

Summary of Technical Data Sheet – ALPOLIC™/fr (Made in Germany)

1. General

ALPOLIC™/fr is an aluminum composite material (ACM) with a non-combustible mineral-filled core, used as exterior and interior claddings and roof covering in new buildings and retrofit applications. The material is manufactured by Mitsubishi Plastics, Inc., Mitsubishi Polyester Film GmbH with the address, Kasteler Strasse 45/E512, 65203 Wiesbaden Germany, and furnished by approved dealers or distributors.

Note: This summary of technical data is about ALPOLIC™/fr. If you need that of ALPOLIC™ composed of polyethylene core and mainly used for signage, contact local distributors or our office.

Technical data may be changed in part without affecting the material quality.

2. Product composition

ALPOLIC/fr is composed of a non-combustible mineral-filled core sandwiched between two skins of 0.5mm thick aluminum alloy (3105-H14 and/or 3005-H14):

Composition	Skin material:	0.5mm thick aluminum alloy (3105-H14 and/or 3005-H14)
	Core material:	Non-combustible mineral filled either core gray or white

ALPOLIC/fr consists of approx. 70% of non-combustible ingredients within the core material. The white is the original fire-retardant core, and the gray is a modified core which contains a trace of carbon black additives that improves its durability but does not impair the original mechanical properties and fire performances.

The surface is finished with a high-performance Lumiflon-based fluorocarbon coating as standard, and the back side is a wash coating or a service coating. ALPOLIC/fr is available in finishes of: Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors and Patterns. In these finishes, Lumiflon-based fluorocarbon paints are applied in manufacturer's continuous coil coating lines.

The back side of ALPOLIC/fr, which will face the structural wall or steel when it is installed as a cladding panel, has a polyester-based wash coating or a service coating to protect it from possible corrosion problems.

The surface is protected with a self-adhesive peel-off protective film consisting of two polyethylene layers of white and black. According to weathering tests under normal outdoor conditions, the protective film will withstand six months' exposure without losing its original peel-off characteristic or causing stains or other damages.

3. Product dimension and tolerance

(1) **Panel thickness:** 3 mm, 4 mm and 6 mm

(2) **Panel size:** Width = 1270 and 1575 mm Length = less than 7200 mm

Note: Custom width can be accepted between 750 mm and 2050 mm subject to minimum quantity. Please contact local distributors or our office.

(3) Product tolerance

Width: ± 2.0 mm

Length: ± 4.0 mm

Thickness: ± 0.2 mm in 3 and 4 mm thick, ± 0.3 mm in 6 mm thick

Bow: Maximum 0.5% (5mm/m) of the length or width

Square-ness (diagonal difference): Maximum 5.0 mm

Surface defect: The surface shall not have any irregularities such as roughness, buckling and other imperfections in accordance with our visual inspection rules. ALPOLIC/fr is supplied with a cut edge and without aluminum sheet displacement or core protrusion.

4. Principal properties

Both ALPOLIC/fr with white core and gray core have the following properties in common.

(1) Panel weight:

	Unit	3mm	4mm	6mm
Panel weight	kg/m ²	6.0	7.6	10.9

(2) Thermal expansion: $24 \times 10^{-6} / ^\circ\text{C}$

(3) Mechanical properties of ALPOLIC/fr:

	Unit	3mm	4mm	6mm
Tensile strength (ASTM E8)	MPa or N/mm ²	61	49	29
0.2% proof stress (ASTM E8)	MPa or N/mm ²	53	44	26
Elongation (ASTM E8)	%	4	5	2
Flexural elasticity, E (ASTM C393)	GPa or kN/mm ²	49.0	39.8	29.1

(4) Mechanical properties of aluminum alloy:

0.2% proof stress (ASTM E8): 150 MPa or N/mm²

Flexural elasticity (ASTM E8): 70 GPa or kN/mm²

(5) Deflection temperature: 115°C in 3mm, 116°C in 4mm and 109°C in 6mm

(6) Sound transmission loss (ASTM E413):

Thickness	4mm	6mm
STC (Standard Transmission Class)	27	29

5. Summary of fire tests

Extensive fire tests have been performed in accordance with standards in various countries. ALPOLIC/fr has passed or classified the following fire tests around the world:

Table 5-1 Fire test for a building material

Country	Test standard	ALPOLIC/fr specimen	Results & classification
EU	EN 13823, EN ISO 11925-2, EN 13501-1	4mm, 6mm	Class B-s1-d0
United Kingdom	BS476 Part 7	4mm, 6mm	Class 1
	BS476 Part 6	4mm, 6mm	Class 0
Germany	DIN4102 Part 1	4mm, 6mm	Class B1
USA	NFPA 259-93 British Thermal Unit	4mm	Passed
	ASTM D1781-76 Climbing Drum Peel Test	4mm, 6mm	Passed
	ASTM E84, Steiner Tunnel Test	4mm, 6mm	Class A / Class 1
	ASTM E108, Modified	4mm	Passed
	UBC 26-9 & NFPA 285, ISMA Test (Intermediate Scale Multi-story Apparatus)	4mm, 6mm	Passed
Canada	CAN/ULC-S 134-92, Full-scale Exterior Wall Fire Test	4mm	Passed
China	GB8625, GB8626 & GB8627	4mm	Class B1
Japan	Heat Release Test for Non-combustible Material (ISO 5660-1) & Toxicity Gas Test	3, 4, 6mm	Passed. Certificate No. NM-1933

