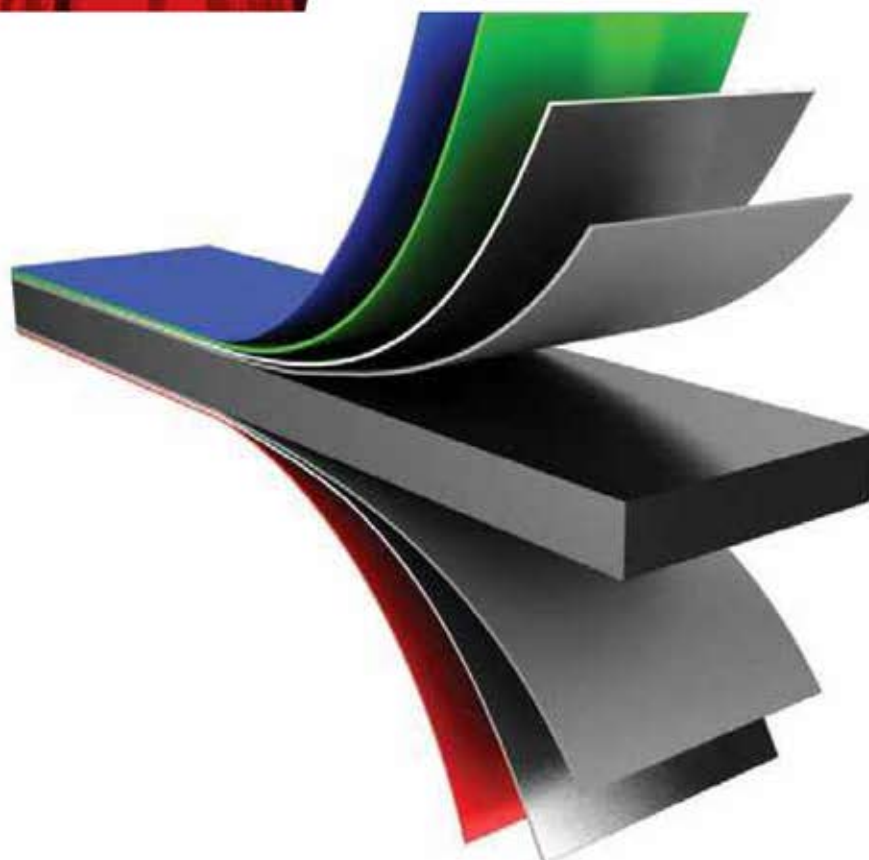
Alstrong can turnaround with **custom created panel** within 10 days of brief. Radically shortening a process that takes others anywhere from 3-4 months. Once approved, we can start production immediately for the quantity that's required for the project. The design remains available for any future projects, in the specification and quantity that may be needed.

# Fire Resistant **ALSTRONG FR**

The safest place from fire is the place which has already burnt completely

A place which is burnt is left with inorganic minerals, which do not catch fire or burn. Alstrong integrates this fact within ACP manufacturing to create a Fire Resistant Mineral core- the Alstrong FR.

The fire resistant Aluminium Composite Panel consists of a specially formulated mineral core which contains 70% minerals- Aluminium trihydroxide (ATH), and Magnesium dihydroxide (MDH) and 30% polymer sandwiched between 2 aluminium sheets. The structure of the panel is as follows:



- Protective Layer
- PVDF
- Aluminium coil
- Adhesive
- Mineral Core
- Adhesive
- Aluminium coil
- Service Coat



## Fire can be extinguished by removing any one element of the fire triangle



Three elements are required in proper combination before ignition and combustion can take place :

1. Fuel to burn
2. Air to supply oxygen
3. Heat (ignition temperature) to start and continue the combustion process

During a fire, precious lives are lost by breathing in poisonous smoke rather than heat from fire.



## Fire Resistance Mechanism Of The Mineral Core

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Alstrong FR resists fire damage by reducing all 3 elements of a fire triangle and suppressing Smoke.

