



altsa

*Alternativas en Importación
y Exportación, S.A.*

POLYCARBONATE SHEETS

BETTER LIVING THROUGH OPTIMUM GLAZING



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AL TSA POLYCARBONATE SHEETS

Better Living Through Optimum Glazing

ALTSA PLASTICS was established in 2007 with the goal of exporting Polycarbonate Sheets of the highest level. With steady progress, we obtained ISO 9001 Certification in the year 2008.

Starting from 1991, we have established a strong foothold in the Taiwan polycarbonate sheet manufacturing industry. Following market trends closely and constantly in pursuit of quality and perfection, we continue to develop high-class, multi-functional polycarbonate sheets to satisfy customer expectations.

Our attention to quality and detail has led us to become the first Polycarbonate sheet manufacturer in Asia to incorporate Class 5000 clean rooms for our extrusion lines.

Through extensive testing, we have seen what the sun and excessive heat does to a poor product. ALTSA polycarbonate sheets use only first class, non-recycled material to ensure the lifespan of all our products, which in turn ensures the longevity of your merchandise.

We are now in pursuit of a higher goal, and aim to expand our sales and reputation throughout the globe.



Polycarbonate Sheet Basics

Polycarbonate (PC) are a particular group of thermoplastic polymers which offers excellent optical clarity and instills a combination of unique properties, making it a good choice for safety and security glazing to fit in a wide variety of applications.

Strength - Extremely high impact resistance

Polycarbonate is half the weight of glass and yet both of these plastics are much stronger than glass. Polycarbonate has 250 times the impact resistance of glass and 10 times over FRP, which lowers the risk of breakage even when subjected to violent blows from heavy objects.

Light & Clarity

Polycarbonate has a light transmittance of 88%. It must be noted that for greenhouse applications, the light diffusing properties of polycarbonate actually benefits vegetation because direct sunlight creates burning effects. Polycarbonate sheets can be tailored to provide optimal light transmission (ranging from 35% to 90%) enabling the designer to create interesting solutions for naturally lit interiors.

High resistance to climatic change

Polycarbonate sheets have good insulation properties. They are neither affected by the fluctuating environmental temperatures nor the humidity. AL TSA PC sheets co-extrudes UV-absorbing agents (Benzotriazole) as a surface coating, screening UV wavelengths between 290~400nm.

By blocking 99.5% of the harmful radiation, sheets are protected against loss of clarity due to the yellowing caused by extreme heat and sunlight, and can last more than 10 years under extreme conditions.

Cleaning

Polycarbonate is also highly resistant to various chemical substances. However, they should be prevented from coming in contact with certain materials, as specified by the manufacturer. The best choice for cleaning is a microfiber or 100-percent cotton cloths.

Ease of handling and installation

The lightweight of AL TSA Polycarbonate Sheets makes them easy to handle and can be cut to fit at site with minimum tooling. Being lightweight also eliminates the need for heavy support structures, and makes it easier to install, meaning reduced cost.

Flexible, Formable, Machinable

AL TSA Polycarbonate sheets can handle temperatures up to 115°C and either be hot or cold bent, drilled, thermoformed to virtually unlimited size and shape. It is also easily machined or fabricated with conventional tools.

Fire Retardant

Polycarbonate is a high polymer that has excellent resistance to flame, self-extinguishing and stable in heat, making it a suitable choice in dry, heated areas.


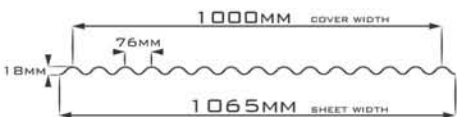

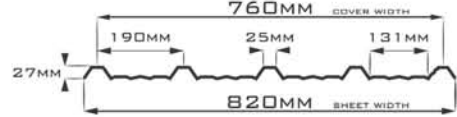

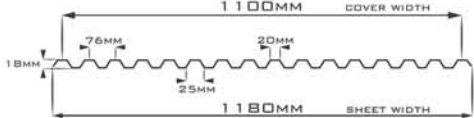

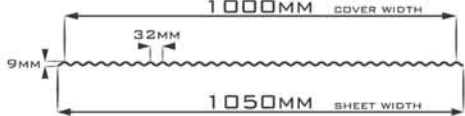

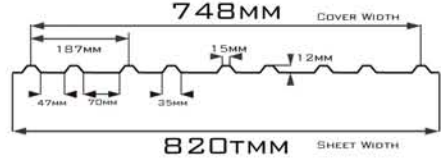

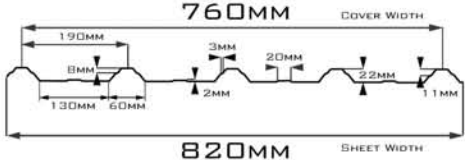

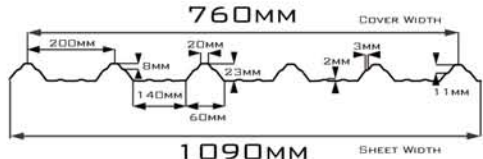
Warranty

AL TSA Polycarbonate Sheets are backed by 5 years of limited warranty against loss of light transmission and by a 10 years limited warranty to breakage.

**All of the information and properties listed above fits only sheets made from 100% Virgin Polycarbonate Resin.*





***Polycarbonate sheets made with recycled material, though cheap, are very prone to yellowing and breaking.*

List of Corrugated Profiles


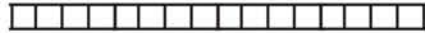

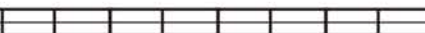
Profile	Illustration	Cover width	Pitch	Depth	Thickness
 Roma (76/18)		1000mm 915mm 836mm 760mm	76mm	18mm	Min:0.6mm Max:2.0mm
 Trimdek (190/27)		760mm	190mm	27mm	Min:0.7mm Max:2.0mm
 Greca (76/18)		1100mm 970mm 895mm 820mm 750mm	76mm	18mm	Min:0.6mm Max:2.0mm
 Mini (32/9)		1000mm	32mm	9mm	Min:1.0mm Max:1.2mm
 JEMPAL (187/12)		748mm	187mm	12mm	Min:0.8mm Max:2.0mm
 PUMA (190/22)		760mm	190mm	22mm	Min:0.8mm Max:2.0mm
 JAGUAR (200/23)		760mm	200mm	23mm	Min:0.8mm Max:2.0mm

