



Fire-rated, Shatterproof, Lightweight, Mirror-finished Panel

 **Mitsubishi Chemical Functional Products, Inc.**

URL <http://www.alpolic.com>

JULY 2006

A-LOOK®/fr

Fire-rated, Shatterproof, Lightweight, Mirror-finished Panel

A-LOOK®/fr is a mirror-finished aluminum composite material, used for such interior surfaces as ceilings, walls and column covers. Its mirror effect enables a luminous and wide interior space, and yet A-LOOK/fr panel is lightweight, unbreakable, and workable with regular woodworking or aluminum processing machines and tools. A-LOOK/fr is a fire-rated material that meets the fire-safety requirements for interior finishing materials in most countries.

Note: We cannot use A-LOOK/fr in humid atmospheres like bathrooms, areas where dew condensation may frequently take place, and areas where cleaning never takes place.

1. Features

A-LOOK/fr has the following features.

- (1) Lightweight: A-LOOK/fr is only 3.8 kg/m² (0.78 lbs/sq.ft.)
- (2) Impact resistance: A-LOOK/fr will not shatter or break.
- (3) Workability: A-LOOK/fr is easy to cut and drill with regular woodworking or aluminum processing machines and tools.
- (4) Fire safety: A-LOOK/fr meets fire code requirements for interior finishing materials in most countries.



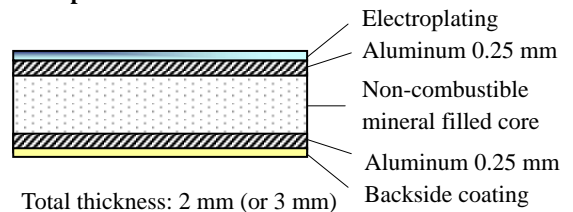
Restaurant Ceiling, USA

2. Material composition

A-LOOK/fr is an aluminum composite material (ACM) composed of two skins of aluminum and the core material. The decorative surface is an electroplating layer.

Note: The standard A-LOOK/fr has a decorative surface of electroplating layer on the topside, but we have another grade called A-LOOK/fr EX that has an additional fluorocarbon overcoat to extend its application field to light outdoor applications such as soffit of entrance.

Composition of A-LOOK/fr



A-LOOK/fr Chrome



3. Color

Chrome

4. Panel dimension

Thickness: 2mm (or 3mm)
Size: 609×609 (2' ×2'), 609×1219mm (2' ×4')

Note 1: 3mm thick is available upon request.

Note 2: 1219×2438mm (4' ×8') is available upon request.

5. Characteristics

(1) Principal properties

	Method	Unit	A-LOOK/fr 2mm
Weight	-	kg/m ²	3.8
Thermal expansion	ASTM D696	×10 ⁻⁶ /°C	24-34
Mechanical properties of aluminum sheet (1050-H18)			
0.2% proof stress	ASTM E8	MPa, N/mm ²	78
Flexural elasticity	ASTM C393	GPa, kN/mm ²	70
Deflection temperature	ASTM D648	°C	116
Sound transmission loss (STC)	ASTM E413	dB	26

(2) Fire performance

A-LOOK/fr is a fire-safe interior material which passes all mandatory requirements for interior surfaces in USA and Japan. A-LOOK/fr passes the following fire tests.

Country	Test standard	Specimen	Result & Classification
U.K.	BS476 Part 6 BS476 Part 7	A-LOOK/fr 3mm	Class 0 Class 1
Germany	DIN4102 Part 1	A-LOOK/fr 3mm	Class B1
U.S.A.	Tunnel test (ASTM E-84) Room corner test (UBC 26-3)	A-LOOK/fr 3mm A-LOOK/fr 2 & 3mm	Class A/Class 1 Passed
Japan	Heat release test (ISO 5660-1) & gas toxicity test	A-LOOK/fr 2 & 3mm	Non-combustible material Certificate No. NM-0020

(3) Performance of surface finish

The topside is an electroplating layer and the backside is a coating. The topside surface finish meets the following performance.

	Method	Conditions	A-LOOK/fr 2mm
Reflection rate (Light type A, 30° reflectance)	ASTM D523-89		67%
Adhesion	ASTM D3359 Method 8		No change
Dry		37.8°C, 24 hrs	No change
Wet		100°C, 20 min	No change
Boiling water			No change
Salt spray resistance	ASTM B117	35°C, 1000 hrs	Blister-10
Humidity resistance		100%RH, 50°C, 1000 hrs	No change

6. Processing method

(1) General

We can process A-LOOK/fr panels with regular woodworking or aluminum-processing machines and tools. We can use circular saws for cutting and hand drills for making holes. The following machines and tools are typical ones suitable for processing A-LOOK/fr panels.

