ALPOLIC®

URL:http://www.alpolic.com

RECYCLABLE MATERIAL	ALPOLIC and its affiliated materials are 100% recyclable. Scraps generated from ALPOLIC plants are collected and brought to the recycling facility for recycling.
ISO 9001: 2008 CERTIFIED	ALPOLIC's design, development, manufacturing and sales are managed with ISO 9001:2008
ISO 14001: 2004	ALPOLIC and iits affiliated materials are produced in the plant that has ISO 14001: 2004 certificate

For further information, please contact:

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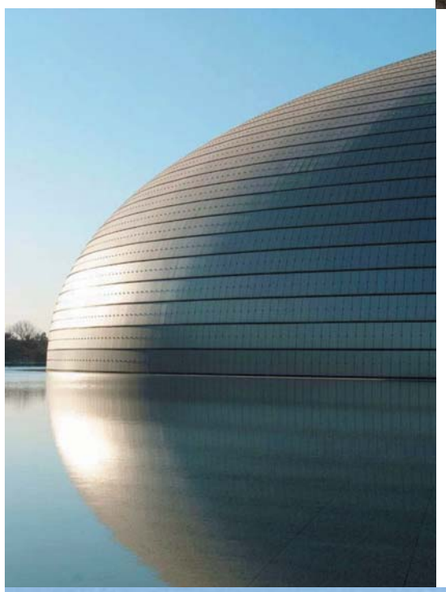
2011.01.1000RIX

Good **Chemistry** for Tomorrow
Mitsubishi Chemical Holdings Group



ALPOLIC®
INNOVATION • STYLE • PERFORMANCE

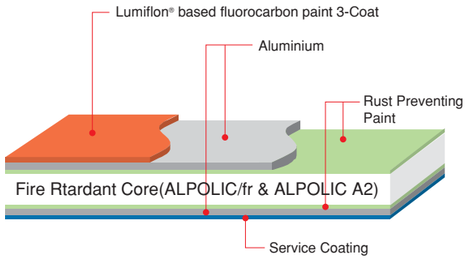
MITSUBISHI PLASTICS

English

Products

Product	Description	Application
ALPOLIC PE	Non-Fire Retardant ACM	Sign, Light Application only
ALPOLIC /fr	Standard Fire Retardant ACM	Exterior and Interior Wall Cladding for Building Construction
ALPOLIC A2	Superior Fire Retardant ACM	

Composition



Standard Composition of ALPOLIC/fr & ALPOLIC A2		
	Excellent Flatness	
	High Rigidity	
	Lightweight	
	Easy Fabrication	
Aluminium		
	High Rigid Alloyed Alumimium Skin	
Paint & Coating Systm		
	Excellent Weatherability	
	Excellent Coating Quality and Wider Color Range	
	Paint	Lumiflon® based fluorocarbon paint
	Coating	Minimum 3-Coat, 3-Bak coating system
	Coater	Die Coater
Core		
	High performance against fire	
	ALPOLIC/fr	Standard Fire Retardant Core
	ALPOLIC A2	Superior Fire Retardant Core
Other		
	Rust preventing paint between Aluminium and core	
	Service coating on the backside	

Dimension (Standard)

	ALPOLIC PE	ALPOLIC/fr	ALPOLIC A2
Thickness (tolerance: ± 0.2mm)	3, 4, 6 mm	3, 4, 6 mm	4mm
Aluminium Skin thickness	0.5mm	0.5mm	0.5mm
Standard Width (tolerance: ±2.0mm)	965, 1270, 1575 mm	965, 1270, 1575 mm	1235, 1270, 1500mm
Length (tolerance: ±0.4mm)	1800 – 7200 mm		
(Bow tolerance)	(± 0.5% of the length and/or width)		
(Squareness tolerance)	(± 5.0mm)		