List of Flat and Hollow Profiles

Flat Profiles

Profile	Illustration	Thickness (mm)	Standard widths (mm)	Lengths (mm)
 Embossed		2	700 800 910 1000 1100 1220	42420 (roll)
		3		24240 (roll)
		4.5	1220	15150 (roll)
		6		2424 (sheet) 4848 (sheet)
 Flat		2	1520 1830	30300 (roll)
		3		18180 (roll)
		4.5		15150 (roll)
		6		4848 (sheet)
		8	1220 1830	2424 (sheet) 3636 (sheet)
		10		2424 (sheet)

Multiwall Hollow Profiles

Profile	Illustration	Thickness (mm)	Standard widths (mm)	Lengths (mm)
 Twin-Wall		4	1200	1220
		6	1220	2440
		8	1810	3050
		10	1830	3660
			2100 ⁽¹⁾	4270
				4880
				5487
				5795
				6100
				9000
				11800
 Triple-Wall		10	1210	
		16		

(1) 2100mm wide panels not available in all thicknesses.

ROMA Overview

Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light -
Transmission (20%~75%)

Solarshield

Low Haze High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
Great shading Properties

Pearly
Green



Beneficial GREEN Light
Great for Living Organisms

Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver



Metallic
Blue



Metallic
Green



Metallic
Bronze



Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance



Self Extinguishing



Shatter Proof

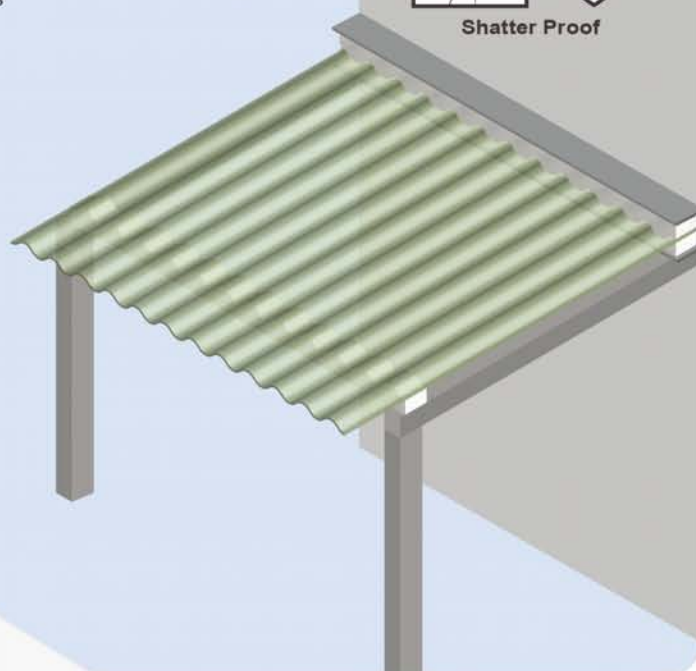
Liteguide Series

Complete Light Dispersion

Ice



Diffused & Consistent Lighting
Transmits 85% Visible Light



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TRIMDEK Overview

Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light -
Transmission (20%~75%)

Solarshield

Low Haze High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

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Great shading Properties

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Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver



Metallic
Blue



Metallic
Green



Metallic
Bronze



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NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance

Self Extinguishing

Shatter Proof

Liteguide Series

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Ice



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GRECA Overview

Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light
Transmission (20%~75%)

Solarshield

Low Haze

High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
Great shading Properties

Pearly
Green



Beneficial GREEN Light
Great for Living Organisms

Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver



Metallic
Blue



Metallic
Green



Metallic
Bronze



Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance

Self Extinguishing

Shatter Proof

Liteguide Series

Complete Light Dispersion

Ice



Diffused & Consistent Lighting
Transmits 85% Visible Light



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Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light
Transmission (20%~75%)

Solarshield

Low Haze

High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
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Pearly
Green



Beneficial GREEN Light
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Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver



Metallic
Blue



Metallic
Green



Metallic
Bronze



Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance

Self Extinguishing

Glass Acrylic FRP
ALTA polycarbonate Sheet
Shatter Proof

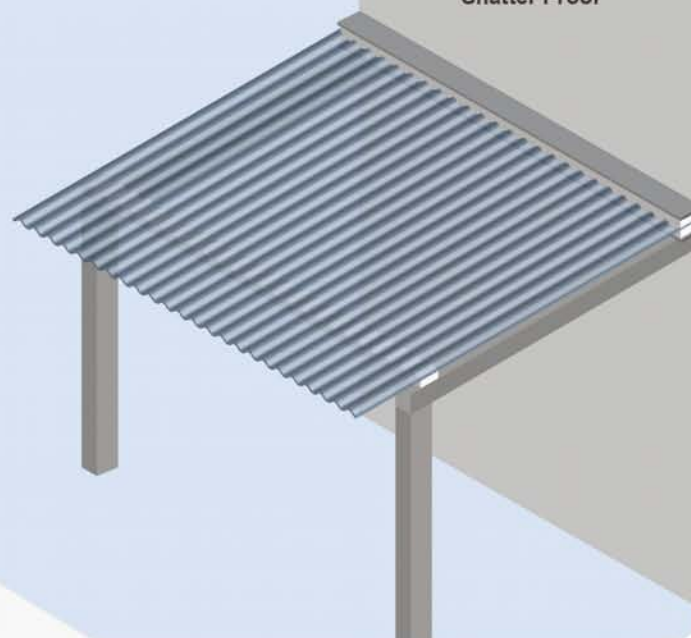
Liteguide Series

Complete Light Dispersion

Ice



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Transmits 85% Visible Light



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JEMPAL Overview

Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light -
Transmission (20%~75%)

Solarshield

Low Haze

High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
Great shading Properties

Pearly
Green



Beneficial GREEN Light
Great for Living Organisms

Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver



Metallic
Blue



Metallic
Green



Metallic
Bronze



Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance

Self Extinguishing

Shatter Proof

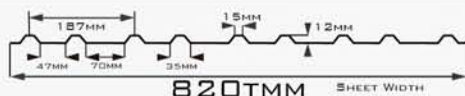
Liteguide Series

Complete Light Dispersion

Ice



Diffused & Consistent Lighting
Transmits 85% Visible Light



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PUMA Overview

Valuview Series

Best Value

Clear

Highest Clarity 88%

Blue

Green

Bronze

Opal

Low Haze Colors
Customizable Light -
Transmission (20%~75%)

