

Net ZERO Healthy Building dengan AGC Group

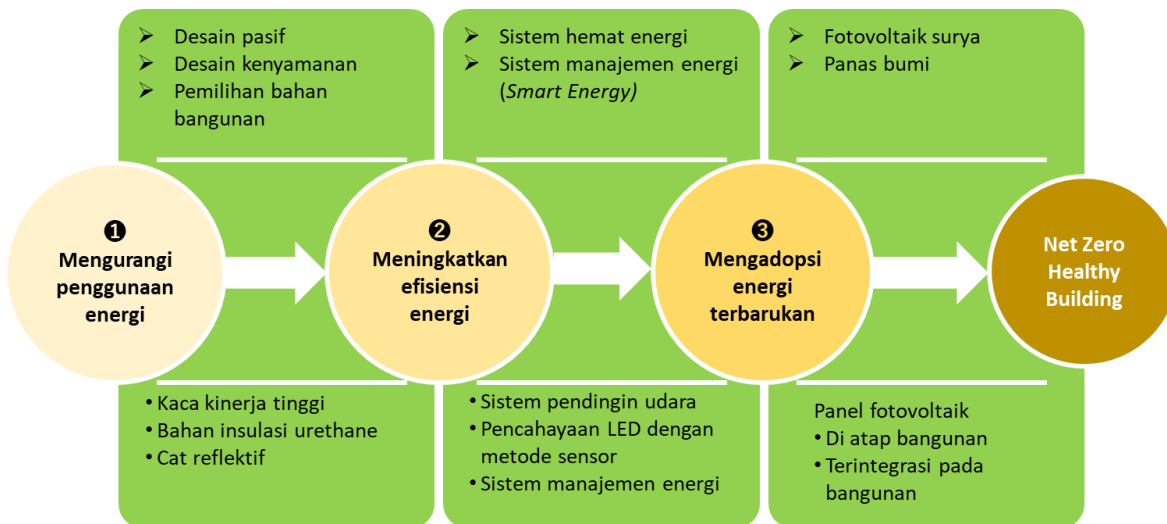


Pendahuluan

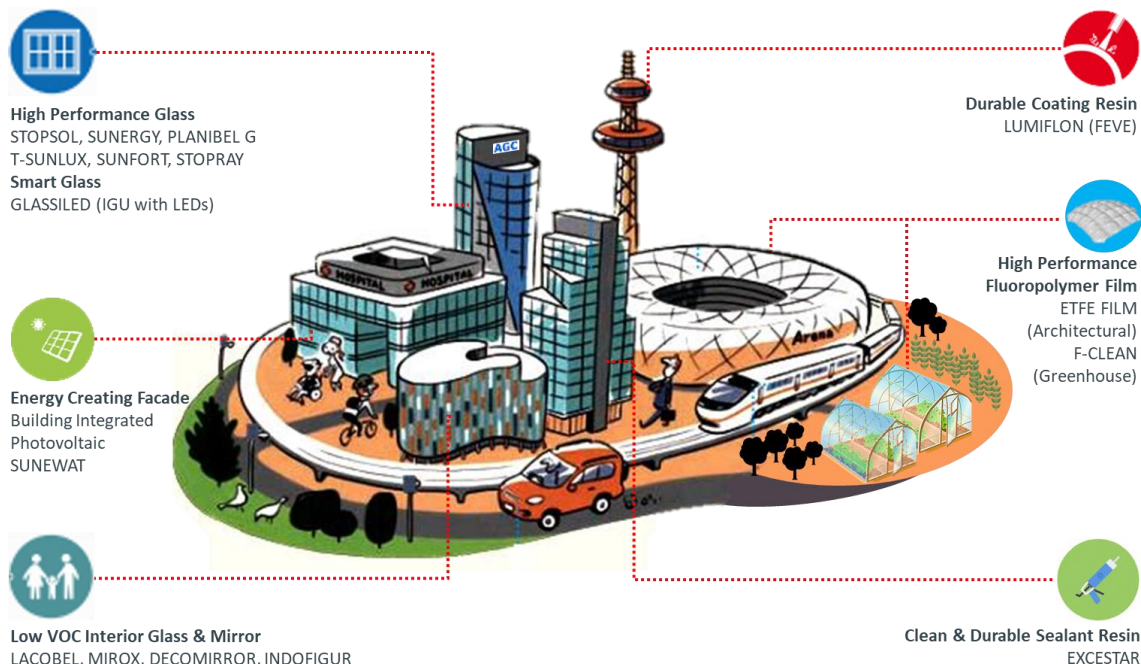
Secara global, sektor bangunan dan konstruksi menyumbang 36% dari penggunaan total energi dan 39% dari emisi karbon dioksida. Oleh karena itu, bangunan hijau dan berkelanjutan telah menjadi hal yang normal, terutama dalam konstruksi komersial dan perumahan.

Penggunaan material, air, energi, dan sumber daya lainnya yang efisien memungkinkan para pemangku kepentingan memenuhi tuntutan peraturan lingkungan yang semakin ketat dan mendapatkan manfaat lainnya. Contohnya, para pengembang mendapat manfaat dari pengurangan biaya operasional dan nilai aset yang lebih tinggi. Selain itu, kemampuan untuk mempromosikan praktik berkelanjutan dan meningkatkan kesehatan dan kesejahteraan penghuni merupakan insentif yang juga sama menariknya.

Untuk menuju *Net Zero Healthy Building*, ada tiga tahap yang perlu kita lakukan. Ketiga tahap tersebut yaitu mengurangi penggunaan energi, meningkatkan efisiensi energi serta mengadopsi energi terbarukan.



Di bawah ini adalah beberapa solusi AGC untuk mencapai *Net Zero Healthy Building*.



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FLUON ETFE FILM

Fluon adalah film fluoropolimer berkinerja tinggi yang diproduksi dari bahan baku kopolimer ethylene-tetrafluoroethylene (ETFE). Sebagai salah satu material bahan bangunan, film transparan ini memiliki properti yang unik, seperti transmisi cahaya yang tinggi, daya tahan cuaca, ringan, mudah dirawat, dan fleksibel dimana dimensi film tersebut dapat disesuaikan dengan permintaan arsitek. Fluon dapat digunakan dengan 1 layer (*tension system*) atau 2 layer (*cushion system*). Film ini juga bisa dipadukan dengan teknologi LED. Penggunaan Fluon kini kian meningkat di kalangan para arsitek di Indonesia. Dengan desain yang tidak terbatas, aplikasi Fluon dapat digunakan pada atap, kanopi serta selubung bangunan.

Berikut adalah spesifikasi Fluon ETFE Film.

Jenis film: Transparan, Berwarna, *Printed*.

Tebal film: 250µm.

Dimensi: sesuai permintaan.

Berat 0.44 kg/sqm.

Transmisi cahaya: 90.8%.

Refleksi cahaya: 7.6%.

LUMIFLON

Lumiflon adalah resin cat yang transparan, dimana komponen tersebut sangat penting dalam pembuatan dan performa cat. Secara ilmiah, Lumiflon dikenal dengan nama fluoro ethylene vinyl ether (FEVE) resin. Lumiflon memiliki 3 jenis fasa, yaitu resin berbasis air dan emulsi (*solvent-based*) serta bubuk (*powder-based*). Lumiflon memiliki daya ketahanan terhadap cuaca dan korosi yang baik, mudah dibersihkan dan hanya mengandung level *volatile organic compound* (VOC) yang sangat rendah. Dengan Lumiflon, pemilihan warna akan lebih banyak dan cakupan lapisan dari *matte* hingga kilauan sebesar 80%. Cat yang mengandung Lumiflon dapat digunakan pada berbagai permukaan seperti kerangka aluminium, panel komposit aluminium, besi dan konkret.

EXCESTAR

Excestar adalah resin sealant untuk pembuatan sealant akhir. Secara ilmiah, Silane Modified Polymer (SMP) digunakan dalam formulasi sealant akhir yang digunakan untuk menyegel antar substrat. Excestar dapat digunakan diantara permukaan beton pra-cetak, konkret, ubin lantai, panel komposit aluminium, marmer dan batu alam. Karena Excestar memiliki kandungan VOC dan minyak silikon yang jauh lebih rendah, hanya sedikit debu yang menempel di permukaan fasad. Dengan demikian, Excestar dapat memberikan tampilan fasad yang lebih bersih untuk periode waktu yang lebih lama. Bangunan yang menggunakan sealant Excestar dapat mengurangi biaya perawatan untuk tujuan pembersihan permukaan fasad.





HIGH-PERFORMANCE FLUOROPOLYMER FILM

WHAT IS Fluon® ETFE FILM?

Fluon® ETFE, a thermoplastic fluoropolymer developed by AGC, is the raw material used to produce Fluon® ETFE FILM. It is an ethylene-tetrafluoroethylene copolymer. Fluon® ETFE has good mechanical properties and mouldability and can be extruded, injection moulded and blow moulded. Fluon® ETFE has excellent characteristics that make it suitable for many kinds of applications.

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FEATURES

- Transparent thermoplastic film manufactured from ETFE (ethylene tetrafluoroethylene)
- Architectural Fluon® ETFE FILM is available in thicknesses between 100um and 500um
- ETFE melting point is 260°C
- Highly transparent and lightweight

BENEFITS

- Strong mechanical strength to resist high wind loads
- Low surface energy, therefore self-cleaning
- Resistant to UV light providing long durability
- Repairable with ETFE FILM patches or sheets
- Excellent chemical resistance

Grades&Size

	Grade	Thickness (µm)	Width (mm)	Length (m/Roll)	Surface condition	Remarks
Transparent	100NJ	100	1600	500	Glossy	
	150NJ	150		333		
	200NJ	200		250		
	250NJ	250		200		
	300NJ	300		170		
Diffused	150HJ	150	1600	333	One side diffused	
	200HJ	200		250		
	250HJ	250		200		
Color	200TB	200	1600	250	Glossy	Blue
	250TB	250		200		
	200WT	200		250		White
	250WT	250		200		
Printed	200NJ P12	200	1580	approx.250-270	Printed	Silver dot print (large)
	250NJ P12	250		approx.200-220		
	200NJ P63	200		approx.250-270		Silver dot print (small)
	250NJ P63	250		approx.200-220		
	200NJ P61	200		approx.250-270		Silver nega dot print
	250NJ P61	250		approx.200-220		

Comparison with glass

	Thickness	Weight(kg/m ²)	Visible light(%)		UV Light transmittance(%)
			Reflection	Transmittance	
Fluon®ETFE FILM(250NJ)	250µm	0.4	7.6	90.8	81.8
Flat Glass(5mm)	5mm	12.5	8	89.5	66.4

HIGH-PERFORMANCE FLUOROPOLYMER FILM



04 OPTIMIZING THE LIGHT CONDITIONS

- Colored film and frit print options can optimize the indoor environment.
- Diffused light option allows for reduced shadows and scattered light to improve grass growth.
- Diffused light provides a pleasant light effect for the user experience.