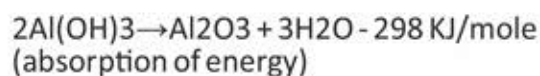
### Fuel Control

Alstrong FR has Non combustible fire-safe mineral core. Mineral core is equivalent to inorganic minerals which do not burn. Aluminium metal does not burn either. PVDF with paint can just char under fire. Thus the Alstrong FR panel stops fire by limiting fuel supply to the fire.

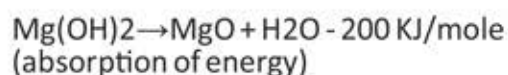
### Heat Control

The mineral core after being heated upto a high temperature releases water and absorbs a lot of energy in this process. This brings down the temperature of the product and water douses the fire. Till the temperature is maintained below the ignition temperature, fire will not start again.

Aluminium Tri-Hydroxide (ATH) decomposes at about 180-200°C, absorbing a considerable amount of heat in the process and giving off water vapour.



Magnesium Di-Hydroxide (MDH) decomposes at 300-330°C to give water and Magnesiumoxide and absorbs 200 KJ/mole energy in the process as under.



### Oxygen Control

Released water from the core at 100 degree centigrade converts into water vapours which mixes with air. This mixing dilutes oxygen concentration in the surrounding air at the place of fire, which again helps in resisting fire.

### Smoke Control

The core after being heated turns into refractory gelatinous material, which forms a protective layer over polymer and does not allow smoke gases to come out and oxygen to go in the core and spread fire any further.

In short the fire resistance in Alstrong FR is a function of not just lessened ignition and fire spread, but also:

1. Fire resisting
2. Fire intumescence (An intumescent is a substance which swells as a result of heat exposure)
3. Fire retarding properties

# Alstrong FR can resist fire upto 2 hours (ASTM E-119)

Testing of Alstrong FR material as per DIN 4102 (accepted worldwide as the best fire resistance standard) confirms to B1 FR grade. Not just that, on BIS (UK Standards) Alstrong FR can be passed as Class-O material, the highest grading for fire safety in construction materials. Besides these Alstrong FR also passes requisite standards set by ASTM(USA), standards and it is acceptable worldwide as a quality fire resistant ACP material.

## Alstrong FR fulfills following criterias of DIN 4102 B1 standard

### **Brandschacht Test**

When Alstrong FR 1 meter long samples are burnt vertically over a ring burner for 10 minutes residual length is 370-480 mm and none of the sample goes to 0mm residual length. The smoke temperature is 123-160°C.

### **Flooring Radiant Panel Test**

When Alstrong FR samples (230mm x 1060mm x thickness) are placed horizontally and are flamed (blue cone length 13mm placed 5mm above sample) and irradiated (maximum temperature 815°C for 10 minutes). No irradiation occurs and smoke density is 10-16%.

### **Edge Flaming**

Sample 90mm x 190mm x thickness, reference mark at 150mm from lower edge- the 20mm flame is applied to the edges for 15 seconds, the tip of the flame does not reach the reference mark in 20 seconds.

### **Surface Flaming**

Samples 90mm x 230mm x thickness with reference marks 40mm and 190mm from lower edge- the flame 20mm is applied to the surface for 15 seconds, the filter paper below the sample does not burn within 20 seconds after flaming showing that the material does not burn with flaming droplets.

# Features

- » Fire Resistant
- » Sound Absorbent
- » Environment Friendly
- » Machinable
- » Durable and Beautiful
- » Dust Resistant
- » Corrosion Resistant
- » Immense Variety
- » Fast Application
- » Ultramodern

# Specifications

## PANEL DIMENSIONS

Standard Sizes	1220 mm x 3660 mm
	1220 mm x 3050 mm
	1220 mm x 2440 mm

Grade	Panel Thickness	Skin
I	4 mm	0.50mm
II	4 mm	0.25mm
III	3 mm	0.25mm

COATING PVDF

## PANEL OPTIONS

LENGTH Upon Request

WIDTH Up to 1550 mm  
(On order)

PANEL THICKNESS 3mm to 6mm

SKIN THICKNESS 0.25mm to 0.50mm

Custom colors & grades can be produced on demand.