Solarshield

Low Haze High Clarity

Solar
Green

Solar
Blue

Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
Great shading Properties

Pearly
Green

Beneficial GREEN Light
Great for Living Organisms

Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver

Metallic
Blue

Metallic
Green

Metallic
Bronze

Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance

Self Extinguishing

Shatter Proof

Liteguide Series

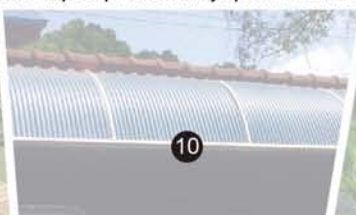
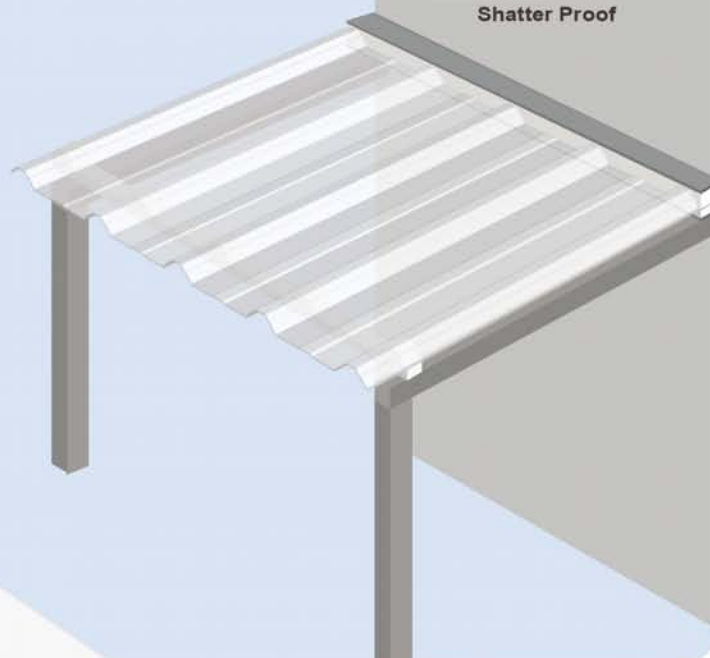
Complete Light Dispersion

Ice

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Transmits 85% Visible Light



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JAGUAR Overview

Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light -
Transmission (20%~75%)

Solarshield

Low Haze High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
Great shading Properties

Pearly
Green



Beneficial GREEN Light
Great for Living Organisms

Ti-Lite Series

Excellent Heat Reduction

Metallic
Silver



Metallic
Blue



Metallic
Green



Metallic
Bronze



Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading



UV
BLOCKS 99% UVA/UVB

High Impact Resistance

Self Extinguishing

Shatter Proof

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Green



Bronze



Opal



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Solarshield

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High Clarity

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UV
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High Impact Resistance

Self Extinguishing

Glass Acrylic FRP
ALISA polycarbonate Sheet
Shatter Proof

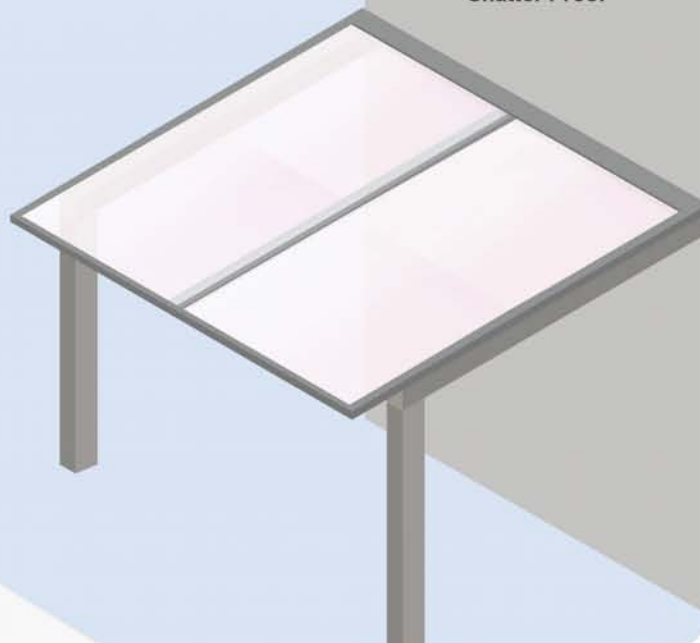
Liteguide Series

Complete Light Dispersion

Ice



Diffused & Consistent Lighting
Transmits 85% Visible Light



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EMBOSSED Overview

Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light
Transmission (20%~75%)

Liteguide Series

Complete Light Dispersion

Ice



Diffused & Consistent Lighting
Transmits 85% Visible Light

Solarshield

Low Haze

High Clarity

Solar
Green



Solar
Blue



Total IR Protection (Reflected NIR)
No Color Change (Weather Proof)

Pearly Series

Heat Reflective

Controlled NIR (780~2500nm)
Great shading Properties

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Beneficial GREEN Light
Great for Living Organisms

Ti-Lite Series

Excellent Heat Reduction

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Silver



Metallic
Blue



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Metallic
Bronze



Blocked heat building
NIR (780~2500nm)
Controlled VIS -
Excellent Shading

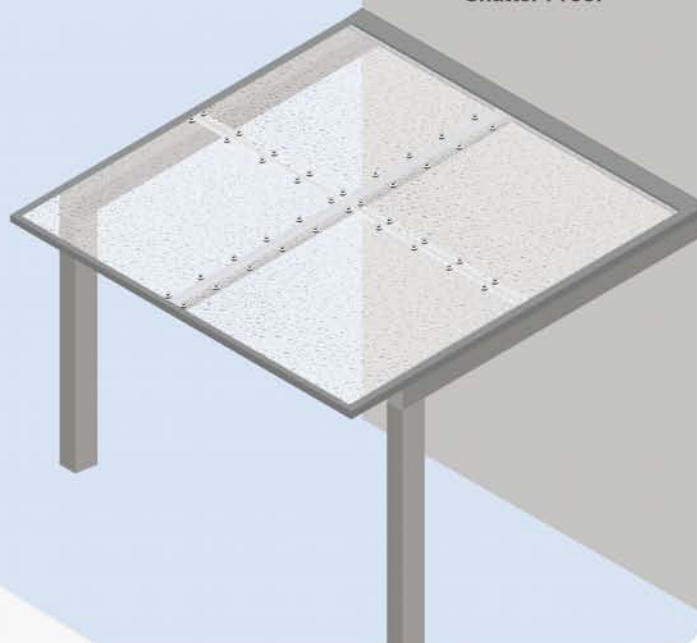


UV
BLOCKS 99% UVA/UVB


High Impact Resistance


Self Extinguishing

 
Shatter Proof



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Valuview Series

Best Value

Clear



Highest Clarity 88%

Blue



Green



Bronze



Opal



Low Haze Colors
Customizable Light
Transmission (20%~75%)