Table 5-2 Fire tests for other categories

Category	Country	Test Standard	ALPOLIC/fr specimen	Results & classification
Fire resistant rating wall	USA	ASTM E119, 1-hr Fire Rating and 2-hr Fire Rating	4mm & 6mm	Passed
Roof material	USA	ASTM E108, Fire Test for Roof Covering	4mm	Passed Class A
Interior material	USA	UBC 26-3, Interior Room Corner Test	4mm	Passed
		Combustion Toxicity Test, New York State Uniform Fire Prevention and Building Code	4mm	Passed

Table 5-3 Flammability characteristics of core materials

Test standard	Specimen	Results
ASTM D7309-07a, Microscale Combustion Calorimetry	2 types of core Gray and white	Performed similarly and heat release of the both cores are within the repeatability of the standard

The gray core does not impair the original fire performances based on ALPOLIC/fr with white core.

6. Paint finish

(1) Coating system

The surface is finished with Lumiflon-based fluorocarbon coating as standard; the back side is a wash coating or a service coating. ALPOLIC/fr is available in finishes of: Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors and Patterns (Stone, Timber, Metal, and Abstract). In these finishes, Lumiflon-based fluorocarbon paints are applied in the manufacturer's coil coating lines.

The coating system of each finish is:

A. "Solid Colors" are three-coat three-bake system

The thickness is 30 microns (1.18 mils) minimum and consists of a conversion coating, an inhibitive primer, a Lumiflon-based fluorocarbon coating and a clear coating.

B. "Metallic Colors", "Sparkling Colors" and "Prismatic Colors" are a three-coat three-bake system.

The thickness is 28 microns (1.1 mils) minimum and consists of a conversion coating, an inhibitive primer, a Lumiflon-based metallic coating and a clear coating.

C. "Patterns" is coated with a unique image transfer process.

The thickness is 45 microns (1.77 mils) minimum and consists of a conversion coating, an inhibitive primer and a Lumiflon-based fluorocarbon coating including the image transfer layer.

Note 1: Lumiflon-based fluorocarbon coating has basically a coating warranty for 10 years. However, 20 year-coating warranty is available subject to several conditions. Please contact local distributors or our office.

Note 2: ALPOLIC/fr is finished with Lumiflon-based fluorocarbon paint as standard, but polyester and other coatings are also available as an option.

(2) Color and gloss

Standard colors are provided in the Color Chart. Custom colors are available for all finishes upon request subject to respective minimum quantities. The standard gloss is 30% for Solid and Metallic Colors, and 15-80% for Sparkling Colors, Prismatic Colors and Patterns (Stone, Timber, Metal, and Abstract). Custom gloss is available between 15 and 80% in all colors upon request subject to minimum quantities. Please contact local distributors or our office for custom color requests.

(3) Coating performance

The Lumiflon-based fluorocarbon coating meets the following criteria:

Table 6-1 General properties

Dry film property	Test method	Criteria
Gloss (60°)	ASTM D523-89	15 to 80%
Formability (T-bend)	NCCA II-19 ASTM D1737-62	2T, no cracking
Reverse impact-crosshatch	NCCA II-5	No pick off
Hardness-pencil	ASTM D3363-92a	H
Adhesion		
Dry	ASTM D3359, method 8	No pick off
Wet	37.8°C, 24 hrs.	No pick off
Boiling water	100°C, 20 min.	No pick off
Abrasive resistance	ASTM D968-93 (Falling sand)	40 liters/mil
Chemical resistance:		
Muriatic acid, 10%HCl, 72hrs	ASTM D1308-87	No change
Sulphuric acid, 20%H ₂ SO ₄ , 18hrs	ASTM D1308-87	No change
Sodium hydroxide, 20%NaOH, 1hr	ASTM D1308-87	No change
Mortar, pat test, 24hrs	AAMA2605	No change
Detergent, 3% solution, 38°C, 72hrs	ASTM D2248-93	No change

Table 6-2 Weatherability

Dry film property	Test method	Criteria
Weather-o-meter test		
Colour retention:	ASTM D2244-93	Maximum 5 units after 4000 hrs.
Gloss retention:	ASTM D523-89	70% after 4000 hrs.
Chalk resistance:	ASTM D4214-89	Maximum 8 units after 4000 hrs.
Salt spray resistance:	ASTM B117-90	Blister-10, scribe-8, after 4000 hrs, 35°C salt fog
Humidity-thermal	ASTM D2246-87	No blister, no cracking After 15 cycles of 38°C 100%RH for 24hrs and -23°C for 20hrs
Humidity resistance:	ASTM D2247-94	No change After 4000 hrs, 100%RH, 35°C

The material properties or the test data in this leaflet are portrayed as general information only and a guide without warranty. Due to product changes, improvements and other factors, Mitsubishi Plastics, Inc. reserves the right to change or withdraw information contained herein without prior notice.

©2014 Mitsubishi Plastics, Inc. All rights reserved.

ALPOLIC is a registered trademark of Mitsubishi Plastics, Inc.