## PRODUCT TOLERANCE

WIDTH  $\pm 02\text{mm}$       LENGTH  $\pm 02\text{mm}$       THICKNESS  $\pm 0.2\text{mm}$



## **Alstrong FR is not only strong but also beautiful**

Alstrong FR is not only an easily machinable and flexible material but it also gives an ultra modern look to the buildings. Available in a wide range of colours, textures and patterns, Alstrong FR adds a touch of beauty to every surface it is pasted on. Alstrong FR sheets can be customized to design and budgetary requirements. What's more, new shade development and old shade matching facility is also available.

## **Befriending a Greener Planet**

Alstrong FR is composed of 100% recyclable materials- the minerals, aluminium and polymer. This helps in conserving valuable resources of the nature and makes Alstrong FR an absolutely environment friendly product. The testimony to the nature friendly Alstrong FR lies in its acceptability for all Green Building projects. Projects in their assessment for their recognition as Green Building can straightaway get 2 points under credit 4.1 and 4.2.



# Technical specifications for 4mm thick Alstrong FR

Attribute	Country	Applicable Standards	Measurable Property	Standard Value	Alstrong ACP Value	Grade
Fire Resistance	Germany	DIN 4102, Part 1, Brandschacht Test	Average rest length of burning		370 to 480mm Smoke temperature 123 to 160 degree C	Class B1
		DIN 4102, Part 1, Floor Radiant Panel Test	Smoke Temperature	No irradiation occurs	No irradiation occurs	Class B1
		DIN 4102, Part 1	Smoke Density Grade	< 300% min	Smoke Density is 10 to 16%	Class B1
		Surface flaming and edge flaming for 20 Sec.	The filter paper below the sample does not burn	The tip of the flame does not reach the reference mark and the filter paper below the sample does not burn	The tip of the flame does not reach the reference mark and the filter paper below the sample does not burn	Class B1
	USA	ASTM E84-05 Steiner Tunnel Test	Flame Spread Index	10	2	Class A
			Smoke developed index	15	3	Class A
		NFPA 259-93 British Thermal Unit				Passed
		UBC 26-9 & NFPA 285, ISMA Test				Passed
		Combustion toxicity test				Passed
		ASTM E 108, Fire test for roof covering				Class A
		UBC 26-3, Interior room corner test				Passed
		ASTM119, 1hr rating and 2hr rating				Passed
	Canada	CAN/ULC-S134-92				Passed
	China	GB8625, GB8626, GB8627				Class B1
	Japan	Heat Release Test for Non Combustible material, ISO5660-1& Toxicity Gas Test				Passed
UK	BS 476 Part V	Ignitability		P (Not easily ignitable)	Class 0	
	BS 476 Part VI	Fire Propagation Index	20	3.45	Class 0	
	BS 476 Part VII	surface spread of flame		NIL (Class 1)	Class 0	
Mechanical Properties (0.5 mm coil)		ASTM E646-07	Young's Modulus		62.70 Gpa (std deviation 2.27)	
		ASTM E646-07	Ultimate Tensile Strength		185.34 Mpa (std deviation 1.65)	
		ASTM E646-07	% Elongation		7.10 (std deviation 0.64)	
		ASTM E646-07	0.2% Proof Stress		160.33 Mpa (Std. deviation 1.70)	
		ASTM E 94	Alloy		3xxx or 5xxx series	
Thermal Properties			Linear Thermal Expansion		2.4mm/m/100deg C	
Acoustic Properties (0.5mm coil)			Sound Absorption Factor		0.04	
			Airborne Sound Insulation Index		26	
Sizes			Thickness		4±0.2mm	
			Width		1220±2mm	
			Length		Customised	
Weight					7.54 kg/m <sup>2</sup>	
Surface Type			Mirror/Metallic/Other Finish		xxxx	
Visible side			Baked Enamel in coil coating process		PVDF Coat	
			as per ECCA guidelines			
Back coat			Baked Enamel in coil coating process		Protective coat	
Surface characteristics		ECCA T3	Colour Difference	Delta E 2.0	Delta E = 1.0	
		ECCA T2	Gloss	Difference ≤ 10	Difference = 5	
		ECCA T1	Coating Thickness 2 layers	Min 23 micrometer	≥ 25 Micrometer	
		ECCA T1	Coating Thickness 3 layers	Min 30 micrometer	≥ 34 Micrometer	
		ECCA T4	Pencil Hardness	≥HB	HB	
		ASTM D4145	T - Bend	≤ 2T	Passes	
		ASTM D3359	Adhesion	Grade 0	Grade 0	
		ASTM D 2794	Impact	≥ 50 Kg Cm	≥ 50 Kg Cm	
		ASTM D1308	Acidity Resistance	5%HCL, 24Hr No change	Passes	
		ASTM D1308	Alkali Resistance	5% NaOH 24 Hr, delta E < 2.0	Passes	
		ASTM D1308	Oil Resistance	24 Hrs, No change	Passes	
		ASTM B117	Salt Fog Resistance	> 4000Hrs	Passes	
		ASTM D968	Abrasion Resistance	≥ 5L/Micrometer	Passes	
		GB/T9780	Dirt Resistance	≤ 5%	Passes	
		GB/T16259	Colour Retaining	4000 Hrs, delta E ≤ 4.0	Passes	
		GB/T16259	Gloss Losing Level	4000 Hrs ≤ Grade 2	Passes	
		GB/T16259	Chalking	4000 Hrs no change	Passes	

