Mitsubishi Chemical Infratec Co., Ltd.

Summary of Technical Data Sheet – ALPOLIC™ NC/A1

The material properties and data in this document are portrayed as general information for reference only and are not product specifications. Due to product changes, improvements and other factors, Mitsubishi Chemical Infratec Co., Ltd. reserves the right to change or withdraw information contained herein without prior notice.

1. General

ALPOLIC™ NC/A1 is an aluminum composite material (ACM) with a non-combustible core, suitable for exterior or interior claddings, soffit linings and roof covering in new buildings and retrofit applications wherever a non-combustible material is required. The ALPOLIC NC/A1 material is manufactured by Mitsubishi Chemical Infratec Co., Ltd. and is furnished by approved distributors and authorised dealers.

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

2. Product composition

ALPOLIC NC/A1 is composed of non-combustible core sandwiched between two skins of 0.5mm thick aluminum alloy (3105-H14):

Composition	Skin material:	0.5mm thick aluminum alloy (3105-H14)
	Core material:	Non-combustible core

The surface is finished with a high-performance Lumiflon™-based fluoropolymer coating as standard. ALPOLIC NC/A1 is available in finishes of: Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors, Patterns, Matte Colors and Premium Aluminum series. In these finishes, Lumiflon-based fluoropolymer paints are applied in manufacturer's continuous coil coating lines.
The back side of ALPOLIC NC/A1, 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 co-extruded (white/black) removable, self-adhesive protection film. 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: 4 mm
(2) Panel size: Width = 1270 and 1575 mm
Length = less than 7200 mm

Note: Custom width can be accepted between 914 mm and 1575 mm subject to minimum quantity. Please contact local distributors or our office. Premium Aluminum series Gold and Copper are available maximum 1270 mm width. Consult panel width in case of Premium Aluminum hairline finishes.

(3) Product tolerance

Width:	±2.0 mm
Length:	±1.0 mm/m
Thickness:	±0.3 mm
Bow:	Maximum 0.5% (5mm/m) of the length or width
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 NC/A1 is supplied with a cut edge and without aluminum sheet displacement or core protrusion.

4. Principal properties

(1) Physical properties

Item	Unit	
Panel weight (nominal thickness 4 mm) (incl. product tolerance ±0.3 mm thick)	kg/m^2	8.6 (8.3 to 9.3)
Thermal expansion (ASTM D696)	$\times 10^{-6}$ /°C	20.6
Thermal conductivity (ISO 8990)	W/m·K	0.4
Deflection temperature (ISO 75-2)	°C	115

(2) Mechanical properties

Item	Unit	
Tensile strength (ASTM E8)	MPa or N/mm^2	48.2
0.2% proof stress (ASTM E8)	MPa or N/mm^2	46.5
Elongation (ASTM E8)	%	2.7
Flexural elasticity (ASTM D7250)	GPa or kN/mm^2	45.6

(3) Mechanical properties of aluminum skin metal (3105-H14 alloy):

0.2% proof stress: 150 MPa or N/mm^2

Elasticity: 70 GPa or kN/mm^2

(4) Sound transmission loss (ASTM E413): STC (Standard Transmission Class) 27

5. Summary of fire tests

ALPOLIC NC/A1 has passed the following fire tests:

Table 5-1 Fire tests for general and external cladding material

Country	Test standard	Results & classification	Remark
Australia	AS 1530.1	NOT deemed COMBUSTIBLE	Core test
	AS 1530.3	Ignitability Index 0, Spread of Flame Index 0, Heat Evolved Index 0, Smoke Developed Index 0	Panel test
EU	EN 13501-1 (below tests as required)	Reaction to fire classification: A1	
	EN ISO 1182	Passed	Core test
	EN ISO 1716	Passed	Heat potential value of all layers and product as a whole
	EN 13823	Passed	Panel test
Singapore	BS 476 Part 4	Passed	Core test

6. Paint finish

(1) Coating system

The surface is finished with Lumiflon-based fluoropolymer coating as standard; and the back side is a wash coating or a service coating. ALPOLIC NC/A1 is available in finishes of: Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors, Patterns (Stone, Timber, Metal, and Abstract), and Premium Aluminum series (hairline and mill finishes). In these finishes, Lumiflon-based fluoropolymer 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 fluoropolymer 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” are coated with a unique image transfer process.
The thickness is 39 microns (1.54 mils) minimum and consists of a conversion coating, an inhibitive primer and a Lumiflon-based fluoropolymer coating including the image transfer layer. Matte finish is also available.

D. “Matte Colors” are 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 fluoropolymer coating and a clear coating.

E. “Premium Aluminum series” are two-coat two-bake system.
The thickness is 36 microns (1.42 mils) minimum and consists of a conversion coating, a clear or tinted primer and a Lumiflon-based fluoropolymer clear coating.