05 LOW MAINTENANCE

- Excellent durability, resistant to adverse environmental conditions.
- Low surface energy to provide easy maintenance and self-cleaning.
- Flame resistant, does not support combustion.
- Wide range of service application temperatures.



Fabricator: Saito Construction Technology Center

01 TRANSPARENCY

- Spanning and innovative building design possibilities providing bright and open interior space.
- High quality visible light and full spectrum UV light to improve user experience.
- Best interior growing conditions to yield a robust, natural grass playing field.
- Retains transparency for a long period of time (25 years).



03 ENERGY SAVING

- Multiple film options can provide additional thermal insulation.
- Light transmission and solar heat gain control options are available.



02 DESIGN FLEXIBILITY

- Light weight and wide design flexibility for free form shapes.
- Back lighting systems allow for multiple color variations for dramatic color changes.
- Colored film and various frit print patterns also an option.



Why lumiflon

1 aesthetics:

LUMIFLON-based coatings offer brilliant, long-lasting colors with a wide gloss range. They simply look great – and keep looking great year after year.

2 corrosion prevention:

LUMIFLON's unique chemical structure improves resistance to corrosion from water, oxygen and even chloride ions, ensuring a longer life for industrial structures like bridges with far less need for repainting.

3 sustainability:

With its long lifespan, LUMIFLON eliminates the environmental impact of repeated repainting and recoating – just one of the reasons LUMIFLON coatings can contribute to LEED certification.

4 outperforms the competition:

No other coating type can match LUMIFLON's combination of attractiveness, application flexibility and – as tests and studies confirm – long life and weathering resistance.

5 lower life cycle cost:

Because they last so much longer, LUMIFLON-based coatings can substantially reduce any project's life cycle costs, including maintenance costs, replacement costs and recoating costs.



name: COSY JADE building, Mexico
substrate: aluminum composite material
market: architectural



name: Tsunome Subasa bridge, Japan
substrate: concrete, steel
market: industrial maintenance

aesthetics

Because LUMIFLON-based coatings offer crisp, clean colors and a wide range of gloss, designers and builders choose them to achieve a superior look from day one. And with LUMIFLON's ability to resist UV degradation, corrosion, and the ill effects of chemical exposure, projects using LUMIFLON continue looking good for years to come with little or no maintenance required. That means markedly less fading, discoloration and chalking for the life of the coating – estimated at up to 60 years! Meanwhile, AGC's research and development team continues to press LUMIFLON's aesthetic advantage with new FEVE resin formulations that add even more improvements, like the ability to resist dirt and grime.

bridge after fourteen years

name: daiichi mukaiyama bridge, Japan
when: 1987
where: mountain area
new/repaint: new
how long: 14 years

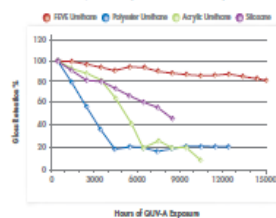


LUMIFLON: gloss retention is still high



name: burj al arab hotel, Dubai U.S.A.
substrate: aluminum composite material
market: architectural
photo by Takanori Matsushima, 2010/01/07

FEVE resin topcoats accelerated weathering QUV-A (ASTM D4587)



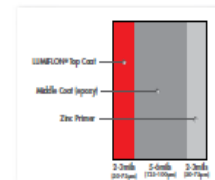
corrosion resistance

Corrosion is a major problem that can dramatically add to a project's life cycle costs, especially for bridges, water towers and other metal structures.

A LUMIFLON-based coating:

- Resists degradation due to weathering and exposure to chemicals
- Over the course of many years, loses little of its thickness
- Keeps corrosion initiators from penetrating the topcoat and degrading the zinc-rich primer underneath
- Has an estimated coating life of 60 years or more

CROSS SECTION OF COATING SYSTEM



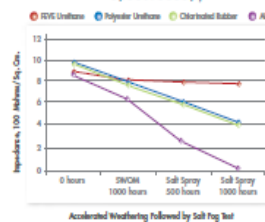
CORROSION RESISTANCE OF LUMIFLON FD-1000: SALT FOG TEST

product (NCO Index)	LUMIFLON FD-1000 (1.0)	polyurethane dispersion ¹ (1.5)
coating system	primer ² /topcoat/topcoat	
salt spray, 1000 hours	good (rating 0)	very slight blisters 1mm (rating 1)
salt spray, 1500 hours	good (rating 0)	slight blisters, 1mm (rating 2)

¹ Bayhydrol 100 (Bayer Corp.)

² Waterborn 20 epoxy primer

ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY



Corrosion resistance is directly related to the slope of the line. The lower the angle difference from horizontal, the better the corrosion resistance.



name: kyosu bridge, japan
substrate: steel
market: industrial maintenance



name: nii sakimoku network center, japan
substrate: steel
market: industrial maintenance



name: water tower, usa
substrate: steel
market: industrial maintenance



name: toumouri water tower, usa
substrate: steel
market: industrial maintenance

sustainability

The weatherability, longevity and the ability to formulate low VOC coatings with LUMIFLON resins are all features that contribute to its sustainability, a concept meaning "to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments" (www.gsa.gov).

"Reduce consumption of non-renewable resources"

LUMIFLON coatings can last more than 30 years without fading, reducing life cycle costs related to the maintenance, re-application and/or replacement of underlying surfaces. On existing roofs, a LUMIFLON topcoat can stop the degradation of the underlying reflective coating, thus extending the life and solar reflectance capability of the roof and minimizing the use of raw materials derived from oil.

"Minimize waste"

By extending the life of roof and wall systems, LUMIFLON topcoats reduce waste created from disposal of damaged roofing and walls, avoid energy consumption in the production, transportation and installation of new systems, and maintain energy and equipment savings from continued high performance of the building envelope. In addition, the energy consumed in removing a coating from a building or structure can be avoided through the use of a new paint product containing a LUMIFLON clearcoat with excellent durability and weatherability.

"Create healthy, productive environments"

There are four types of LUMIFLON resins, three of which – solid, powder, and emulsion grades contain either zero volatile organic compounds (VOCs) or can be formulated to contain less than 50 g/L of VOCs, meeting the most stringent green building criteria in the US.

Due to its longevity, LUMIFLON reduces the environmental impact associated with production, transportation (energy consumed, greenhouse gases emitted), and VOCs off-gassed during the repainting/coating process.

gloss and color retention of toumouri bridge



october 1988



april 1993



april 2011

initial gloss	final gloss	gloss retention	color change
75	69	91%	ΔE=3.5

outperforms the competition

Industry insiders know that, from buildings and bridges to water towers and automobiles, LUMIFLON-based coatings look great. But they look even better when cold, hard data comparing LUMIFLON with high-performance polyesters and other competitors are collected from tests and studies conducted in laboratories, simulators and harsh, real-world environments.

Advantages of FEVE Based Coatings

- Ambient or elevated temperature cure – field or shop applied coatings.
- Solvent soluble – clean crisp colors and a wide gloss range.
- Versatile – solvent grade, solid, water based and powder coating resins offered.
- OH functional – polyurethane chemistry, use standard paint equipment.
- Fluoropolymer segments – ultra-weatherable and corrosion resistant.
- Longer life cycle – up to 60 years.



Alloy coating is peeling



LUMIFLON coating: no chalking or peeling



Alloy coating: chalking and color fade have occurred

LUMIFLON vs. pvcf

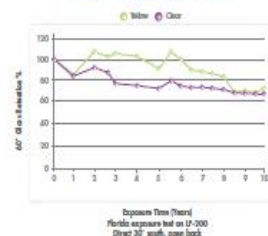
	LUMIFLON	pvcf
resin type	solution	solvent dispersion
curing temperature	room temp. to 220°C	>250°C
60° gloss	5 to 90	5 to 35
color range	>230 colors	color selection is limited
maintainability	excellent	difficult



name: ferrari world, abu dhabi u.a.e.
substrate: aluminum
market: architectural

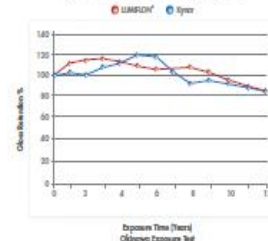
The results confirm what you see with your own eyes every time you look at an attractive, long-lasting LUMIFLON coating all over the world. LUMIFLON outperforms the competition.

NATURAL EXPOSURE TEST ON LUMIFLON Miami, Florida (ASTM G2)



name: boeing 777 airplane
substrate: aluminum alloy / composites
market: aerospace
photo by AIAA

Okinawa weathering chart



name: stadium seat, japan
substrate: fiberglass
market: architectural

lower life cycle cost

There are those who make buying decisions based on price – and then there are those who are more interested in value. With LUMIFLON, the difference is clear.

- LUMIFLON-based coatings maintain gloss and color when applied to buildings, bridges, water towers, and other structures for between 20 and 60 years – significantly longer than other coating types.
- LUMIFLON resins protect steel, aluminum, fiberglass, concrete, and other materials from corrosion, sun, wind, rain and chemical exposure.

Over time, all that protection also protects your bottom line. Total life cycle costs, factoring in savings on maintenance, recoating and replacement, are much lower with LUMIFLON. Based on results from numerous projects, it's estimated that the life cycle cost of LUMIFLON coatings is only 40-60% of that of polyurethane. Price versus value: Over the course of a project's lifetime, the difference can be monumental.