Solarshield

Low Haze

High Clarity

Solar
Green



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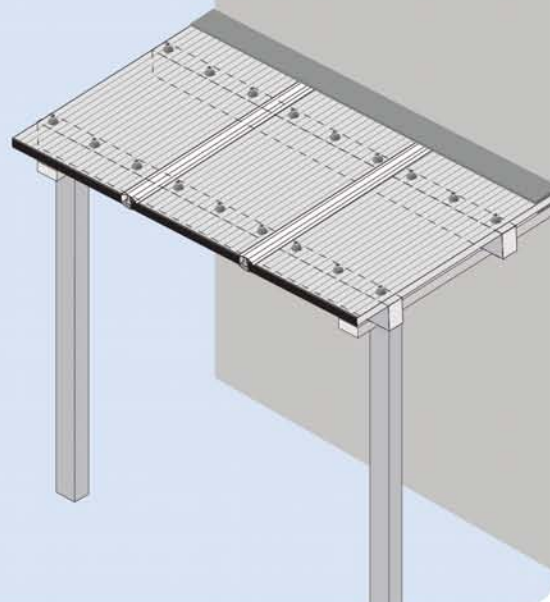
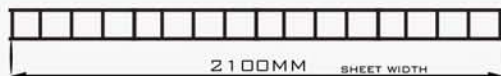
Liteguide Series

Complete Light Dispersion

Ice



Diffused & Consistent Lighting
Transmits 85% Visible Light



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Product Range

ALTSA Product Range

Product	Description
LiteGuide	For diffused and indirect visible light penetration with a matte appearance.
Solarshield	Reflects heat building NIR radiation. High visible light transmission
Pearly GREEN	Controlled NIR and VIS wavelengths. Beneficial Green light penetration.
Ti-Lite	Exceptional heat blocking, minimum, indirect sunlight penetration. Metallic appearance.
Valuview	General Purpose Polycarbonate Sheet, with a choice of single or double layered UV coating.

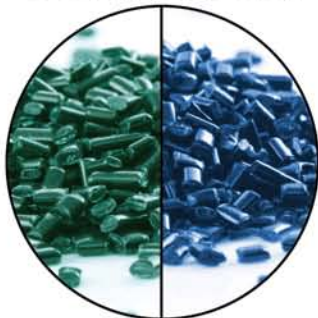
ALTSA Product Colors

Opacity	Description	Colors
Clear	Transmits up to 90% natural daylight, resulting in high lighting within the structure.	Clear
Transparent	High Transparency, low haze colors offering high clarity. Solar colors offer advanced heat blocking capabilities that reduces heat buildup while allowing a clear view through the sheet.	<div>ICE</div> <div>Valuview Blue</div> <div>Valuview Green</div> <div>Valuview Bronze</div> <div>Solar Blue</div> <div>Solar Green</div>
Translucent	<p>White Opal: Light diffuser included. Transmits 20-50% visible light with exceptional light dispersion, produces mild and even lighting within the structure.</p> <p>Metallic Colors: Low Transparency, high haze colors offering great shade and indirect light transmission.</p> <p>Pearly: Moderate transparency, spectrally selective, allowing cool and relaxing lighting within the structure.</p>	<div>Metallic Silver</div> <div>Metallic Blue</div> <div>Metallic Green</div> <div>Metallic Bronze</div> <div>White Opal</div> <div>Pearly GREEN</div>

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Solarshield Series

Solarshield



Base Material	Additives
Covestro UV Stabalizer Included Base Resin	Solarshield IR Reflective Pigment
Weather Resistance	Advantages
Clariant CESA-Light UV & Light Stabilizers. (UV Resistant + Weather Proof)	<ul style="list-style-type: none"> • High Light Transmission (VIS:40%) • Reflects Far Red Light (735nm) • Lowers Heat by max. 15°C / 59°F.
Interference Color (Reflection)	Warranty
Solar Green / Blue	15 year limited warranty*

*Warranty will only be in affect if ALTSA Installation and Care Instructions are followed.



Weathering Resistant

Single or Double side co-extruded CESA-Light UV and Light Stabilizers.

ALTSA Solarshield

Blocks UV and far IR Radiation. Allow over 50% of energy savings. Up to 80% Visible Light transmission.

Base Material

100% Virgin Covestro UV stabilizer included master-batch.

Clear but Cool

Solarshield keeps visible light transmission rates same as clear glass but reflect infrared induced heat by 99% and reduce temperatures by max. 15 °C / 59 °F.

Best Bang for the Buck

ALTSA Solarshield provides the same clarity and heat reduction properties as Low-E (Emissivity) glass, but costs 1/2 less.

Solar Heat Gain Coeffiecient

SHGC 0.26 - 26% of the solar radiation will pass through and 74% excluded.
Excellent Passive Solar Cooling Properties.

Exceptional Impact Resistance

250 times the impact strength over glass and 10 times over FRP and Acrylic.

Polycarbonate is the safest of all glazing materials in that it will not shatter and cause damage to anything underneath and is the item of choice.