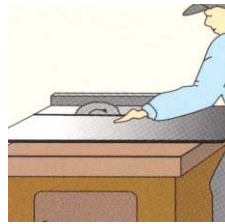
(2) Saw cutting

Table saws, panel saws and hand circular saws are suitable for straight cut. In workshop, use a table saw or a panel saw, and at construction site, use a hand circular saw.

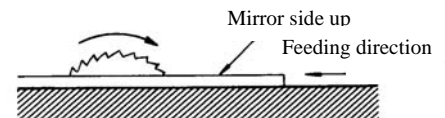
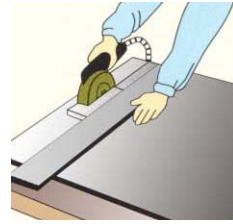
Note:

- Suitable rotation is 2500-4500 rpm (rotation per minutes).
- Suitable saw blade is a carbide-tipped saw for aluminum.
- Suitable feeding speed is 15-30 m/min.
- Do the cutting work with the mirror side facing upward.
- Feed the panel toward the rotating blade teeth, as shown in the diagram.
- Check that the space between blade and saw access plate is adequate. If it is too loose, repair or replace the access plate.
- Remove chips from the saw table and the A-LOOK/fr surface during cutting work.

Table saw



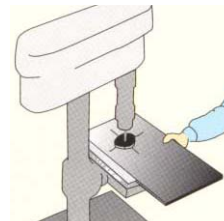
Hand circular saw



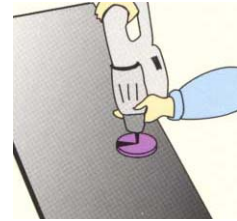
(3) Drilling

We can make holes with a drill press or a hand drill, equipped with a suitable drill bit, hole-saw or circle-cutter. Use a drill bit for metals. Do drilling work with mirror side facing upward.

Drill press



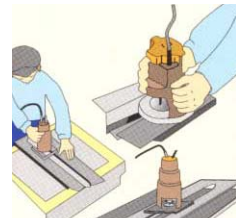
Hand drill



(4) Curving line cut

We can use a hand router and a trimmer for curving line cut. Use a guide template to stabilize the work. Remove cutting chips caught between the guide template and the panel. Jigsaws are also useful for cutting complex shapes.

Hand router and trimmer



(5) Bending

We can bend A-LOOK/fr panels with manual or electric-drive 3-roll benders. The smallest bendable radius of A-LOOK/fr 2mm is 200-250mm in 2500mm long machines. The exact bendable limit depends on the bending roll diameter, roll length and the type of bending machine. Refer to the separate manual for details.

(6) General notes on processing

- A-LOOK/fr is a shatter and break resistant panel, however, avoid hitting with rigid or sharp objects during handling and processing, as they may cause dents or scratches in the mirror surface.
- The mirror side is covered with a polyethylene film for protection during handling, processing and installation. Do not remove the protective film until installation is completed, and remove it immediately after the installation. Exposure to direct sunlight for a prolonged period may cause a degradation of film and a glue residue problem.
- Do processing work in a cleaned area. Prior to processing work, remove chips and particles from the worktable and the panel.

7. Installation method

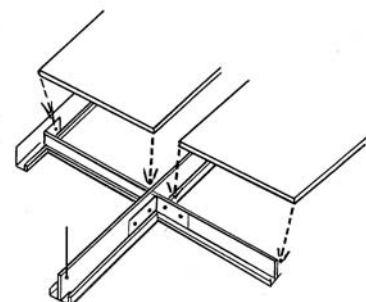
(1) Suspension ceiling method

A-LOOK/fr panels can be installed with the suspension ceiling system.

Note:

- When fastening the panel with screws, bolts or rivets, apply a minimum pressure in order not to distort the reflective image.

Suspension ceiling method



b. When sealing the joint, use acid less sealant such as silicone or polysulfide type.

c. The thermal expansion/contraction of A-LOOK is not so large and comparable to aluminum. Therefore, movement due to temperature change is almost negligible between A-LOOK/fr and aluminum profiles. However, the expansion rate of steel and concrete is less than one half, and we have to allocate enough space (0.5-1.0mm/m) to relieve the expansion.