Characteristics

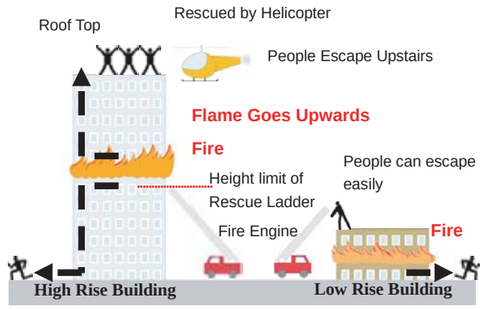
	(4mmt)	Method	Unit	ALPOLIC PE	ALPOLIC/fr	ALPOLIC A2
Physical properties	Specific gravity	–	–	1.38	1.9	1.95
	Weight	–	kg/m²	5.5	7.6	7.8
	Thermal expansion	ASTMD696	x 10⁻⁶/℃	24	24	24
	Thermal conductivity	ASTMD976	W/(m.K)	0.39	0.45	0.45
	Thermal resistance	ASTMD976	m².K/W	0.16	0.16	0.16
	Deflection temperature	ASTMD648	℃	115	116	110
Mechanical properties of composite material	Tensile strength	ASTM E8	MPa, N/mm²	48	49	43
	0.2% proof stress	ASTM E8	MPa, N/mm²	44	44	41
	Elongation	ASTM E8	%	14	5.0	3.8
	Flexural elasticity, E	ASTM C393	GPa, kN/mm²	39.8	39.8	38.5
	Flexural rigidity, EI	ASTM C393	kN.mm²/mm	137	137	203
	Punching Shear resistance	ASTM D732	MPa, N/mm²	22	32	37
Sound Transmission Loss		ASTM E413	dB	26	27	27
Metal thickness with equivalent rigidity				Aluminium 3.3 mm	Aluminium 3.3 mm	Aluminium 3.3 mm
Metal amount required for Alpolic products				30%	30%	30%
Minimum Bendable Radius				50 mm	100 mm	Consult our office

Fire Performance of ACM Series

Core Material	ALPOLIC PE	ALPOLIC/fr	ALPOLIC A2
Approx. portion of combustible ingredients within the core material	100%	< 30%	< 10%
			
Heat Potential of the core material	＞45 MJ/kg	＜15 MJ/kg	＜ 3 MJ/kg
Reference Fire Classification	DIN 4102 B2 Euroclass C - D	DIN 4102 B1 Euroclass B	DIN 4102 A2 Euroclass A2

ALPOLIC®/fr and ALPOLIC A2 are safe exterior cladding materials, passing most of all mandatory requirements for exterior wall applications in the following countries and test standards. The main ingredient of the core material does not permit the proliferation of flame and restricts the development of smoke detrimental to evacuation activities. Always consult local building codes before actual use.

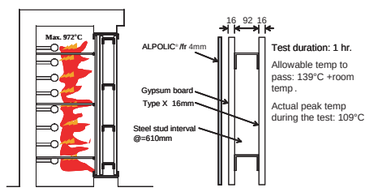
Country	Test Standard
USA	ASTM E-84 (Tunnel Test),
	ASTM E-108 Modified,
	UBC 26-9 & NFPA 285 (ISMA Test),
	ASTM E108 (Fire Test for Roof Covering),
	ASTM E119 (1-hr and 2-hrs Fire Rating),
	UBC 26-3 (Interior Room Corner Test),
	Etc
Canada	CAN/ULC-S 134-92 (Full-scale Exterior Wall Fire Test)
Japan	ISO 5660-1 (Heat Release Test for Non-combustible Material)
China	GB8625, GB8628 ,GB8627
Singapore	BS 476 Part 6 & 7, Local fire regulation
Malaysia	BS 476 Part 6 & 7, ISO 9705:1993, Local fire regulation
Russia	GOST 30244-94 (Combustibility)
	GOST 30402-96 (Inflammability)
	GOST 12.1.044-89 (Toxicity)
	GOST 12.1.044-89 (Smoke Density)
	GOST 31251-2003 (Multi Story Test)
Kazakhstan	GOST 30244-94 method II, SNIP 21-01-97*
Ukraine	BV 2.7-19-95 (GOST 30244-94)
Lithuania	LST 1531:1998/1K:2001
Hungary	MSZ 14800-6:1980
Czech Republic	ISO 13785-1
Poland	PN/B-02867
EU (Euroclass)	EN 13501-1: 2007
United Kingdom	BS 476 Part 6 & 7
Germany	DIN 4102 Part 1
Italy	UNI 8457, UNI 9174
Spain	UNE EN 13823:2002, UNE EN ISO 11925-2:2002
Scandinavia	DS/INSTA 412, ISO 5567