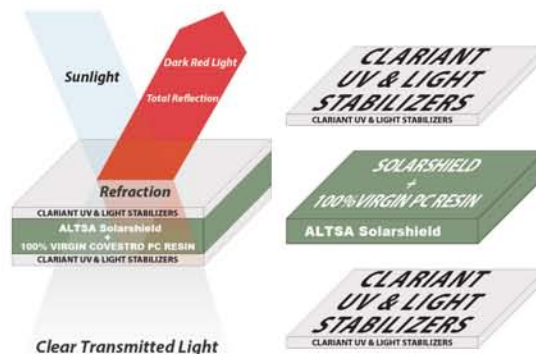
Weather Resistance

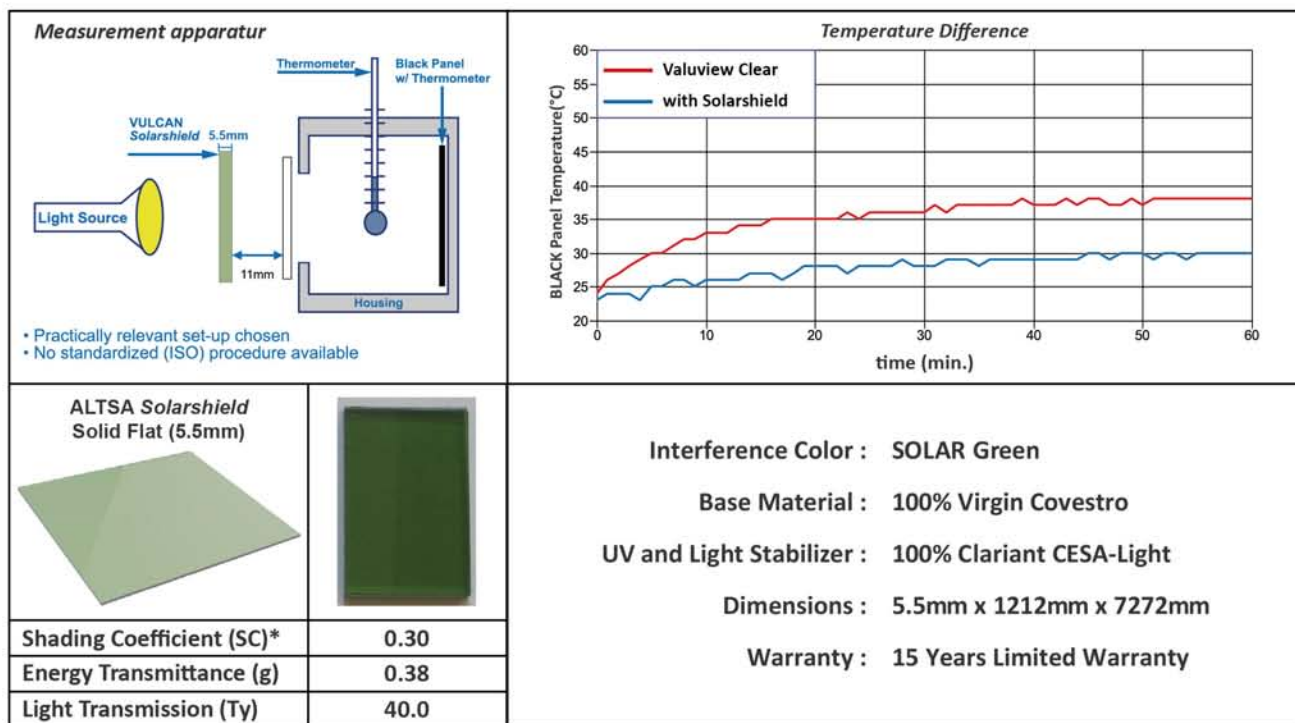
Solarshield is protected by double layered, co-extruded Clariant CESA light and UV Stabilizers. Solarshield will be able to last for 15 years or more due to excellent UV protection and lower surface temperatures.

Cost Saving

IR Reflection (Lowered Heat) – Less air conditioning required and lower power consumption.

Light Weight – 1/2 the weight of glass means lighter support structures, easier transportation, less labor time and costs.





*SC: g value Solarshield / g value 3mm glass

INSPECTED ITEM	TEST METHOD	TEST STANDARD	TEST RESULT	PASS / FAIL	REMARK
APPEARANCE	CNS11335	Sheets should be flat and smooth, without bubbles, dimples, color blotches or curvature.	GOOD	PASS	
SIZE	CNS11335	Tolerance: 0 ~ +1% (mm)	1213 x 7275	PASS	
THICKNESS	CNS11335	Tolerance: ±10% (mm)	5.51	PASS	
TENSILE STRENGTH	ASTM D638	Should exceed: 551 (kgf/cm ²)	719.8	PASS	
TENSILE ELONGATION	ASTM D638-10	Should exceed: 50 (%)	59%	PASS	
TENSILE MODULUS	ASTM D638-10	STANDARD TENSILE PROPERTY TEST FOR PLASTICS	24649	PASS	
Mean Impact Resistance	CNS11335	NO FAILURE AFTER IMPACT OF A 1KG STEEL BALL FREE FALLING FROM 120CM HIGH.	No Failure	PASS	
LUMINOUS TRANSMITTANCE	SOLARSHIELD IN HOUSE SPECIFICATION	HAZE AND LUMINOUS TRANSMITTANCE TEST FOR SOLARSHIELD (Within 50% ~ 59%)	51.2	PASS	
SHADING COEFFICIENT (SC)	EDTM - WE2500	The fraction of incident solar radiation admitted through a window, both directly transmitted and absorbed and subsequently released inward.	0.3	PASS	Lower is Better for Passive Solar Cooling
Solar Heat Gain Coefficient (SHGC)	EDTM - WE2500	The ratio of the total solar radiation transmitted by a given material relative to transmitted by 3mm thick clear glass, whose light transmission rate is 87%.	0.26	PASS	Lower is Better for Passive Solar Cooling
HEAT DEFLECTION TEMPERATURE	ASTM D648-07	STANDARD DEFLECTION TEMPERATURE TEST FOR PLASTICS UNDER FLEXURAL LOAD (°C)	133.1	PASS	
LINEAR DIMENSIONAL CHANGE	ASTM D648-07	STANDARD LINEAR DIMENSIONAL CHANGE TEST FOR NON-RIGID THERMOPLASTIC SHEETS @ ELEVATED TEMPERATURES (±3%)	<1	PASS	
BURN CHARACTERISTICS	CNS11335	FLAME DOES NOT REACH OR PASS THE 100 (mm) REFERENCE MARK. FLAME CEASES AFTER REMOVAL OF THE TEST FLAME.	17.9	PASS	
Weather Resistance YELLOWIN INDEX (YID)	IN HOUSE WEATHERING TEST	YID SHOULD BE LESS THAN 6.0 FOR COLORED SHEETS. NO CRACKS OR SEPARATION OF THE POLYMER AFTER TESTING.	1.05	PASS	