Life Cycle Cost Advantages

- **Initial applied cost of FEVE-based topcoat:**
5-10% higher than standard polyurethane topcoat.
- **FEVE-based topcoat life expectation:**
30-60+ years
- **Expected maintenance of standard polyurethane topcoat in this time frame:**
2-3 repainting cycles.
- **Additional costs of repainting:**
Asset downtime
Staging costs
Environmental costs
Emissions and CO₂ from equipment



name: bullet train "mag"
substrate: steel
market: transportation



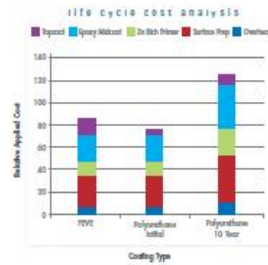
name: 747 airplane
substrate: aluminum alloy
market: aerospace



name: chevy cruze
substrate: plastic
market: automotive

comparative life cycle costs: LUMIFLON coating and chlorinated rubber coating

coating type	process	cost, \$/m ²	initial cost ratio	coating life, years	cost/year, \$/m ²
chlorinated rubber	surface preparation	\$10.06	0.19		
	staging	\$27.48	0.52		
	coating	\$15.53	0.29		
	TOTAL	\$53.09	1.00	8	\$6.64
LUMIFLON coating	surface preparation	\$10.06	0.19		
	staging	\$35.08	0.66		
	coating	\$52.96	0.82		
	TOTAL	\$98.10	1.47	>25	\$3.72
LCC Ratio:					0.56



name: okayama castle, japan
substrate: concrete
market: architectural

solvent grades



name: spectrum building, usa
substrate: aluminum composite material



name: sakashi straits bridge, japan
substrate: steel



name: rosemont water tower, usa
substrate: steel

solid resins



name: teikyo dragon tower gateway, usa
substrate: steel



name: sola center, usa
substrate: aluminum composite material

water emulsion resins



name: stadium seats, japan
substrate: fiberglass



name: miyama estate, japan
substrate: fiber reinforced concrete



name: okayama castle, japan
substrate: concrete

powder coating



name: the birmingham news, usa
substrate: aluminum

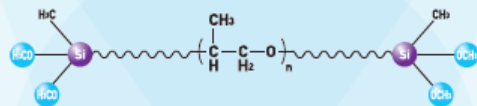


name: richmond city hall, usa
substrate: aluminum composite material

Superior durability and weatherability. More brilliant, longer lasting colors and a far wider gloss range. And the toughest, most durable finish ever with the industry's leading longevity record. Add LUMIFLON's unique capabilities for field application and you have an end product that looks better, longer - and ultimately costs less. Longer life is also a formula for sustainability, which is good chemistry for a blue planet. For more information on LUMIFLON's applications worldwide, please call 800-424-7833, 610-423-4300 or visit www.lumiflonusa.com. Discover for yourself how good your bottom line looks when you raise your own standards with LUMIFLON.

EXCESTAR™

Silane Modified Polyether (SMP)



PERFORMANCE ADVANTAGES

Environmentally friendly / Safe

- Solvent free, toxic (amine, isocyanate) free and low VOC material
- Good for interior adhesion such as automotive and construction

Elasticity

- Suitable for an application which requires expansion and contraction, high vibration resistance
- Keeping elasticity for a long time

Good adhesion

- Excellent adhesion for metal, plastics and coating material

Non-staining

- Pollutant (low molecular weight compound) free
- Keeping various adherend (tile, stone, metal panel etc.) clean for a long term

Good weatherability

- Suitable for outdoor use

Good paintability

- Paintable with various kinds of paints

PROPERTIES

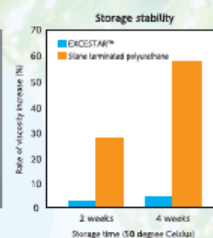
SMP demonstrates the excellent properties compared with other resin.

		SMP	Silicone	PU	Epoxy
Sealant	Paintability	Excellent	Poor	Good	•
	Non-staining	Good	Poor	Good	•
	Weatherability	Good	Excellent	Poor	•
	Durability	Good	Excellent	Average	•
Sealant/Adhesive	Flexibility	Excellent	Excellent	Average	Poor
	Bubble free curing	Excellent	Excellent	Poor	Excellent
	Environmental Characteristic	Excellent	Good	Poor	Poor
	Storage stability	Excellent	Good	Average	Poor
Adhesive	Curing rate	Excellent	Excellent	Poor	Average
	Strength	Average	-	Good	Excellent
Adhesive	Adhesion	Good	-	Poor	Excellent

FEATURES OF EXCESTAR™

EXCESTAR™ has multiple advantages compared with silane terminated polyurethane.

- Elongation
- Heat resistance
- Weatherability
- Storage stability and production stability



EXCESTAR™ APPLICATION

Construction

House

- Metal roof sealant
- Exterior / Interior sealant
- Interior adhesive (flooring, wall, ceiling)



Building

- Metal / pre-cast concrete curtain wall joint sealing
- Reinforced Concrete joint sealing

Industrial

Automotive

- Interior materials adhesive
- Millar / window shield adhesive



Train

- Interior adhesive
- Joint sealing (panel, glass)

Elevator

- Panel adhesive

Electronics

- Electronics component adhesive



EXCESTAR™ & PREMINOL™ APPLICATION

Plasticizer for SMP

PERFORMANCE ADVANTAGES

- Non-staining
- Excellent paintability
- Environmentally friendly

Formulation

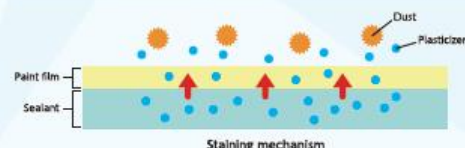
20 ~ 40% EXCESTAR™
10 ~ 20% plasticizer
1 ~ 2 % water scavenger
40 ~ 60% fillers (calcium carbonates)
2 ~ 4 % silane coupling agent,
antioxidant, ultraviolet absorber etc.
0.1 ~ 1.0% catalyst



PROPERTIES

PREMINOL™ is suitable for a plasticizer combined with SMP sealant.

	PREMINOL™ A	PREMINOL™ B	Conventional PPG	DMP
Molecular weight	Average	High	Average	Low
Environmentally friendly	Good	Good	Good	Poor
Workability	Good	Average	Good	Good
Non Bleed (Resistance to staining)	Good	Excellent	Poor	Poor
Appearance (after staining test)				



STOPSOL (Online Reflective Glass)

Kaca yang memiliki satu lapisan reflektif pada satu sisi permukaan kaca yang diaplikasikan sewaktu kaca dasar masih dalam proses pemanasan (kaca masih dalam temperatur tinggi). Kaca Stopsol memiliki ketahanan yang relatif lebih tinggi terhadap pengaruh perubahan cuaca ataupun goresan-goresan halus pada sisi coating. Sisi lapisan coating bisa diaplikasikan pada sisi luar (#1 – Eksterior) dengan penampilan lebih reflektif, maupun pada sisi dalam (#2 – Interior) dengan penampilan warna dasar kaca yang lebih cerah.

SUNERGY (Online Solar Control Low-Emissivity Glass)

Kaca yang memiliki dua lapisan (reflektif dan emisivitas yang rendah atau *Low-E*) pada satu permukaan kaca. Kaca Sunergy memberikan penampilan yang netral pada fasad bangunan. Kaca ini juga mengizinkan banyak cahaya yang masuk ke dalam bangunan, tanpa mengurangi kenyamanan termal. Sisi lapisan coating diaplikasikan pada sisi dalam (#2 – Interior).

PLANIBEL G (Online Pure Low-Emissivity Glass)

Kaca yang memiliki dua lapisan *Low-E* yang rendah pada satu permukaan kaca. Untuk kaca fasad gedung, Planibel G tidak disarankan diaplikasikan sebagai kaca tunggal. Untuk performa yang lebih baik, kaca ini bisa dikombinasikan dengan kaca reflektif atau kaca *Low-E* pada sisi luarnya (kaca laminasi atau kaca ganda yang dikenal sebagai IGU atau DGU). Sisi lapisan coating bisa diaplikasikan pada sisi dalam (#4 – Interior) untuk kaca laminasi dan pada sisi Air Space (#3 – menghadap *Air Space*) untuk kaca IGU atau DGU.

T-SUNLUX (Offline Reflective Glass)

Kaca yang memiliki satu lapisan reflektif pada satu sisi permukaan kaca yang diaplikasikan sewaktu kaca dasar sudah selesai dari proses produksi. Kaca T-Sunlux memiliki karakteristik memblokir panas yang relatif tinggi dari sinar matahari langsung, meskipun diaplikasikan sebagai kaca tunggal. Sisi lapisan coating diaplikasikan pada sisi dalam (#2 – Interior).

SUNFORT

Kaca yang memiliki performa yang baik dan mampu mencegah panas memasuki ruangan. Kaca ini menciptakan kenyamanan termal untuk area tropis. Mengacu peraturan OTTV, Sunfort menghasilkan penghematan dan kenyamanan energi yang unggul. Selain itu, Sunfort juga dapat membawa bangunan selangkah lebih dekat ke sertifikasi ramah lingkungan.

STOPRAY (Offline High-Performance Solar Control Low-Emissivity Glass)

Kaca yang memiliki beberapa jenis lapisan, yaitu *Low-E* dan perak pada satu sisi permukaan kaca. Sesuai dengan perkembangan arsitektur fasad masa kini, kaca Stopray sangat diminati karena memiliki transparansi yang relatif cukup tinggi. Kaca ini juga memiliki performa termal yang sangat baik. Hal ini bisa dibuktikan dengan nilai *SC* dan *U-value* yang rendah. Kaca Stopray harus diaplikasikan sebagai kaca ganda IGU atau DGU, dengan sisi lapisan diaplikasikan pada sisi Air Space (#2 – menghadap *Air Space*).

Combining comfort and privacy

— STOPSOL —

Stopsol is a reflective pyrolytic coated glass that stands out for its performance durability coupled with good solar control and unique reflective aesthetics. It can be easily used for a large variety of processing options including tempering, laminating, double glazing, bending and silkscreen printing, offering architects unlimited creativity for its applications.

The final appearance of Stopsol will depend on the colour of the substrate glass, the coating, the thickness and the position of the coating. With constant strive for innovation and cutting edge technologies, PT. Asahimas Flat Glass Tbk. has improved the performances of the Stopsol Supersilver series by using advanced technology to apply the oxide coating. This new generation of Stopsol Supersilver has a brighter and more attractive appearance.

What's so special about it?	What does it mean for you?
Wide variety of visual appearances	- Provides architects with an array of aesthetic choices through its reflective appearance.
Enhanced Solar Control	- Keeps the heat out there by maintaining comfortable temperatures indoor. - Reduces energy cost needed for air - conditioning.
Durable Online Coating	- With stands harsh environmental conditions such as extreme temperature changes, pollution and corrosion. - Allows for long term storage due to infinite shelf life. - Provides easy handling and multiple processing options.