Example of Fire Tests

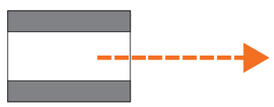
UBC 26-9 & NFPA285
(ISMA Test)

ASTM E108
(Fire Test for Roof Covering)



ASTM E119 (1-hr and 2-hrs Fire Rating)

Example of Fire retardant mechanism (chemical reaction) of ALPOLIC/fr during combustion



Ingredient	Chemical Reaction	Status
Polyethylene	$(-CH_2-) + O_2 \rightarrow CO_2 + H_2O$	Heat Generation
Aluminium Hydroxide	$\mathbf{2Al(OH)_3 \rightarrow Al_2O_3 + 3H_2O}$	**Heat Absorption**

Standard Paint System of ACM Series

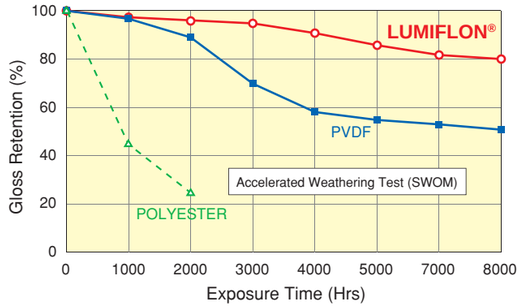
PAINT

LUMIFLON based Fluorocarbon Paint
- Superior Weatherability, Wider Color and Gloss Range, Repairable -

LUMIFLON® based fluorocarbon paint is applied to ALPOLIC® ACM series as a standard. It is considered as a second-generation paint system, not only meeting PVDF (Kynar 500 or Hylar 5000) standards, but also has superior characteristics

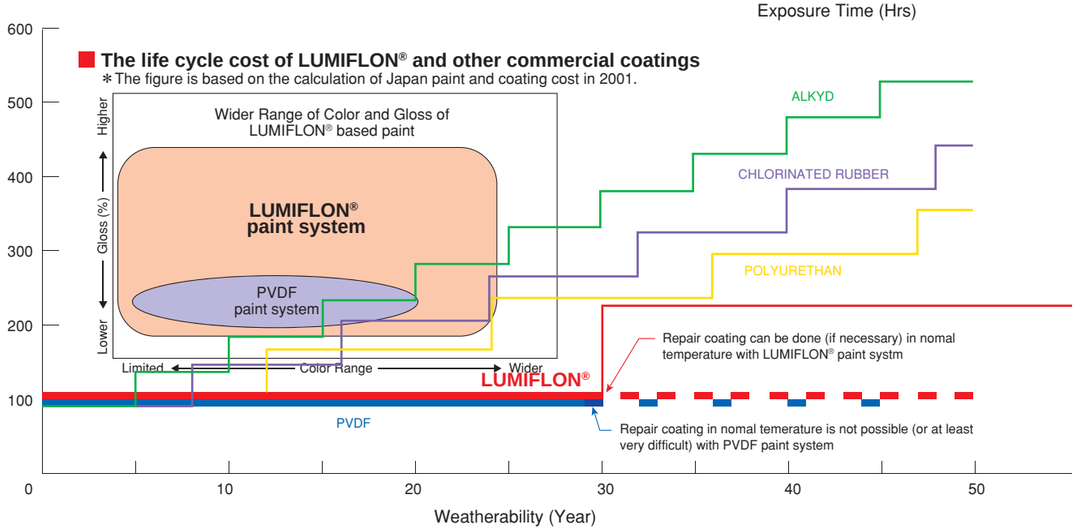
General comparison between conventional paints and fluorocarbon paints