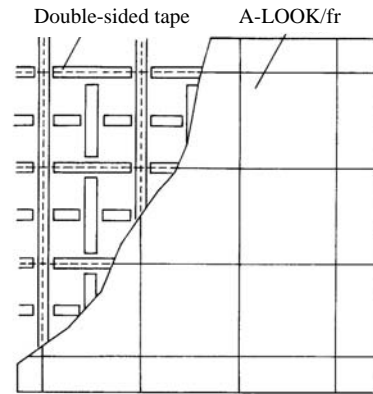
(2) Adhesion method by double-sided tape

a. Backing materials

Gypsum board, plywood or particle board is suitable for the backing material. The backing material must have a smooth and clean surface without irregularities and loose materials.

b. Preparation of backing surface

- Remove all foreign matters from backing surface. Smooth out surface irregularities such as nail heads or bumps.
- Use 3M's VHB 4950 or equivalent for the double-sided tape. Apply the tape to the prepared backing surface in such a pattern as shown in the diagram. In order to ensure a good adhesion, flatten the tape surface with a roller or a flexible squeegee. Keep the liner paper in place.

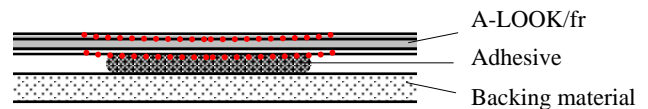


c. Installation

- Clean the backside of the panel with 50% IPA solution (50% Isopropyl Alcohol and 50% water). Remove the liner paper from the tape. Align the panel, adhere one edge, and adhere the remainder of the panel. Press the edges of the panel with a consistent pressure using a small roller. Press the center of the panel with palms to ensure the contact with the adhesive tape at the center of the panel.

(3) Adhesion method by adhesive

a. Use adhesives of low or no shrinkage. Low modulus silicone or contact cement is recommended.



b. Hard setting adhesives may cause a distortion after installation, as shown in the diagram.

c. Apply adhesives evenly along the perimeter and the center of the panel.

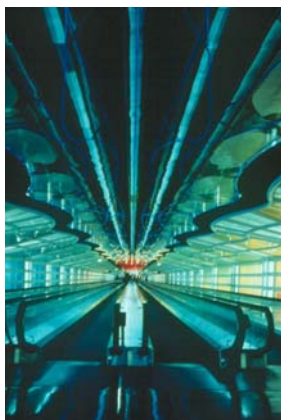
d. Adhesive can be used together with double-sided tapes.

8. Cleaning method

While staining is still weak, wipe off it with a clean, soft cloth. For strong staining, use household cleaners, ammoniated detergents or glass cleaners such as Windex or Glass Plus. Do not use abrasive cleaners, pads and strong acid or alkaline solutions.

9. Examples of applications

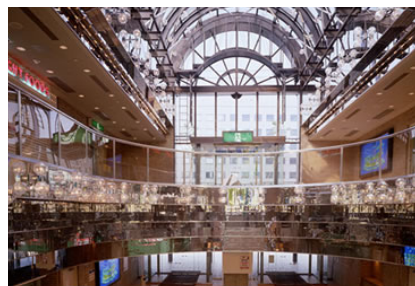
A-LOOK/fr is used for interior finishes such as ceilings, walls and column covers. The following projects are outstanding examples.



O'Hare Airport, Chicago IL,
USA



Hotel Lobby, Ceiling, USA



Shopping Center, Entrance Hall, Japan



Game Center, Ceiling & Display, USA



Passenger Boat, Banquet Room Ceiling, Japan



Art Museum, Ceiling & Wall, USA

Note: The project photographs include A-LOOK projects.

For further information, please contact:

MITSUBISHI CHEMICAL FUNCTIONAL PRODUCTS, INC.
Composite Materials Division
Tekko Building, 8-2, Marunouchi 1-chome, Chiyoda-ku Tokyo
100-0005 Japan
Telephone: 81-3-3287-8124
Facsimile: 81-3-3287-8133
E-mail: mks-ho-alpolic@cc.m-kagaku.co.jp

MITSUBISHI CHEMICAL FP AMERICA, INC.
Composite Materials Division
401 Volvo Parkway, Chesapeake, VA 23320
Telephone (USA): 800-422-7270
Telephone (International): 1-757-382-5750
Facsimile: 1-757-436-1896
E-mail: info@alpolic.com

MITSUBISHI CHEMICAL SINGAPORE PTE LTD
Composite Materials Department
79 Anson Road, #12-01 Singapore 079906
Telephone: 65-6226-1597
Facsimile: 65-6221-3373
E-mail: SIN0027@cc.m-kagaku.co.jp

Distributed by:

MITSUBISHI CHEMICAL FUNCTIONAL PRODUCTS, INC.
Turkey Liaison Office
Baglarbasi Kisikli Cad., No:4, Sarkuysan-Ak Is Merkezi,
S-Blok, Teras Kat, Altunizade, Uskudar, 34664 Istanbul, Turkey
Telephone: 90-216-651-8670/71/72
Facsimile: 90-216-651-8673
E-mail: info@mcfp-tlo.com

©2006 Mitsubishi Chemical Functional Products, Inc. All rights reserved.
A-LOOK® is the registered trademark of Mitsubishi Chemical Corporation.