# Alstrong's Worldwide Presence

-  HEAD OFFICE
-  BRANCH OFFICES
-  OVERSEAS OFFICES
-  FACTORY
-  WAREHOUSES
-  DEALERS



Middle East & North Africa



# FAQs

## **What is the difference between Fire Resistant ACP (Alstrong FR) and normal ACP?**

**Ans.** Fire Resistant ACP (Alstrong FR) and normal ACP, both are ACP but with a different core material. The core of normal ACP is a plastic core, while Fire Resistant ACP core is made of specially formulated fire resistant mineral core.

## **What is fire resistant mineral core?**

**Ans.** The core is composed of special chemicals like Aluminium Hydroxide and Magnesium Hydroxide. These chemicals do not ignite or burn, thus they resist fire. These chemicals do not aid in propagating, enhancing or spreading of fire and thus become a block for fire to reach any combustible material to propagate fire, resulting in retarding of fire. In case of a fire, they simply heat up and beyond a specific temperature release water. The released water helps in extinguishing fire by cooling of the fire environment, and water vapour generated from this water dilute the concentration of oxygen in the air. Both temperature and oxygen in air are 2 essential components of the fire triangle to sustain a fire. All 3 phenomena- Non combustibility of Aluminium Hydroxide and Magnesium Hydroxide, lowering of temperature, and dilution of oxygen concentration in the air help resist, retard and to a limited extent even extinguish fire.

## **Is the weight of Alstrong FR similar to ACP?**

**Ans.** No, minerals have a higher density as compared to organic polymers. Alstrong FR, having a mineral core naturally weighs higher as compared to ACP.

## **How different are the fabrication and installation procedures for Alstrong FR from ACP?**

**Ans.** Fabrication and installation procedures are similar for ACP and Alstrong FR.

## **What are the sizes available in Alstrong FR?**

**Ans.** Alstrong FR normally can be obtained in following lengths e.g. 2440mm, 3050mm and 3660mm and the panel width provided is 1220mm. If required, customers may request customized sizes too.