Paint type	Fluorocarbon paints		Polyester paints
	Lumiflon	PVDF	
Weatherability	20 years	20 years	3 - 5 years
Gloss	15 - 80 %	25 - 35 %	25 - 90 %
Color Range	Wider	Limited	Wider
Repair Coating	Can be done	Difficult	Can be done
Pencil Hardness	H	F	2H
Bendability	2T	1T	2T



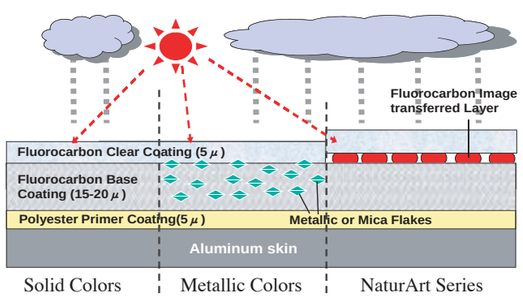
The life cycle cost of LUMIFLON® and other commercial coatings

*The figure is based on the calculation of Japan paint and coating cost in 2001.



COATING

Minimum 3 (THREE)-COAT, 3 (THREE) -BAKE System

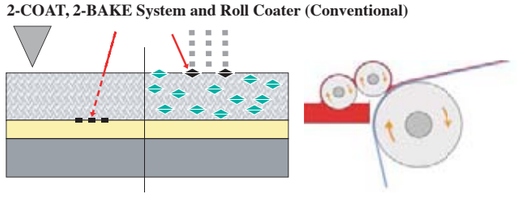


COATER

DIE Coater
–Excellent Coating Surface -

Consistent coating quality is maintained through the continuous application of paints to the aluminium coil in the coil coating line. The "Die Coating" process that occurs on this line employs a unique technology developed by Mitsubishi Chemical that ensures a smooth, fine coating.

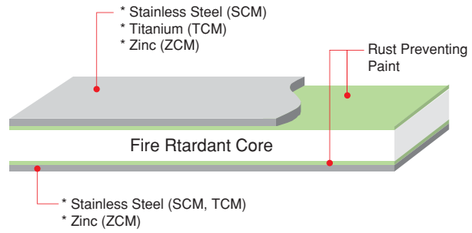
2-COAT, 2-BAKE System and Roll Coater (Conventional)



Products

Product	Description
ALPOLIC /fr SCM	Stainless Steel Composite Material with Fire Retardant Core
ALPOLIC /fr TCM	Titanium Composite Materials with Fire Retardant Core
ALPOLIC /fr ZCM	Zinc Composite Materials with Fire Retardant Core

Composition



Finishes

ALPOLIC /fr SCM	ALPOLIC /fr TCM	ALPOLIC /fr ZCM
* Dull Finish (DL) * Hair Line Finish (HL) * Mirror Finish (MR)	* Dull Finish (DL)	* Pre-Weathered (PW)

Comparison of Melting Point of various metals

Metal	Melting Point
Titanium	1668℃
Stainless Steel	1424℃
Copper	1084℃
Aluminium	660℃
Zinc	420℃

Dimension (Standard)

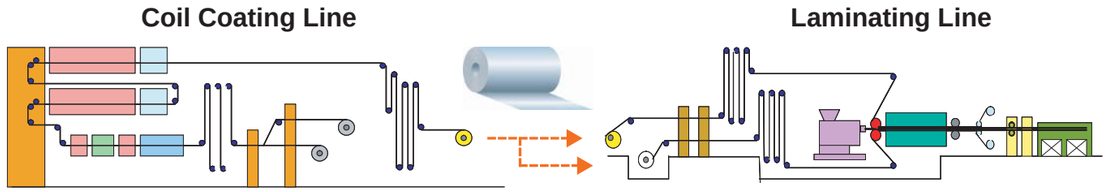
*** Please consult our office for non-standard dimensions**