Performance Data

Stopsol

Type Of Stopsol	Standard Thickness (mm)	Coating Position	Light Performances			Energy Performances			SF (%)	SC	U Value W/m ² K
			VLT (%)	VLR Ext (%)	VLR Int (%)	DET (%)	ER (%)	EA (%)			
Stopsol Classic Dark Blue (CDH)*	5	#1	28	32	16	28	27	45	40	0.46	5.8
		#2	28	16	32	28	12	60	44	0.50	5.7
	6	#1	26	32	14	25	26	49	37	0.43	5.7
		#2	26	14	32	25	10	65	41	0.48	5.7
	8	#1	22	32	12	20	26	54	34	0.39	5.7
		#2	22	12	32	20	9	71	38	0.44	5.6
New Stopsol Supersilver New Dark Blue (SSDHF)	5	#1	37	30	13	32	23	45	44	0.50	5.8
		#2	37	13	30	32	10	58	47	0.54	5.7
New Stopsol Supersilver Green (SSGNF)	6	#1	48	34	22	30	26	44	41	0.47	5.7
		#2	48	22	34	30	12	58	44	0.51	5.7
	8	#1	44	34	19	24	25	51	37	0.42	5.7
		#2	44	19	34	24	10	66	41	0.47	5.6
New Stopsol Supersilver Dark Blue (SSDHF)	6	#1	40	36	18	33	27	40	44	0.50	5.7
		#2	40	18	36	33	12	55	47	0.54	5.7
	8	#1	34	35	14	27	27	46	39	0.45	5.7
		#2	34	14	35	27	10	63	43	0.49	5.6
New Stopsol Supersilver Euro Grey (SSGEF)	5	#1	35	34	14	39	26	35	48	0.55	5.8
		#2	35	14	34	39	11	50	52	0.59	5.7
	6	#1	31	34	12	35	26	39	45	0.52	5.7
		#2	31	12	34	35	10	55	49	0.56	5.7
	8	#1	25	34	9	28	26	46	40	0.46	5.7
		#2	25	9	34	28	8	64	44	0.51	5.6
New Stopsol Supersilver Blue Green (SSBNF)	6	#1	43	35	19	30	26	44	41	0.48	5.7
		#2	43	19	35	30	12	58	45	0.52	5.7
	8	#1	38	35	16	24	26	50	37	0.42	5.7
		#2	38	16	35	24	10	66	41	0.47	5.6

Remark :

- > * Non standard product
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STOPSOL SUPERSILVER GREEN UNIVERSITY OF OTTAWA, VANIER HALL - CANADA

Versatile with neutral aesthetics

SUNERGY

Sunergy is a pyrolytic coated glass that is highly scratch-resistant and can be bent, tempered, laminated and double glazed, product in making it one of the favourite choices for complex constructions. Together with its excellent solar control properties, low reflection and neutral appearance, Sunergy is definitely an ideal product in today's architectural world.

Sunergy is available in several types Sunergy Clear (neutral greyish tone), Sunergy Cool (bluish grey color tone), Sunergy Tinted (Euro Grey, Green, and Blue Green)

What's so special about it?	What does it mean for you?
Excellent Solar Control	- Keeps the heat out thereby maintaining comfortable temperatures indoor. - Reduces energy cost needed for air - conditioning.
Low Emissivity	- Delivers thermal insulation properties to keep comfortable temperatures within the building.
Wide variety of visual appearances	- Provides architects with an array of aesthetic choices.
Durable Online Coating	- Withstands harsh environmental conditions such as extreme temperature changes, pollution and corrosion. - Allows for long term storage due to infinite shell life. - Provides easy handling and multiple processing options.



Disclaimer: Illustrated colors are only an indication of actual color. Please refer to actual glass samples to get the accurate glass color.

Performance Data

Sunergy

Type Of Sunergy	Standard Thickness (mm)	Coating Position	Light Performances			Energy Performances			SF (%)	SC	U Value W/m ² K
			VLT (%)	VLR Ext (%)	VLR Int (%)	DET (%)	ER (%)	EA (%)			
Clear (SNFL)	3	#2	70	9	11	57	10	33	63	0.73	4.1
	4	#2	70	9	11	56	10	34	62	0.72	4.1
	5	#2	69	9	11	55	9	36	61	0.71	4.1
	6	#2	69	9	11	54	9	37	61	0.70	4.1
	8	#2	68	9	11	52	8	40	59	0.68	4.1
	10	#2	68	9	11	50	8	42	58	0.66	4.0
Green (SNGN)	6	#2	56	7	10	30	6	64	42	0.48	4.1
	8	#2	51	7	9	25	6	69	38	0.43	4.1
Blue Green (SNBN)	6	#2	47	7	9	27	6	67	40	0.46	4.1
	8	#2	42	6	9	22	6	72	36	0.41	4.1
Euro Grey (SNGE)	6	#2	34	6	8	28	6	66	40	0.46	4.1
	8	#2	27	5	8	22	6	72	35	0.41	4.0
Cool (SNCFL)	5	#2	50	7	9	39	7	54	49	0.56	4.4
	6	#2	50	6	9	38	7	55	48	0.56	4.4
	8	#2	50	6	9	36	7	57	47	0.55	4.3

Remark

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Low Emissivity Glass

PLANIBEL G

Planibel G is a coated glass that can be tempered and do not require any edge deletion. Its durability and high - resistant surface make it suitable for both construction and industrial applications, such as home appliances, commercial refrigeration, heated glass, etc.

To achieve better thermal insulation performances, Planibel G can be combined with solar control glass (Eg. Stopsol, Sunergy and T-Sunlux) in a double glazing unit. It is particularly suitable for OPTIMA combinations due to its clear and neutral appearance.

What's so special about it?	What does it mean for you?
High light transmission	- Increase the amount of natural light entering a building and reduce the need for artificial lighting, resulting in a more comfortable environment.
Low Emissivity	- Delivers thermal insulation properties to keep comfortable temperatures within the building.
Durable Online Coating	- High levels of scratch resistance, leading to reduced maintenance. - Withstands harsh environmental conditions such as extreme temperature changes, pollution and corrosion. - Allows for long term storage due to infinite shelf life. - Provides easy handling and multiple processing options.



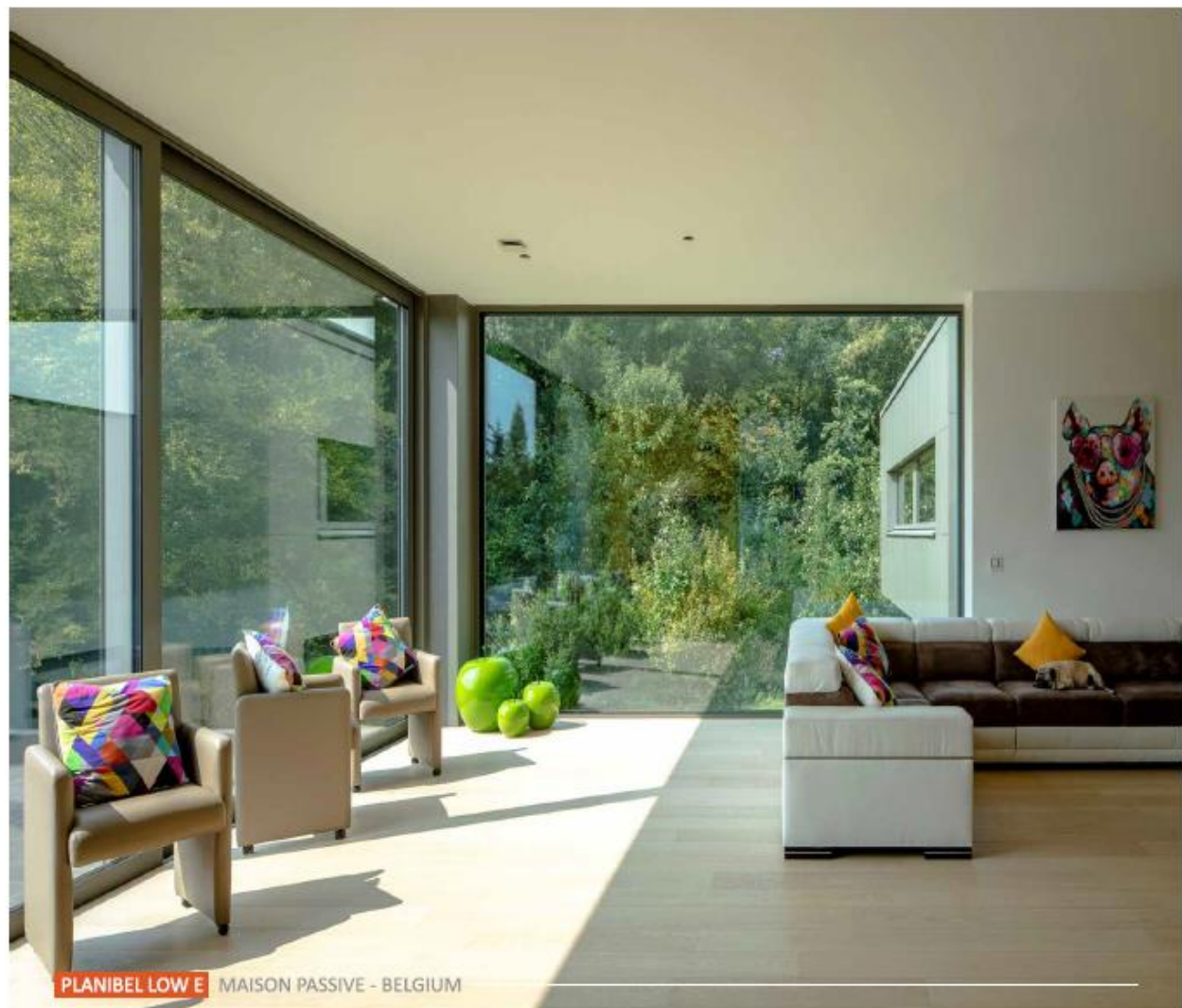
Performance Data

Planibel G

Type Of Planibel G	Standard Thickness (mm)	Coating Position	Light Performances		Energy Performances			SF (%)	SC	U Value W/m²K
			VLT (%)	VLR (%)	DET (%)	ER (%)	EA (%)			
Clear (PNGFL)	3.2	#2	82	10	71	10	19	74	0.85	3.8
	4	#2	82	10	70	10	20	73	0.84	3.7
	5	#2	81	10	68	10	22	72	0.82	3.7
	6	#2	81	10	67	9	24	71	0.81	3.7

Remark :