## **How many colours are available in Alstrong FR?**

**Ans.** The colour variety available in Alstrong FR is immense. Recently Alstrong has installed a state-of-the-art coil coating facility at Samba. With this facility it becomes possible to develop new colours and shades as per design aspirations of the customers.

## **What is PVDF?**

**Ans.** It is a transparent polymer matrix and it acts as a medium for colour pigment of the paint. It protects colour pigment from disintegrating by providing a shield against harmful UV rays of the Sun. Thus it helps in keeping lasting colours for a very long duration.



**What is the thickness of PVDF Coating in Alstrong FR?**

**Ans.** For a 2 coat system the thickness of PVDF is 23 to 27 Micron.

**What is the coating on the back skin of Alstrong FR?**

**Ans.** The bottom of the aluminium coil is provided with a 7-8 micron thick polyester coating.

**What is alloy series 1100 or 3003 or 3005 or 5005? And what is meant by H16 or H28?**

**Ans.** Alloys of a metal (aluminium alloy) are made by mixing specific elements for imparting differing mechanical properties. For e.g. a 4-storey building will have completely different requirement of mechanical strength of ACP as compared to a 60 storey high-rise building. The stress and strains experienced by the ACP fixed on the walls of 60th floor, the air pressures, the pressures experienced during a dust storm are going to be very different.

Depending on the kind of stress and strains that the ACP may undergo, one may choose from a range of alloys. The mechanical properties (Tensile strength, 0.2% proof stress, yield strength) of a similar thickness sheet will progress in the following manner-1100 < 3003 < 3005 < 5005, so on and so forth.

These alloys are hardened to change the mechanical properties and these changes are specified with the help of H16 or H28 or another H value.

**Which Alloy is used for Alstrong FR?**

**Ans.** Depending on the project requirements, the customers may choose from alloy 3003, 3105 or 5005. Generally the preferred alloys belong to 3000 series.

**What is the difference between DIN4102 - B1 and B2 grade?**

**Ans.** DIN 4102 B1 grade material is difficult to ignite, has a low flammability, often self-extinguishing (e.g. high-end silicones and intumescent), and it can resist fire upto 2 hours.


On the other hand DIN 4102 B2 grade material has normal combustibility e.g. timber which has moderate flammability.

**For how many hours can Alstrong FR resist/retard fire?**

**Ans.** Upto 2 hours, as per ASTM E-119 system test.

**What is the composition of the mineral core?**

**Ans.** The mineral core is made of 70% inorganic minerals e.g. Calcium hydroxide & Magnesium Hydroxide, and 30% polymer.



**What is the melting point of Core and Aluminium?**

**Ans.** Aluminium alloy melts at 660.32°C, and the mineral core inside melts completely only after the temperature rises above 2500°C.

**Is LDPE used in Fire Resistant ACP core?**

**Ans.** About 30% LDPE is used in Fire Resistant ACP mineral core.

**Is Alstrong FR recyclable? Does it help in promoting Green Building strategies for sustainable environment?**

**Ans.** Calcium and Magnesium compounds, the polymer, aluminium— all the component of FR-ACP can be recovered from used Alstrong FR. Thus Alstrong FR is fully recyclable and helps in fulfilling on Green building norms for a healthier and greener planet.

**What is the Manufacturing capacity of Alstrong for ALSTRONG FR?**

**Ans.** Alstrong has a production capacity of 18 million sq.ft. Fire Resistant ACP annually.

**What will be the Peel off strength, and colour fading in Alstrong FR?**

**Ans.** The Peel off strength for Alstrong FR will be 10±3 Newton/mm. The colours under normal environmental conditions may last upto 15 years.

**What is the life of Alstrong FR?**

**Ans.** Alstrong FR under normal environmental conditions and usage may last upto 20 years.

**What will be the delivery time of Alstrong FR?**

**Ans.** The delivery time for Alstrong FR will be similar to the normal ACP manufactured at Alstrong.



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