		ALPOLIC PE		ALPOLIC/fr	ALPOLIC A2
Thickness (tolerance: ± 0.2mm)		4 mm		4 mm	4 mm
Metal Skin (thickness)	Surface	Stainless Steel (0.3mm)		Titanium (0.3mm)	Zinc (0.5mm)
	Back	Stainless Steel (0.3mm)		Stainless Steel (0.3mm)	Zinc (0.5mm)
Standard Width (tolerance: ±2.0mm)		DL, HL	1000, 1219mm	1000, 1219mm	965mm
		MR	990, 1200mm		
Length (tolerance: ±0.4mm)		DL, HL	1800 – 7200mm	1800-7200mm	3708mm
		MR	1800 – 5000mm		
(Bow tolerance)		Max. 0.5% (5mm/m) of the length or width		ditto	ditto
(Squareness tolerance)		Maximum 5.0 mm		ditto	ditto

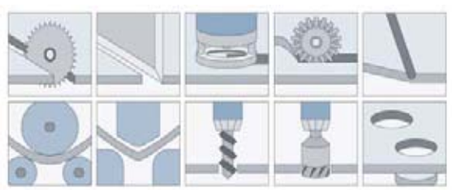
Characteristics (for Standard Dimension)

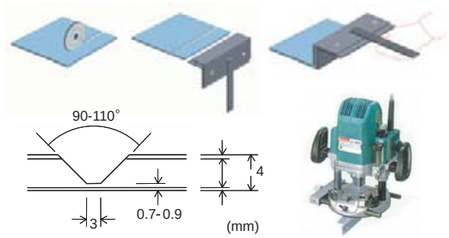
	(4mmt)	Method	Unit	ALPOLIC /fr SCM	ALPOLIC /fr TCM	ALPOLIC/fr ZCM
Physical properties	Specific gravity	–	–	2.5	2.3	3.1
	Weight	–	kg/m²	10.2	9.3	12.5
	Thermal expansion	ASTMD696	x 10⁻⁶/℃	10.4	10.4	28 (//) , 20 ( )
	Thermal conductivity	ASTMD976	W/(m.K)	0.40	0.40	0.45
	Thermal resistance	ASTMD976	m².K/W	0.16	0.16	0.16
	Deflection temperature	ASTMD648	℃	117	112	115
Mechanical properties of composite material	Tensile strength	ASTM E8	MPa, N/mm²	84	69	37
	0.2% proof stress	ASTM E8	MPa, N/mm²	69	60	34
	Elongation	ASTM E8	%	12.6	11.1	36.9
	Flexural elasticity, E	ASTM C393	GPa, kN/mm²	70.6	49.0	28.9
	Flexural rigidity, EI	ASTM C393	kN.mm²/mm	372	265	170
	Punching Shear resistance	ASTM D732	MPa, N/mm²	55	48	28
Sound Transmission Loss		ASTM E413	dB	30	25	Not tested
Metal thickness with equivalent rigidity				Stainless Steel 2.9mm	Titanium 3.1mm	Zinc 3.3mm