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

Note 2: ALPOLIC NC/A1 is finished with Lumiflon-based fluoropolymer 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, except Premium Aluminum series, upon request subject to respective minimum quantities. The standard gloss is 30% for Solid and Metallic Colors, 30-80% for Sparkling Colors, 80% for Prismatic Colors, 5-80% for Patterns (Stone, Timber, Metal, and Abstract) and 5% for Matte Colors. Premium Aluminum series are available in High Gloss and Low Gloss. Custom gloss is available between 5 and 80%, except Premium Aluminum series, upon request subject to minimum quantities. Please contact local distributors or our office for custom color requests.

(3)Coating performance

The Lumiflon-based fluoropolymer coating meets the following criteria:

Solid Colors, Metallic Colors, Sparkling Colors, Prismatic Colors, Patterns and Matte Colors

Table6-1 General properties

Dry film property	**Test method**	**Criteria**
Gloss (60°)	ASTM D523	15 to 80% (Matte 5%)
Formability (T-bend)	ASTM D4145	2T, no cracking
Impact Resistance	ASTM D5420	No removal of film from substate
Hardness-pencil	ASTM D3363	H
Adhesion	ASTM D3359	
Dry	method B	No pick off
Boiling water	100°C, 20 min.	No pick off
Wet	38°C, 24 hrs.	No pick off
Abrasive resistance	ASTM D968 (Falling sand)	80 liters/mil (except Matte data not available)
Chemical resistance:		
Muriatic acid, 10%HCl, 15-min. spot test	AAMA 2605 Sec. 8.7.1	No change
Mortar, pat test, 24 hrs	AAMA 2605 Sec. 8.7.2	No change
Nitric acid, 70%HNO3, 30-min. spot vapor test	AAMA 2605 Sec. 8.7.3	Not more than 5ΔE units of color change
Detergent, 3% solution, 38ºC, 72 hrs	AAMA 2605 Sec. 8.7.4 & ASTM D2248	No change
Window cleaner, 18°C to 27°C, 24 hrs	AAMA 2605 Sec. 8.7.5	No change

Table 6-2 Weatherability

Dry film property	Test method	Criteria
Weather-o-meter test Colour retention: Gloss retention: Chalk resistance:	 ASTM D2244 ASTM D523 ASTM D4214	 Maximum 5 units after 4000 hrs. 70% after 4000 hrs. Maximum 8 units after 4000 hrs.
Cyclic corrosion resistance:	ASTM G85 Annex A5	Blister-8, scribe-7, after 2000 hrs, 35°C, dilute electrolyte cyclic fog/dry test
Humidity resistance:	ASTM D2247	No change After 4000 hrs, 100%RH, 38°C

Premium Aluminum series

Table 6-3 General properties

Dry film property	Test method	Criteria
Impact	JIS K 5600-5-3	No pick off
Hardness-pencil	JIS K 5600-5-4	H
Adhesion Dry Wet, 50°C, 240 hrs. Boiling water, 100°C, 8 hrs.	 JIS K 5600-5-6 ditto ditto	 No pick off No pick off No pick off
Chemical resistance: Sulphuric acid, 5%H_2SO_4, 24 hrs. Sodium hydroxide, 1%NaOH, 24 hrs.	 JIS H4001 (reference) ditto	 No change No change

Table 6-4 Weatherability

Dry film property	Test method	Criteria
Weather-o-meter test Colour retention: Gloss retention:	JIS B7753 JIS Z8730 JIS Z8741	 Maximum 5 units after 4000 hrs. 50% after 4000 hrs.
Cyclic corrosion resistance	ASTM G85 A.5	Rating No. Area≧8, Scribe≧7
Humidity resistance	JIS K 5600-7-2	No change After 240 hrs., 95%RH, 60°C

Note

As part of its rigorous quality assurance procedures, Mitsubishi Chemical Infratec Co., Ltd. (“MCIT”) conducts visual inspections of ALPOLIC products during the manufacturing process. If any imperfections are identified, the products will undergo a pre-shipment inspection in accordance with the test methods specified in AAMA 2605: *Voluntary Specifications, Performance Requirements, and Test Procedures for Superior Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix)*. Only products that, in MCIT’s sole discretion, pass this inspection will be shipped.

The relevant standard in AAMA 2605:
5.0 GENERAL
5.2 Coatings shall be visibly free from flow lines, streaks, blisters or other surface imperfections in the dry-film state on exposed surfaces when observed at a distance of 3 m (10 ft) from the metal surface and inspected at an angle of 90 degree to the surface.