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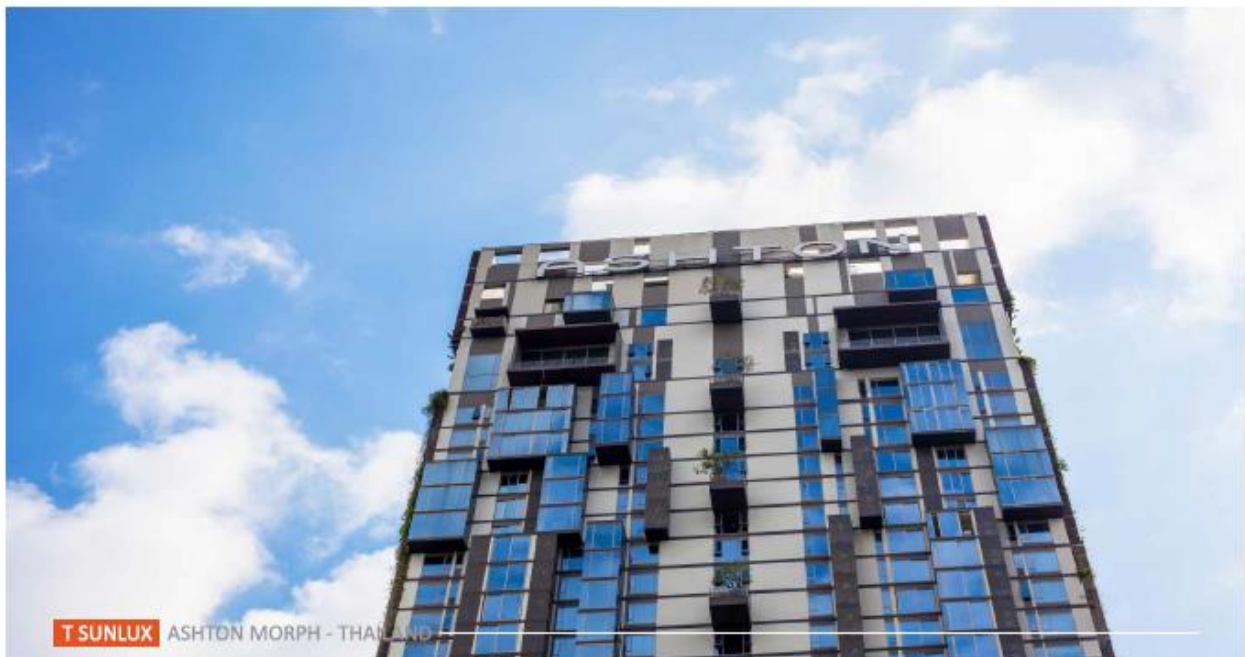
Reflective and Temperable

— T-SUNLUX —

T-Sunlux, a temperable magnetron coated glass, has a strong and durable coating that is able to go through tempering without compromising its appearance.

This high performance solar control coated glass specializes in blocking heat and is a great fit for architectural glass applications where heavy sun makes excessive solar heat gain. In addition to its excellent performance, T-Sunlux is available in various colour substrates and has a wide selection of coatings.

What's so special about it?	What does it mean for you?
Variety of coatings on many colour substrates	- Offers multiple options to provide the right solution for all glass needs.
Excellent Solar Control	- Keeps the heat out thereby maintaining comfortable temperatures indoor. - Reduces energy cost needed for air-conditioning.
Durable Coating	- Durability exceeds traditional magnetron coated products. - Allows for long term storage due to long shelf life. - Provides easy handling and multiple processing options.



Performance Data

T-Sunlux

Type Of T-Sunlux	Glass Substrate	Standard Thickness (mm)	Light Characteristic			Energy Characteristic				SF (%)	SC	U Value W/m²K	
			VLT (%)	VLR Ext (%)	VLR In (%)	DET (%)	ER (%)	EA (%)	UV VLT %				
CS-108 #2	On Clear	5	9	41	42	8	34	58	7	19	0.22	4.4	
		6	9	41	42	7	33	60	7	19	0.22	4.4	
		8	9	40	42	7	31	62	6	19	0.22	4.3	
CS-120 #2		5	22	26	29	19	21	60	19	32	0.37	4.9	
		6	22	25	29	19	20	61	18	32	0.37	4.9	
		8	21	25	29	18	19	63	17	32	0.36	4.8	
CS-130 #2		5	33	19	26	31	15	54	25	44	0.50	5.2	
		6	33	19	26	30	15	55	24	43	0.50	5.2	
		8	33	18	26	29	14	57	22	42	0.49	5.1	
CS-150 #2		5	51	16	21	50	13	37	35	59	0.68	5.7	
		6	51	16	21	48	13	39	34	58	0.67	5.7	
		8	50	16	21	46	12	42	31	57	0.65	5.6	
CS-308 #2	On Green	5	7	29	42	4	16	80	2	20	0.23	4.4	
		6	7	27	42	4	14	82	2	20	0.23	4.4	
		8	6	23	42	3	12	85	1	20	0.23	4.3	
CS-320 #2		5	18	19	29	11	11	78	7	28	0.32	4.9	
		6	17	17	29	10	10	80	5	27	0.31	4.9	
		8	15	15	29	8	9	83	4	26	0.3	4.8	
CS-330 #2		5	27	14	26	18	9	74	9	35	0.4	5.2	
		6	26	13	26	16	8	76	7	33	0.38	5.2	
		8	23	12	26	13	7	80	5	31	0.36	5.1	
CS-408 #2		On Bronze	5	5	19	42	5	20	75	3	20	0.23	4.4
			6	5	16	42	5	17	78	2	20	0.23	4.4
			8	4	13	42	4	13	83	1	20	0.23	4.3
CS-420 #2	5		14	13	29	14	13	74	7	30	0.34	4.9	
	6		12	11	29	12	11	76	6	29	0.33	4.9	
	8		10	9	29	10	9	80	4	28	0.32	4.8	
CS-430 #2	5		21	10	26	22	9	68	9	38	0.44	5.2	
	6		19	9	26	20	8	71	7	37	0.42	5.2	
	8		16	8	25	17	7	76	5	35	0.40	5.1	
CS-508 #2	On Dark Blue	5	4	17	44	3	14	83	3	19	0.22	4.4	
		6	5	21	44	4	16	80	3	19	0.22	4.4	
		8	4	17	44	3	13	84	2	19	0.22	4.3	
CS-520 #2		5	11	13	29	8	10	82	7	26	0.29	4.8	
		6	12	16	29	9	11	80	7	26	0.30	4.8	
		8	11	13	29	7	10	83	6	25	0.29	4.8	
CS-530 #2		5	23	11	26	20	9	71	14	36	0.42	5.2	
		6	21	10	26	18	8	74	12	35	0.40	5.2	
		8	18	9	26	14	7	79	9	33	0.37	5.1	
Sunlux Gold SS 13/20 Annealed	On Clear	5	13	24	34	10	27	63	7	21	0.24	4.1	
		6	13	24	34	10	26	64	7	21	0.25	4.1	
		8	13	24	34	9	24	67	7	21	0.25	4.1	
Sunlux Gold SS 13/20 Toughened		5	13	27	36	9	29	62	7	20	0.23	3.9	
		6	13	27	36	9	28	63	7	20	0.23	3.9	
		8	12	26	36	9	26	66	6	20	0.23	3.9	

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Glass that creates your tropical comfort zone

SUNFORT

SUNFORT is a specially-designed glass that is able to turn any space into a comfortable fort that protects you from the tropical heat within a single glaze.

High shading and emissivity prevent heat from entering living spaces. Low external reflectance protects your eyes as you approach, also allowing SUNFORT to be part of most building facades according to regulations in place within the Asia region. Adherence to OTTV regulations result in superior energy savings and comfort, bringing buildings a step closer to green certification. Best of all, aesthetic designs make it easy to create your dream space.

This is how we turn harsh tropical sun rays into gentle beams that inspire and brighten any day. This is how we create your ideal tropical comfort zone.

What so special about it?	What does it mean for you?
Good Level of Light Transmission	- Offering interior visual comfort
Low Level of External Reflection	- Ideal for both commercial & residential projects
Good Solar Control	- Maintain pleasant indoor temperature while maximizing building's energy efficiency & comfortability level
Shelf-Life	- Durable coating that allows long shelf-life with proper packaging intact
Production in Asia	- Short delivery lead time



Performance Data

SUNFORT

Type Of Sunfort	Standard Thickness (mm)	Light Characteristic			Energy Characteristic			SF (%)	SC	U Value W/m ² K
		VLT (%)	VLR Ext (%)	VLR Int (%)	DET (%)	ER (%)	EA (%)			
Sunfort	5	29	5	10	14	14	72	27	0.31	3.8
	6	29	5	10	14	13	72	27	0.30	3.8
	8	28	5	10	14	12	74	26	0.30	3.8

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Energy-efficient glazing

— STOPRAY —

Stopray, a high performance magnetron coated glass, gives excellent selectivity while retaining a neutral appearance. It offers improved balance between visible light transmittance, solar control and enhanced U-values thereby delivering maximum energy savings that meet or exceed energy code requirements.

Always used as double or triple glazing, it is suitable for use in all climates as it controls heat entering in the summer and keeps heat from escaping during the winter. Stopray is also available in temperable versions (Stopray T range), this brand offers architects more design freedom and flexibility in their projects.

Each product...	... has its benefits
Stopray Smart	- No edge deletion required - Low internal reflection, making it ideal for residential projects - Longer shelf life compared to other magnetron coating
Stopray Vision	- Offer a wide range of light transmission from 36 % to 72 % - Provides good thermal insulation - Good selectivity ratio (LT/SF)



Performance Data

Stopray

Type Of Stopray	Light Performances			Energy Performances				SC (%)	SF	U Value W/m²K
	VLT (%)	VLR Ext (%)	VLR Int (%)	DET (%)	ER (%)	EA (%)	UV VLT			
	EN 410	EN 410	EN 410	ISO 9050	ISO 9050	ISO 9050	ISO 9050	ISO 9050	ISO 9050	ISO 9050
6mm Stopray (#2)+12mm AS+6mm Clear Glass										
Smart 30/20	29	28	15	17	30	53	10	21	0.25	1.6
Smart 32T	33	19	16	20	19	61	11	27	0.31	1.8
Smart 51/33	50	25	17	28	32	40	21	33	0.38	1.6
VISION 31T	31	20	15	15	32	53	12	19	0.22	1.6
VISION 38T	38	17	16	17	38	45	12	21	0.24	1.5
VISION 40T	40	19	15	18	43	39	10	22	0.25	1.6
VISION 40TB	40	20	15	18	39	42	11	22	0.25	1.6
VISION 51T	50	14	14	24	37	39	10	28	0.32	1.6
VISION 52T	50	16	12	24	38	38	13	27	0.32	1.6
VISION 61T	60	13	13	29	35	36	12	33	0.38	1.6
VISION 72T	71	13	14	34	38	28	14	38	0.44	1.6
8mm Stopray (#2)+12mm AS+6mm Clear Glass										
Smart 30/20	29	28	15	16	28	56	9	21	0.24	1.6
Smart 32T	33	18	16	20	18	62	11	26	0.30	1.8
Smart 51/33	49	25	17	27	29	44	20	32	0.37	1.6
VISION 31T	31	20	15	15	29	56	12	19	0.22	1.5
VISION 38T	37	17	16	17	34	49	12	21	0.24	1.5
VISION 40T	39	19	15	18	39	43	10	22	0.25	1.6
VISION 40TB	39	20	15	18	36	46	11	22	0.25	1.6
VISION 51T	50	14	14	23	33	44	10	27	0.31	1.6
VISION 52T	50	16	12	23	36	41	13	27	0.31	1.5
VISION 61T	60	13	13	29	32	39	11	33	0.38	1.6
VISION 72T	70	13	14	34	35	31	13	37	0.43	1.5