Production



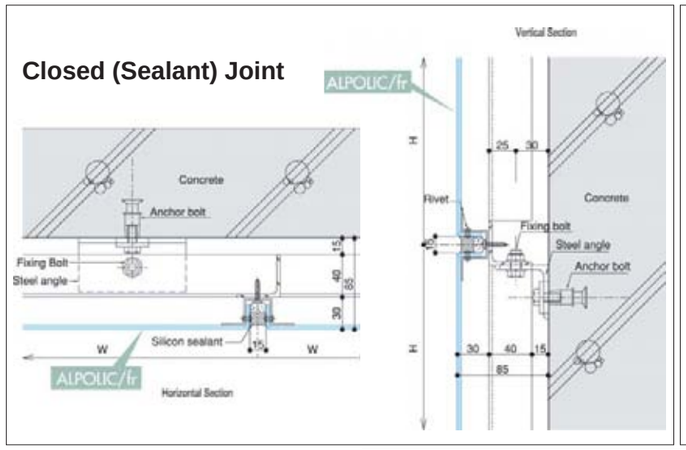
Fabrication

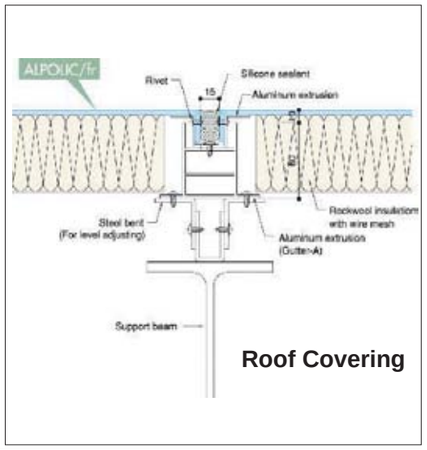


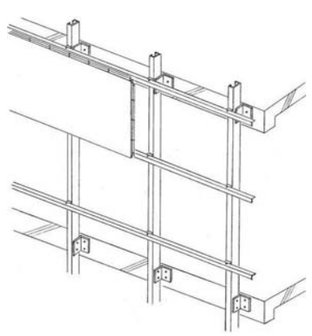


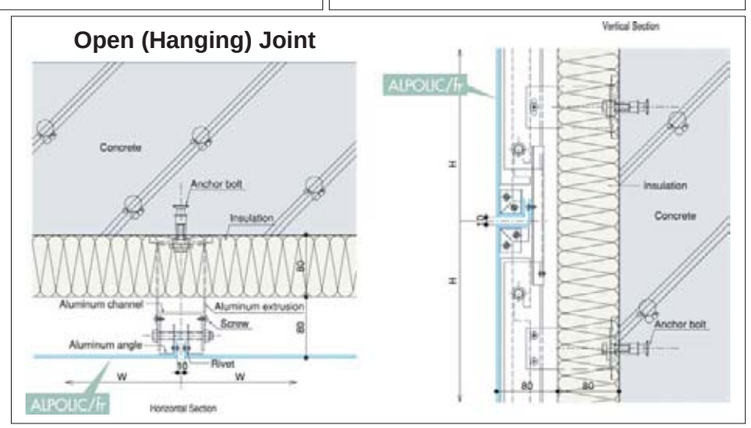
Installation

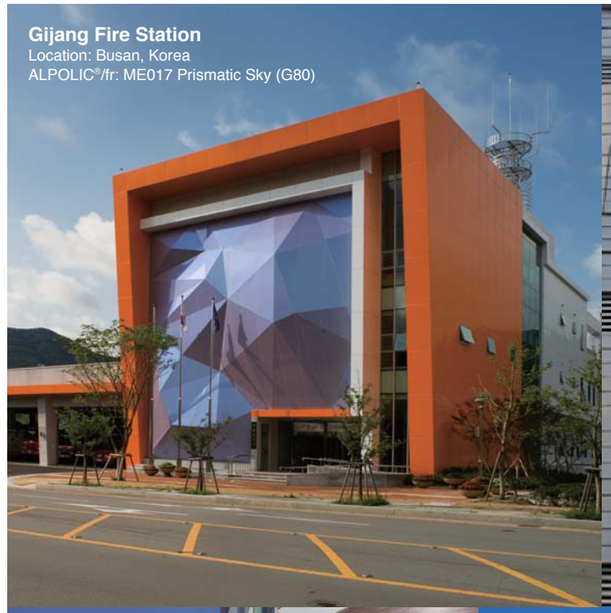
(Example of Fixing System)