Lab Environment: Ambient Temperature: 23±2°C

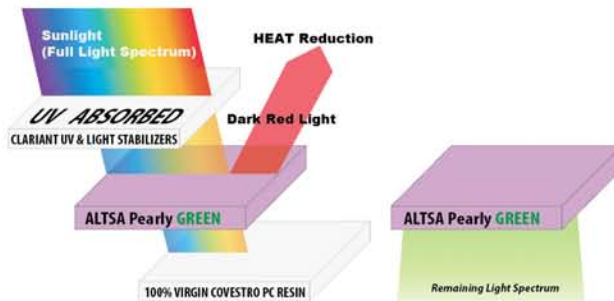
Pearly Green Series

Pearly GREEN



Base Material	Additives
Covestro UV Stabilizer Included Base Resin	Pearly GREEN Pigment
Weather Resistance	Advantages
Clariant CESA-Light UV & Light Stabilizers. (UV Resistant + Weather Proof)	<ul style="list-style-type: none"> • Green light transmission within the VIS spectrum • Controlled NIR (780~2500nm) - Lowers Heat up to 10c
Interference Color (Reflection)	Warranty
Lilac	10 year limited warranty*

*Warranty will only be in affect if ALTSA Installation and Care Instructions are followed.



Weathering Resistant

Single or Double side co-extruded
Clariant CESA-Light UV and Light Stabilizers

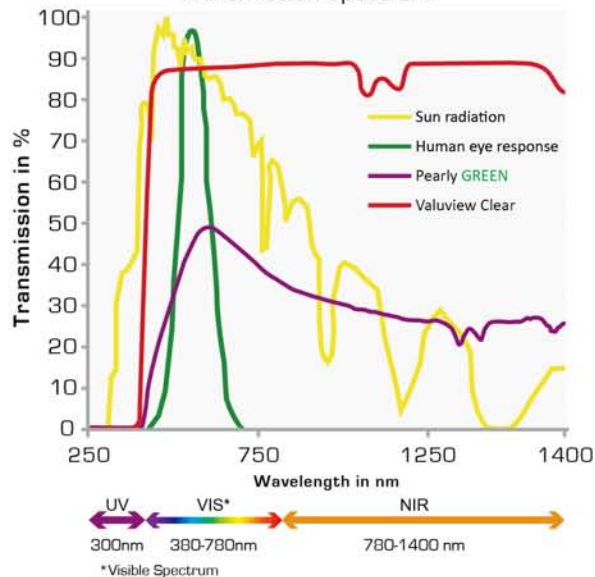
Pearly GREEN

Reflected solar-transmitted heat (NIR)
Retains beneficial GREEN light
Controlled visible light transmission (VIS)

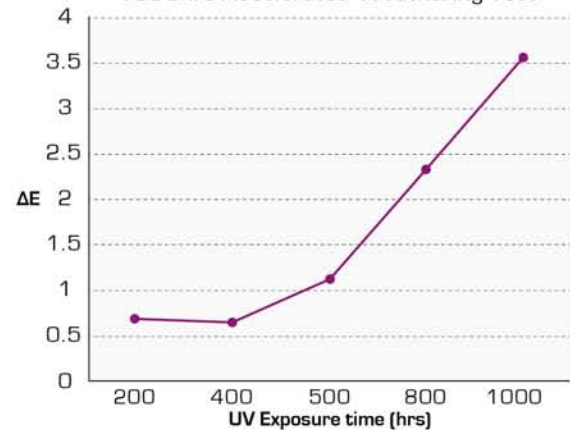
Base Material

100% Virgin Covestro UV stabilizer included
master-batch.

AL TSA Pearly GREEN
Transmission Spectrum



AL TSA Pearly GREEN with CESA-light
1000hrs Accelerated Weathering Test



Time (hrs)	200	400	500	800	1000
ΔE	0.68	0.65	1.12	2.33	3.56

Test Protocol: ASTM G-154

Tester: QUV Accelerated Weathering Tester (UVA-340nm irradiance)

ΔE: Lower is better

Pearly Green Series

AL TSA Pearly **GREEN** has been designed as a solar heat protection application that attenuates longer wavelength heat-producing infrared radiation very effectively through reflection, but at the same time, retains health benefiting **GREEN** light. Pearly **GREEN** pigment have particle sizes in the range of 10~60µm, and is suitable for general-purpose infrared blocking applications. Pearly **GREEN** pigment reflects rather than absorbs heat producing far-red solar radiation without affecting the transmittance of the **GREEN** spectrum, and retains beneficial **GREEN** light. This makes it easier to control the climate, particularly in the summer, and maintain optimum room temperature.*

*A large proportion of the heat increasing far-red light is reflected.

Product Strengths

Pearly **GREEN** Material

Designed as a solar heat protection application that attenuates longer wavelength heat-producing infrared radiation very effectively through reflection, but at the same time, retains beneficial **GREEN** light.

Pearly **GREEN** Technology

With particle sizes ranging from 10~60µm, Pearly **GREEN** is suitable for general-purpose infrared blocking applications.

Light Transmission Rate

Controlled VIS (380~780nm)

Excellent shading Properties - Perfect for living organisms

Heat Reflective Properties

Controlled NIR (780~2500nm)

Capable of reducing temperatures up to 10°C / 50°F*

*Certain conditions may apply.

Base Material

AL TSA polycarbonate sheets use only 100% Virgin Covestro UV stabilizer included master-batch.

Weathering Resistant

Co-extruded with the Base Material, our CESA-Light UV & Light Stabilizers block 99% of harmful UV rays. With the help of CESA-Light UV protective coating, AL TSA Polycarbonate sheets will last for more than 10 years.

Clean Room Manufacturing

AL TSA Sheets are manufactured in Class 5000 clean rooms to ensure an impeccable quality.

Production Method

Co-Extrusion ensures evenly spread, evenly thick base material and UV coating.