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STOPRAY VISION 60T CU OFFICE - POLLAND

Processing Option

		Stopsol	Sunergy	Planibel G	T-Sunlux	Sunfort	Stopray Smart series	Stopray Vision series
Safety	Tempering & Heat strengthening	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Laminating	Yes	Yes ⁽¹⁾	Yes ⁽²⁾	Yes	Yes ⁽²⁾	Yes ⁽²⁾	Yes ⁽²⁾
Insulation	IGU	Yes ⁽³⁾	Yes ⁽³⁾	Yes ⁽³⁾	Yes ⁽³⁾	Yes ⁽³⁾	Yes ⁽³⁾	Yes ⁽³⁾
Cutting	Straight or circular ⁽⁶⁾	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shaping and edge finishing	Edge grinding ⁽⁶⁾	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Hole drilling ⁽⁶⁾	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Notches ⁽⁶⁾	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Edge deletion	No	No	Yes	No	Yes	No	Yes
Special Treatment	Curving or Bending	Yes	Yes	Yes	Yes	Yes	Yes ⁽⁵⁾	Yes ⁽⁵⁾
	Silkscreen printing	Yes ⁽⁵⁾	Yes ⁽⁵⁾	Yes	Yes	Yes ⁽⁵⁾	Yes ⁽⁵⁾	Yes ⁽⁵⁾

⁽¹⁾ Coating is not low-E if placed next to PVB

⁽²⁾ Coating must not come in contact with PVB

⁽³⁾ Recommended position #2

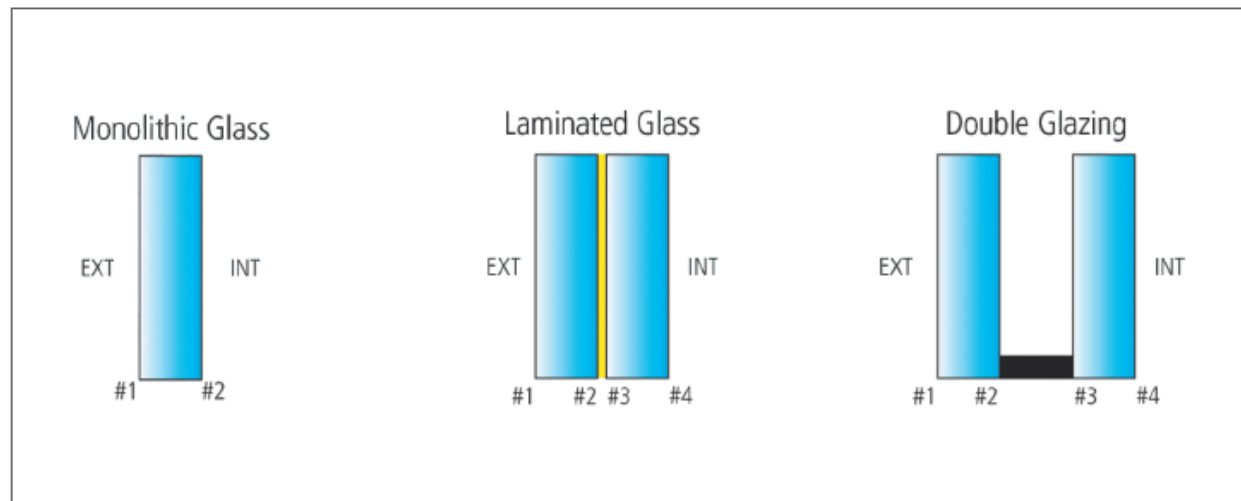
⁽⁴⁾ Recommended position #3

⁽⁵⁾ Certain conditions apply

⁽⁶⁾ After tempering, all glasses cannot be cut, edge grind, drill and notches

Glass Configurations

The numbering of glass surfaces and position of coating for various glass configurations are given below



#1 : Outer Glass, Coating Outside/ Exterior

#2 : Outer Glass, Coating Inside Facing Air Space/ PVB

#3 : Inner Glass, Coating Inside Facing Air Space/ PVB

#4 : Inner Glass, Coating Inside/ Interior

LACOBEL

Kaca interior dengan cat ekologis berkualitas tinggi pada bagian belakang kaca. Lacobel memastikan keseragaman warna and daya tahan yang lama. Lacobel ini mudah dipasang dan perawatannya juga tidak sulit untuk para pengguna. Lacobel menawarkan tiga warna, yaitu *Soft White*, *Classic Black*, dan *Pure White*.

MIROX

Mirox adalah kaca cermin yang juga dikenal dengan nama MNGE (*Mirox New Generation Ecological*). Mirox memiliki kinerja yang sangat baik dalam hal kualitas, ketahanan and ekologi, dimana sebagian besar produk beracun telah tereliminasi pada saat produksi. Hal ini memastikan kualitas udara dalam ruangan tetap terjaga dan meningkatkan kesehatan serta kesejahteraan penghuni.

DECOMIRROR

Decomirror adalah kaca cermin yang berwarna. Cermin ini diproduksi dengan menerapkan lapisan perak ke berbagai kaca berwarna Asahimas yang berkualitas tinggi. Sama seperti Mirox, Decomirror merupakan produk ramah lingkungan, dimana produk-produk berbahaya telah tereliminasi pada saat produksi. Decomirror menawarkan tiga warna, yaitu hitam, perunggu and abu-abu.

INDOFIGUR

Produk kaca berpola dekoratif yang menampilkan desain dan tekstur yang dicetak pada permukaan salah satu atau kedua sisi lembaran kaca bening. Kaca berpola ini diproduksi oleh proses *roll-out* yang paling canggih. Indofigur menawarkan beberapa desain seperti *Non-Reflective*, *Mislite*, *Rain Down*, *Diamond* dan *Lotus* (akan datang).

Painted Glass

LACOBEL

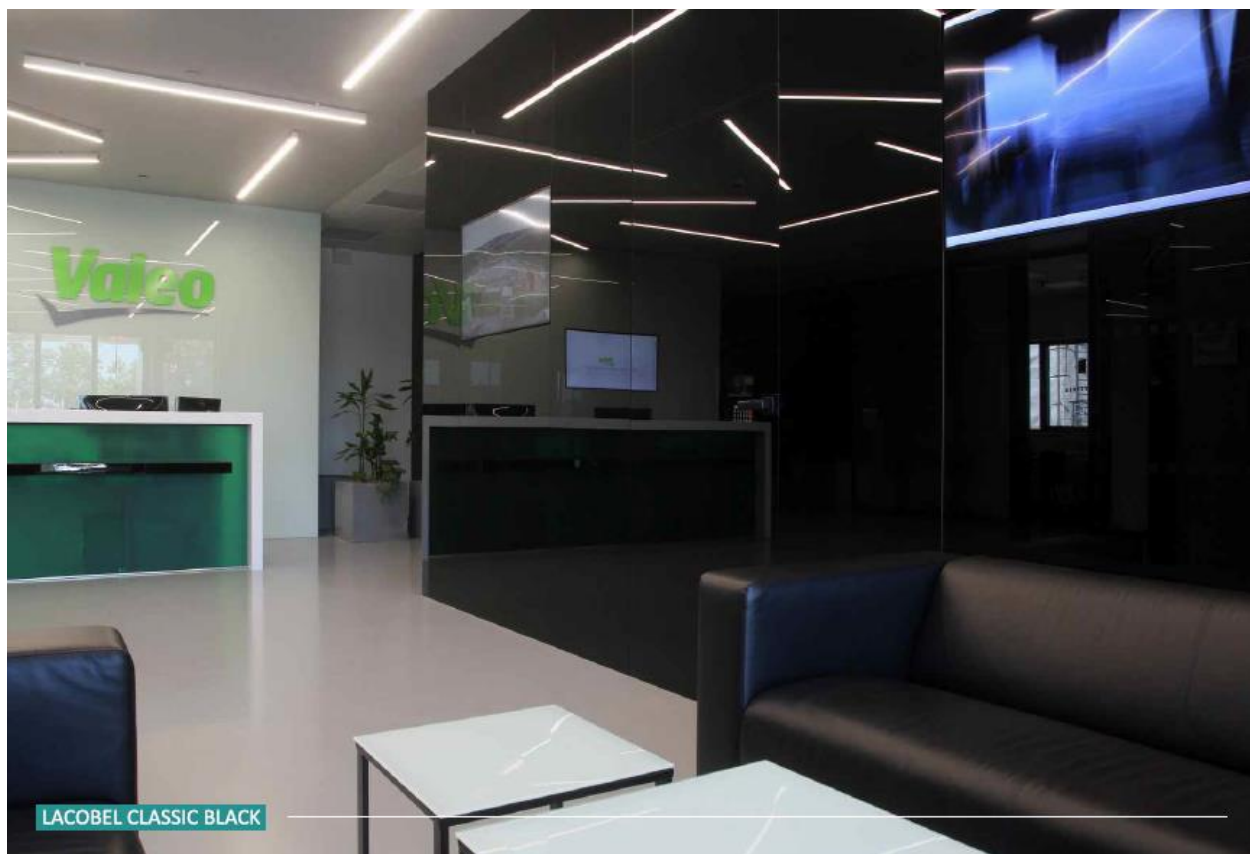
Lacobel is a range of painted glass with many contemporary colors option. With a high quality ecological paint on clear float or low iron glass, Lacobel ensures color uniformity and durability

What's so special about it?	What does it mean for you?
High Quality Finishing	- Uniformity finishing manufacturing process - Paint adheres flawlessly to glass
Environmentally friendly manufacturing process	- No Formaldehydes based on the JIS Standard during production
Lacobel is available with safety film (Lacobel SAFE)	- Ensures safety in case of glass breakages. The fragments adhere to the safety film and do not break up, preventing injury. - Meets Grade A AS/NZS 2208:1996 norms