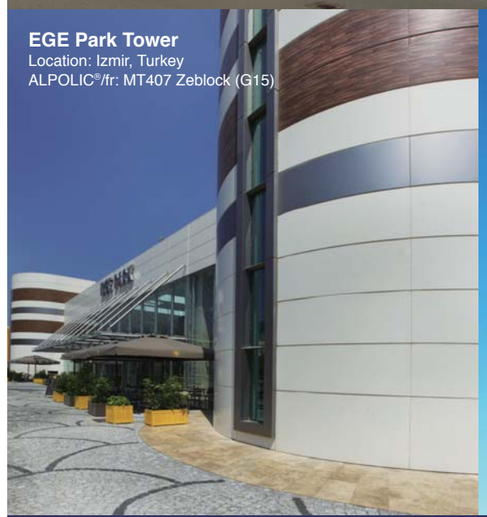


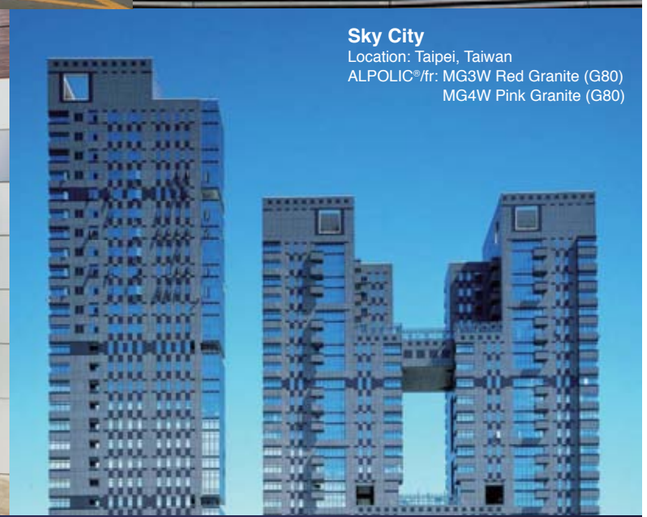




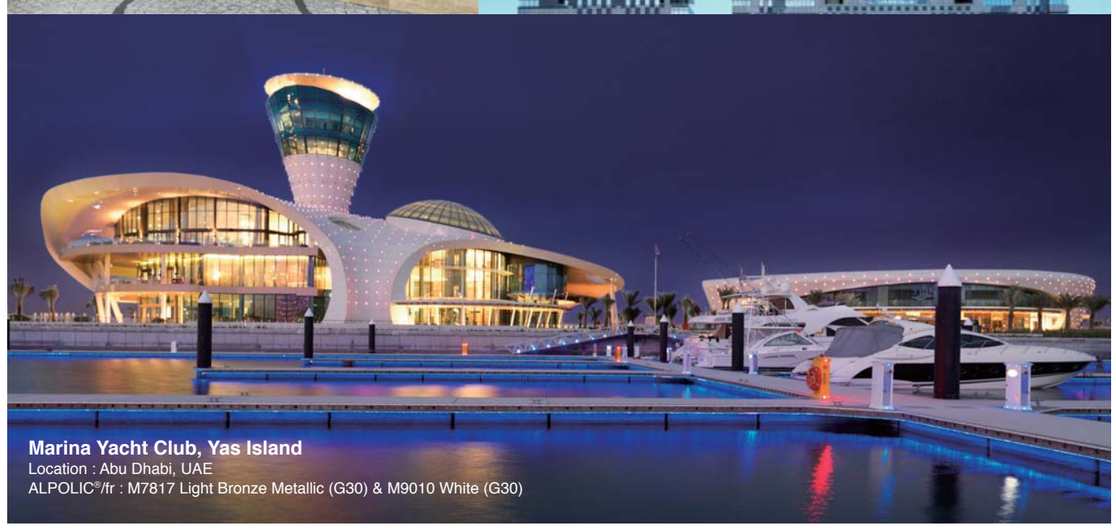
Gijang Fire Station
Location: Busan, Korea
ALPOLIC®/fr: ME017 Prismatic Sky (G80)

EGE Park Tower
Location: Izmir, Turkey
ALPOLIC®/fr: MT407 Zeblock (G15)





Sky City
Location: Taipei, Taiwan
ALPOLIC®/fr: MG3W Red Granite (G80)
MG4W Pink Granite (G80)



Marina Yacht Club, Yas Island
Location : Abu Dhabi, UAE
ALPOLIC®/fr : M7817 Light Bronze Metallic (G30) & M9010 White (G30)