Pearly **GREEN** Material Properties

Material Typical Properties	Test Method	Results	Remark
Tested on 1.5mm Pearly TRIMDEK Sheets			
Tensile Strength @yield (kgf/cm ²)	CNS 11335	667	Should exceed 551 (kgf/cm ²)
Tensile Elongation (%)	CNS 11335	47	Mean Value of 3 Specimen
Impact Strength	CNS 12093	No Rupture	Mean Value of 3 Specimen
Change Percent of Yellow Index after Weather Resistance Test (YIΔ)(1200hrs)	ASTM G154 (for 1 cycle) UV-A (340nm): 60°C, 8hrs Condensation: 50°C, 4hrs	ΔYI -0.49	
Visible Light Transmittancy (%)	ASTM D1003	30	
Ultraviolet Transmittancy (%)	ASTM D1003	0.9	
Density (p)	ASTM D792	1.19 g/cm ³	
Heat Resistance	CNS 12093	Burnt portion self extinguishes after burner is removed.	
Heat Reflective Properties	JIS R3106 (1998)	Blocked NIR	Solar Heat Gain Coefficient
Properties	AL TSA Pearly GREEN sheets are co-extruded with a special pigment that blocks far-red solar radiation and allows only healthy Green light to reach organisms underneath. It also lowers slightly more heat compared to AL TSA Pearly RED sheets.		
Places to Use	Housing, warehouse or industrial skylights, walkways, patios; basically places with living organisms.		

Ti-Lite Series

Ti-Lite Series

Comfort level under **ALTSA Ti-Lite**

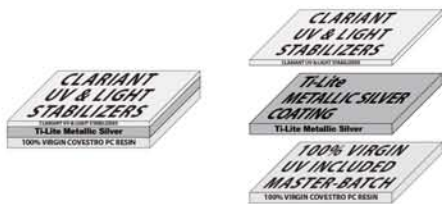


Light level under **ALTSA Ti-Lite**



Base Material	Additives
Covestro UV Stabalizer Included Base Resin	Ti-Lite TiO ₂ Included master-batch
Weather Resistance	Advantages
Clariant CESA-Light UV & Light Stabilizers. (UV Resistant + Weather Proof)	<ul style="list-style-type: none"> • Diffused Lighting. • Exceptional heat reduction. • Blocks heat inducing Far Red Light (735nm) - Lowers Heat. • Excellent shading properties. • Customizable VIS transmission rate (Avg. 25%).
Interference Color (Reflection)	Warranty
Metallic Silver / Blue / Green / Bronze	10 year limited warranty*

*Warranty will only be in affect if ALTSA Installation and Care Instructions are followed.



Weathering Resistant

Single or Double side co-extruded CESA-Light UV and Light Stabilizers.

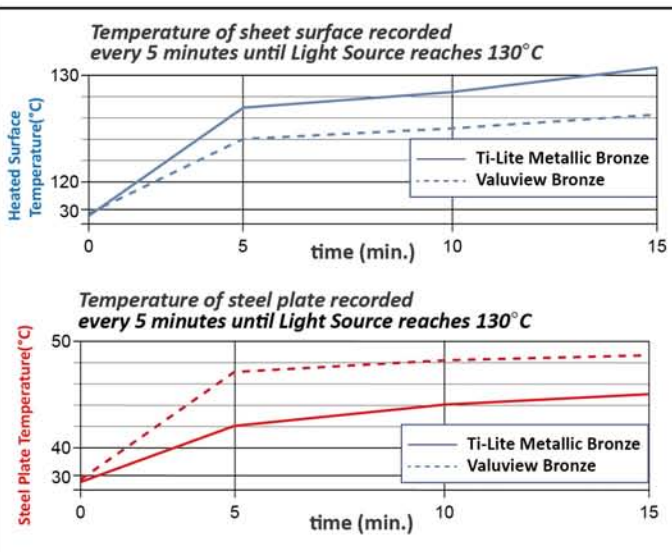
Ti-Lite Metallic Silver

Controlled solar-transmitted heat. Reduced visible light transmission
Metallic Silver / Blue / Green / Bronze Tint

Base Material

100% Virgin Covestro UV stabilizer included master-batch

Ti-Lite Metallic Bronze Solid Flat sheet		
	Shading Coefficient (SC)*	0.55
	Total Solar Transmission (%)	48.0
	Light Transmission (Ty)	38.0
*SC: g value Solarshield / g value 3mm glass		
Measurement apparatur 10.5cm 20cm Light Source Thermometer Black Panel w/ Thermometer Housing • Practically relevant set-up chosen • No standardized (ISO) procedure available		



Ti-Lite Series

ALTSA Ti-Lite integrates TiO₂ (Titanium Dioxide) along with other proprietary material to cope with the blazing solar radiation. Ti-Lite provides excellent shade - an average of 25% visible light transmission rate. Ti-Lite blocks a portion of heat building near-Infrared radiation, is capable of reducing temperatures up to 15°C, and transmits cool shaded lighting, thus improving well being while reducing AC costs. Ti-Lite comes in four different colors – Metallic Silver, Metallic Blue, Metallic Green and Metallic Bronze.

Product Strengths

Ti-Lite Material

Designed to significantly reduce solar-transmitted energy even to a level of 10% from the solar level that originally hit the upper side of the sheet facing the sun.

Ti-Lite Technology

TiO₂ (Titanium Dioxide) along with other heat reducing material to cope with the blazing solar radiation while also providing excellent shading properties.

Light Transmission Rate

Controlled VIS (380~780nm)
Excellent shading Properties - Less than 46% light transmission rate.

Heat Reflective Properties

Controlled NIR (780~2500nm)
Capable of reducing temperatures up to 15 °C / 59 °F*
*Certain conditions may apply.

Base Material

ALTSA polycarbonate sheets use only 100% Virgin Covestro UV stabilizer included master-batch.

Weathering Resistant

Co-extruded with the Base Material, our CESA-Light UV & Light Stabilizers block 99% of harmful UV rays. With the help of CESA-Light UV protective coating, ALTSA Polycarbonate sheets will last for more than 10 years.

Clean Room Manufacturing

ALTSA Sheets are manufactured in Class 5000 clean rooms to ensure an impeccable quality.

Production Method

Co-Extrusion ensures evenly spread, evenly thick base material and UV coating.