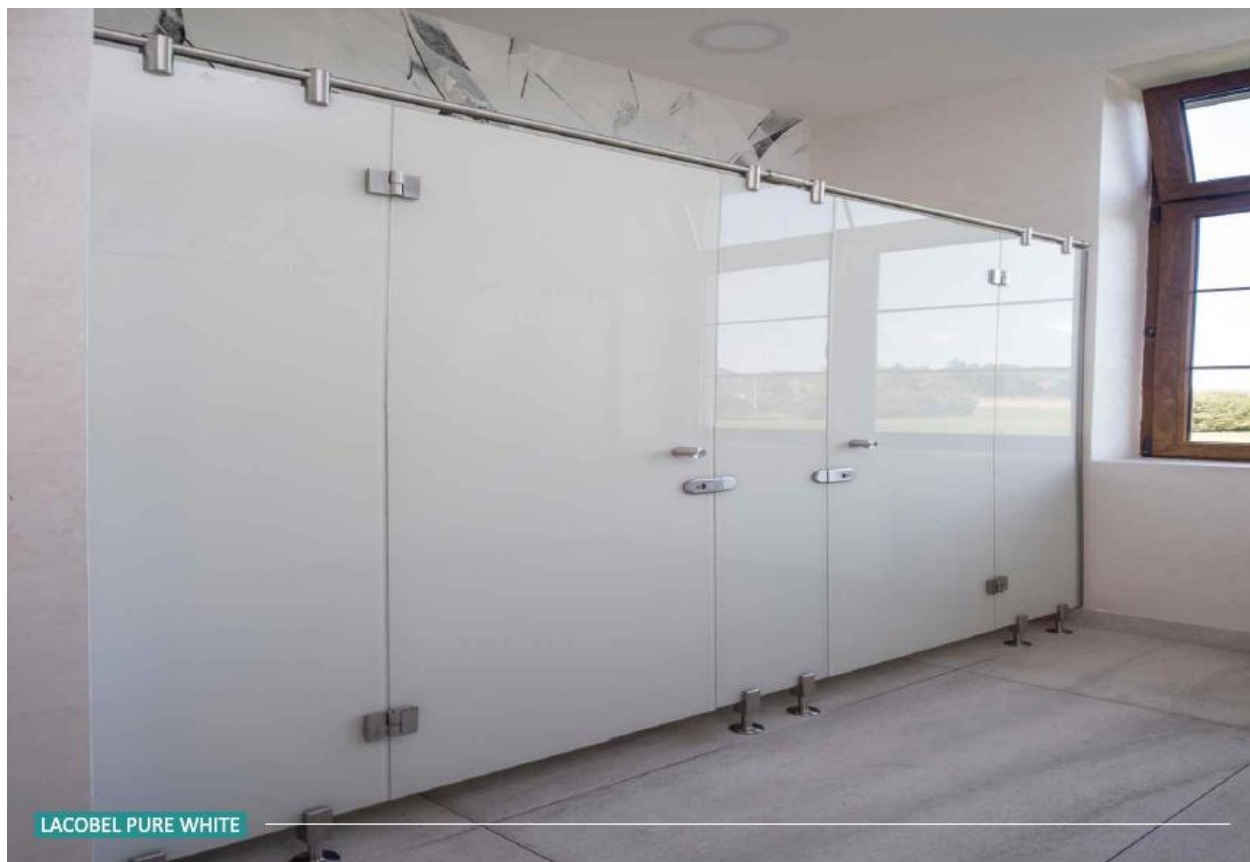


LACOBEL is available:

- in colors: Soft White, Classic Black, Pure White
- in a range of thicknesses : 5mm
- in safety version : Lacobel SAFE (non standard product)
- in size: on clear glass 3048x2134mm and on extra clear glass 3300x2134 mm



LACOBEL CLASSIC BLACK



LACOBEL PURE WHITE

New Ecological Mirror

MIROX

Asahimas initially has Dantalux and Miralux for Mirror products. After move to new factory in Cikampek with new technology, Asahimas simplify it's product range with superior mirror. Miralux well known in Indonesia meanwhile for export known as Mirox. Miralux patented by Asahimas but in 2020 AGC decide to unify mirror products using Mirox. Therefore Asahimas will provide same product as AGC, Mirox.

Mirox New Generation Ecological (MNGE) from AGC Europe has been well recognised globally since its introduction, thanks to it's long-standing reputation for its quality and performance. AGC has taken a step further to manufacture Mirox MNGE in Asia (PT Asahimas Flat Glass Tbk, Cikampek plant) with the same patented AGC European technology, offering the same optimum levels of quality and service.

What we aim is to bring our ecological mirror closer to our customers in Indonesia.

What's so special about it?	What does it mean for you?
Double layer protective paints	- Provides excellent anti corrosion protection for the silver layer outperforming EN 1036 norms
Very low lead content in paint layer (<3000ppm)	- Emits very low levels of Volatile Organic Compounds (VOCs) and formaldehyde - Preserves indoor air quality
Environmentally friendly production process	- Contributes to environmental protection by elimination of toxic products (ie. Copper, ammonia and lead) during production
Mirox MNGE is available with safety film	- Ensures safety in case of glass breakages. The fragments adhere to the safety film and do not break up, preventing injury - Meets Grade A AS/NZS 2208:1996 norms

Product Name	Size (Inch)/ Thickness (mm)	Domestic					Export			
		60x48	72x48	96x72	120x84	144x96	84x60	96x72	120x84	144x96
Mirox (MX)	3	✓	✓	✓				✓	✓	
	4					✓	✓			✓
	5	✓	✓	✓	✓			✓	✓	
	6				✓	✓				✓

Mirox is available :

- In a range of thickness : 5mm
- in safety : Mirox SAFE (non standard product)
- in size 3048 x 2134 mm



Tinted Mirror

— DECOMIRROR —

Decomirror is a unique mirror for your lifestyle, it's produced by applying silver coating to various Asahimas high quality tinted glass.

What's so special about it?	What does it mean for you?
Copper-free layer	- Better resistance to corrosion
Environmentally friendly manufacturing process	- Elimination of harmful products (i.e.,copper,ammonia) during production
Decomirror is available with safety film (Decomirror SAFE)	- Ensures safety in case of glass breakages. The fragments adhere to the safety film and do not break up, preventing injury. - Meets Grade A AS/NZS 2208:1996 norms

Product Name	Size (Inch)/ Thickness (mm)	Domestic			Export			
		96x72	120x84	126x84	96x72	120x84	126x84	144x96
Decomirror Bronze (DMBR)	5	✓	✓	✓	✓	✓		✓
	6				✓	✓		✓
Decomirror Black (DMDG)	5	✓	✓	✓	✓	✓		
	6				✓	✓		
Decomirror Grey (DMGE)	4							✓
	5	✓	✓	✓			✓	✓
	6						✓	✓



- DECOMIRROR is available:
- in colors : Decomirror Black, Decomirror Bronze, Decomirror Grey
 - in a range of thicknesses : 5mm
 - in Safety Version : Decomirror SAFE (non standard product)
 - in size: On Bronze & Black : 120x84 inc; On Grey : 126x84in

Figured

INDOFIGUR

Indofigur is patterned glass that produced by the most advanced roll-out process. The melting blend of glass material is flown through a pair of rollers where one of the roller has a pattern that will be printed on the glass surface

What's so special about it? | What does it mean for you?

Luxurious Patterned - Providing privacy with art

Decorative Versatile Applications - Can be used for furniture, art glass, partition, etc

Indofigur is available in size : 3mm (60x48in, 72x48in) ; 5mm (60x48in, 84x48in)

PERFORMANCE DATA

Type Of Glass	Standard Thickness (mm)	Position	Light Characteristic		Energy Characteristic				Solar Factor (%)	Shading Coefficient *3*4	U-Value W/m2k
			Transmittance (%)	Reflectance (%)	Transmittance (%)	Reflectance (%)	Absorption (%)	Ultra Violet Transmission (%)			
Non Reflective (NR)	2	#1	91	8	87	7	6	75	88	1.02	5.9
		#2	91	8	87	7	6	75	88	1.02	5.9
Mislite (FM)	3	#1	87	7	81	6	12	66	85	0.97	5.9
		#2	87	7	81	7	12	66	85	0.97	5.9
	5	#1	88	7	80	6	14	64	84	0.96	5.8
		#2	88	8	80	7	13	64	84	0.96	5.8
Rain Down (FRD)	5	#1	88	8	80	8	12	66	84	0.96	5.9
		#2	88	7	80	7	13	66	84	0.97	5.9
Diamond	3	#1	88	1	83	1	16	70	88	1.0	5.9
		#2	88	4	84	4	12	70	87	1.0	5.9
	5	#1	89	1	81	1	18	57	86	1.0	5.9
		#2	89	4	81	4	15	57	85	1.0	5.9
Lotus	3	Coming Soon									
	5										

Remarks :

- The energy properties are calculated according to ISO 9050 and ISO 10292
- The tolerance of published data with respect to photo metric properties is ± 3 points The U-Value tolerance is ± 0.1 W/mK
- Specifications, technical and other data are based on information available at the time of preparation of this document and are subjected to change without notice.
- PT. Asahimas Flat Glass Tbk. cannot be held responsible for any deviation between the data introduced and the conditions on site
- This document is no evaluation of the risk of glass break age due to thermal stress.
- Tempered glass and heat strengthened glass have potential risk of spontaneous breakage. PT. Asahimas Flat Glass Tbk. cannot guarantee spontaneous breakage due to characteristics of glass.
- For tempered glass, PT. Asahimas Flat Glass Tbk. strongly recommends to apply heatsoak test to reduce the risk of spontaneous breakage. The Official NIS Disclaimer document is available on www.amfg.co.id

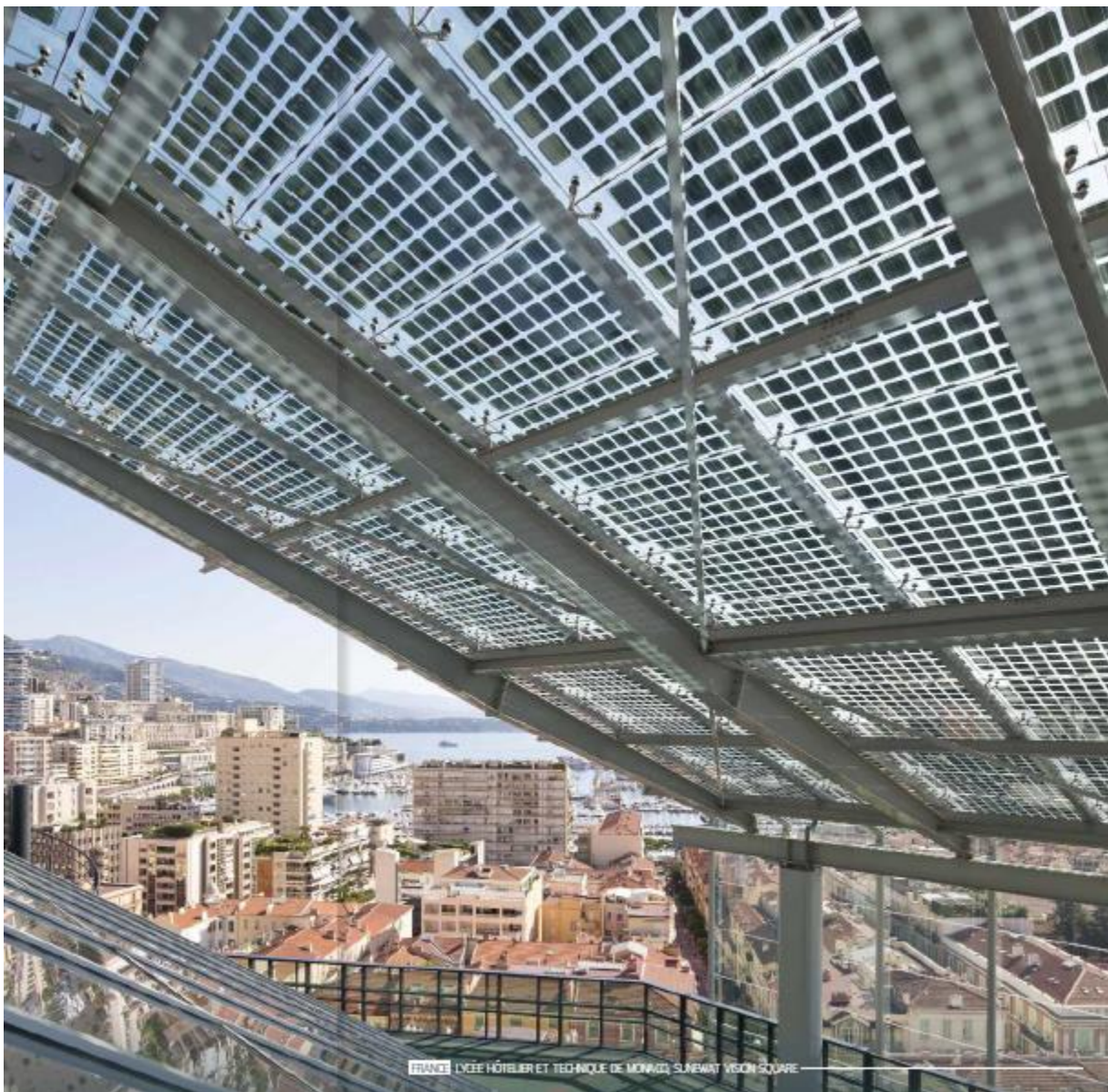


INDOFIGUR DIAMOND

SUNEWAT

SunEwat adalah solusi ideal untuk kaca fasad yang memanfaatkan teknologi fotovoltaik yang berkualitas tinggi. SunEwat menghasilkan energi yang signifikan dan memberi kenyamanan optimal bagi penghuninya. Di samping itu, SunEwat juga menawarkan para desainer pilihan arsitektur and estetika yang tanpa batas, dengan memastikan tidak ada halangan untuk mengintegrasikan SunEwat pada bangunan.

SunEwat memiliki berbagai karakteristik seperti daya tahan yang lama dan transmisi cahaya yang baik (sesuai dengan kebutuhan). Aplikasi pemasangan dapat dilakukan pada fasad, kanopi, atap dan spandrel.



The range

SunEwat

Generating energy and delivering optimal comfort for occupants. Facade designers enjoy limitless architectural and aesthetic options combined with seamless integration.

Transparent

Transparent energy-generating glass solutions for facades.

- △ Vision Square
- △ Vision Stripe
- △ SmartSkin

Opaque

Opaque energy-generating glass solutions for spandrels and cladding.

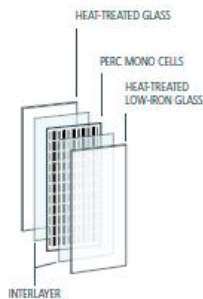
- △ Stopray Active
- △ Artite Active
- △ Lacobel T Active



n

Vision Square

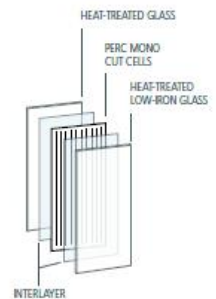
DESIGN & COMMUNICATION



- COMPOSITION: high-efficiency PERC mono or bi-facial cells
- APPLICATION: facades, second skins, canopies, roofs, blinds, etc.
- BENEFITS: creative use of glass, cells, shapes and silkscreen printing

Vision Stripe

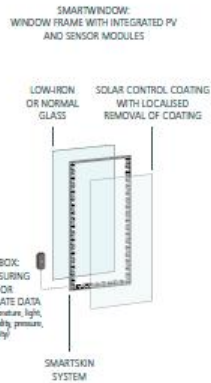
ENERGY & TRANSPARENCY



- COMPOSITION: laser-cut PERC mono cells
- APPLICATION: facade, roof
- BENEFITS: semi-transparent solution

SmartSkin™

SMART ECO-SYSTEM



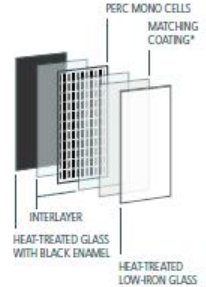
Through a network of sensors, SmartSkin detects changes in internal and external conditions, and autonomously manages sun blinds, lighting and ventilation to optimise user comfort, well-being and productivity levels.

- COMPOSITION:** PV cells along the perimeter + sensors in the IGU and DC energy and data grid of connected IGUs
- APPLICATION:** windows
- BENEFITS:** plug and play system, enhanced user comfort

In partnership with PHYSEE

Stopray Active

SEAMLESS INTEGRATION

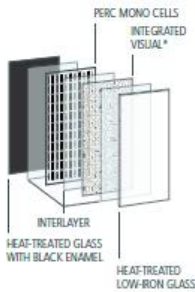


- COMPOSITION:** PV-embedded glass combined with Stopray coating
- APPLICATION:** spandrels
- BENEFITS:** no negative impact on design

*special energy-transmitting technology

Artlite Active

CREATIVE DESIGN



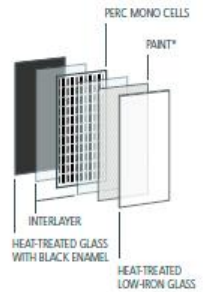
- COMPOSITION:** PV-embedded glass combined with pictures and patterns
- APPLICATION:** cladding, corporate logos and messaging
- BENEFITS:** flexibility in design

In partnership with Lacobel

*special energy-transmitting technology

Lacobel T Active

UNIFORM DESIGN



- COMPOSITION:** PV-embedded glass combined with selective transmission paint
- APPLICATION:** spandrels and cladding
- BENEFITS:** smooth, uniform appearance

*special energy-transmitting technology

Simplicity of standard design

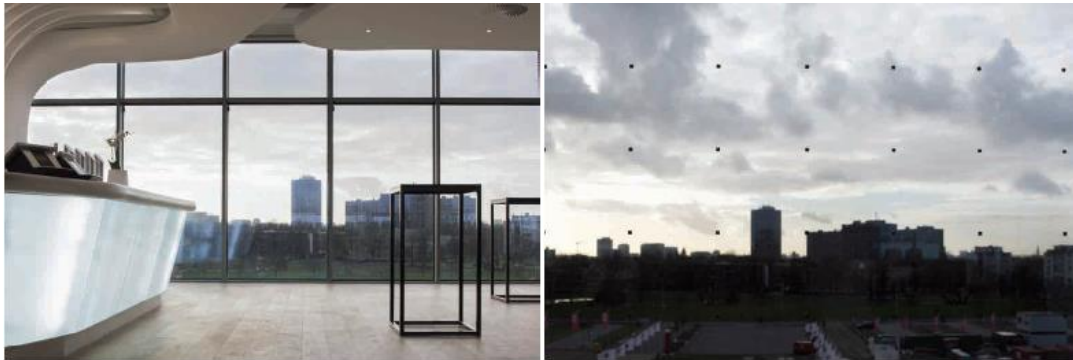
Artlite Active and Lacobel T Active are also available in standard sizes, colours and patterns.

BENEFITS OF THESE SOLUTIONS:

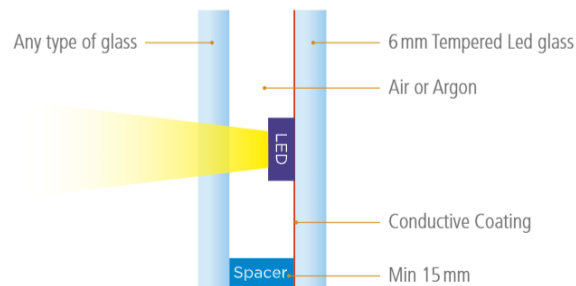
- Δ Always available in stock
- Δ Fast delivery
- Δ Attractive pricing
- Δ Available in small quantities

GLASSILED

GlassiLED adalah kaca aktif dengan menggunakan LED. Produk ini menanggapi kebutuhan dampak visual dengan menyediakan solusi teknologi tinggi yang mengintegrasikan kaca fasad transparan dengan teknologi LED. Transparansi kaca bisa mencapai 99% pada siang hari dan komunikasi cahaya dari teknologi LED dapat dioptimalkan pada malam hari. Aplikasi Glassiled pun bervariasi seperti yang dijelaskan di bawah ini.



Exterior



Three Glassiled products

Glassiled Sign	→ Laminated glass or double glazing unit → Embedded monochrome LED → Permanent design with limited animation
Glassiled Motion	→ Double glazing unit → Embedded individually addressable monochrome or RGB LEDs → Any animated content can be displayed on your building
Glassiled Uni	→ Double glazing unit → LEDs concealed in the IGU spacer light up the glass surface uniformly → Monochrome or RGB → Static or dynamic

Three Glassiled applications

	What can you use it for?	Be inspired...	Product available
Facade Branding	Signature Information Art	Make your building recognisable and alive	Sign Uni Motion
Facade Display	Video display Advertisement	Animate your building facade with any content	Motion
Decorative	Partition Floors Skylight	Give dynamic and colourful effects to your interior design	Sign Uni

GLASSILED SIGN

A skylight full of stars or a partition with a rain effect are all possible thanks to Glassiled Sign, which delivers a pixelised touch of light.



BELGIUM D HOTEL - GLASSILED SIGN

GLASSILED UNI

If you're looking for an original way to create intimacy or colourful effects in your interior design, Glassiled Uni is the perfect solution.



GLASSILED MOTION

Go for dynamic branding, which you can modify as much as you want to send the right message.



Kontak

Untuk keterangan produk lebih lanjut, silahkan hubungi:

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Salam hijau,

AGC Asia Pacific Pte. Ltd. dan PT. Asahimas Flat Glass Tbk.