Ti-Lite Material Properties

Material Typical Properties	Test Method	Results	Remark
Tested on 1mm Ti-Lite TRIMDEK Sheets			
Tensile Strength @yield (kgf/cm ²)	CNS 11335	693	Should exceed 551 (kgf/cm ²)
Tensile Elongation (%)	CNS 11335	17	Mean Value of 3 Specimen
Impact Strength	CNS 12093	No Rupture	Mean Value of 3 Specimen
Change Percent of Yellow Index after Weather Resistance Test (YID)(1200hrs)	ASTM G154 (for 1 cycle) UV-A (340nm): 60°C, 8hrs Condensation: 50°C, 4hrs	ΔYI -0.49	
Visible Light Transmittancy (%)	ASTM D1003	25	METALLIC SILVER METALLIC GREEN METALLIC BLUE METALLIC BRONZE
Ultraviolet Transmittancy (%)	ASTM D1003	0.2	
Density (ρ)	ASTM D792	1.20 g/cm ³	
Burn Characteristics	CNS 12093	Burnt portion self extinguishes after burner is removed.	
Heat Reflective Properties	JIS R3106 (1998)	Blocked NIR	Solar Heat Gain Coefficient
Properties	Ti-Lite provides exceptional shade and heat reduction properties. (Dissipates heat from the covered area) Designed to lower temperatures, provide great shade and cooling.		
Places to Use	Specially designed for hot areas requiring lots of shade, but still need well dispersed lighting. Recommended for warehouse, patios, rainsheds, canopies, carparks, and many more.		

Valuview Series

Valuview Series

Comfort level under **AL TSA Valuview**



Light level under **AL TSA Valuview**



Base Material	Additives
Covestro UV Stabilizer Included Base Resin	<ul style="list-style-type: none"> • Clariant UV Stabilized Pigment • Clariant Light Diffusers (Opal)
Weather Resistance	Advantages
Clariant CESA-Light UV & Light Stabilizers. (UV Resistant + Weather Proof)	<ul style="list-style-type: none"> • Direct Lighting (Clear) • Diffused Lighting (Blue / Green / Bronze / Opal) • Light Weight: 1/2 Weight of Glass • Impact Resistant: x250>Glass, x10>FRP / Acrylic
Interference Color (Reflection)	Warranty
Clear / Blue / Green / Bronze / Opal	10 year limited warranty*

*Warranty will only be in affect if AL TSA Installation and Care Instructions are followed.



Weathering Resistant

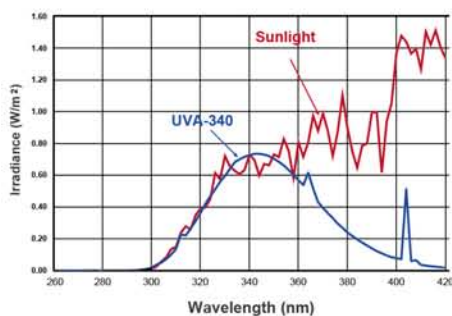
Single or Double side co-extruded CESA-Light UV and Light Stabilizers.

Base Material

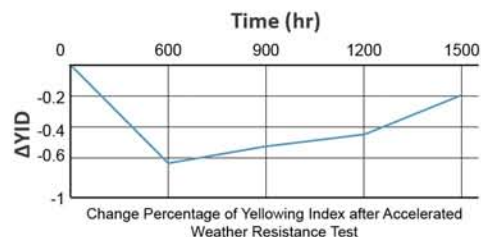
100% Virgin Covestro UV stabilizer included master-batch.



QUV Accelerated Weathering Tester -
Uses Fluorescent UV lamps to reproduce
the damaging effects of sunlight.



UVA-340 lamps provide the best available simulation
of sunlight in the critical short-wave UV region.



ΔYI	-0.61	-0.52	-0.49	-0.2
time(hr)	600 (50 cycles)	900 (75 cycles)	1200 (100 cycles)	1500 (125 cycles)

* ASTM G154 Accelerated Weathering Test (1 Cycle)
UV Lamp: 8hrs, 60°C±3
Condensation: 4hrs, 50°C±3

Sunlight Simulation

The QUV is designed to reproduce the damaging effects of sunlight on durable materials using fluorescent UV lamps. These lamps are electrically similar to the common cool white lamps used in general lighting, but are designed to produce mainly UV rather than visible light or infrared.

Valuview Series

Polycarbonate (PC) is a particular group of thermoplastic polymers which offers excellent optical clarity and instills a combination of unique properties, making it a good choice for safety and security glazing to fit in a wide variety of applications. Its lighter weight (1/3 of acrylic and 1/6 of glass) and versatility makes it easy to install and bent to form to meet different requirements. When Co-Extruded with UV surface coating, PC sheet enhances protection against light transmission losses and yellowing caused by excessive exposure to UV radiation in sunlight. AL TSA Valuview Series is targeted towards projects seeking optimal price versus value.

Product Strengths

Base Material

AL TSA polycarbonate sheets use only 100% Virgin Covestro UV stabilizer included master-batch.

Weathering Resistant

Co-extruded with the Base Material, our CESA-Light UV & Light Stabilizers block 99% of harmful UV rays. With the help of CESA-Light UV protective coating, AL TSA Polycarbonate sheets will last for more than 10 years.

Production Method

Co-Extrusion ensures evenly spread, evenly thick base material and UV coating.

Clean Room Manufacturing

AL TSA Sheets are manufactured in Class 5000 clean rooms to ensure an impeccable quality.

Light Transmission Rates

Projects which requires direct light projection.

- Valuview Clear: 88%

Projects which requires reduced light projection.

- Valuview Blue: 40%
- Valuview Green: 40%
- Valuview Bronze: 25%*
- Valuview Opal: 20%*

*Custom transmissions rates are available, and subject to minimum quantity.

VALUVIEW Material Properties

Material Typical Properties	Test Method	Results	Remark
Tested on 3mm Valuview Solid Flat Sheets			
Tensile Strength @yield (kgf/cm ²)	ASTM D638-10	656	Should exceed 551 (kgf/cm ²)
Tensile Elongation (%)	ASTM D638-10	89	Should exceed 50%
Flexural Strength (kgf/cm ²)	ASTM D790-10	1103	Mean Value of 5 Specimen
Compression Yield Strength (kgf/cm ²)	ASTM D695-10	756	Mean Value of 5 Specimen
Impact Resistance • Falling Dart [Mean Impact Resistance (J)]	ASTM D5628-96	>26.67	Speciman shouldn't fail when max. impact capacity 26.67J was reached.
Change Percent of Yellow Index after Weather Resistance Test (YI)(1200hrs)	ASTM G154 (for 1 cycle) UV-A (340nm): 60°C, 8hrs Condensation: 50°C, 4hrs	ΔYI -0.49	
Luminous Transmittance (%)	ASTM D1003-07	89	
Ultraviolet Transmittancy (%)	ASTM D1003	0.4	
Density (ρ)	ASTM D792-08	1.19 g/cm ³	
Burn Characteristics	ASTM D635-10	Burnt portion self extinguishes after burner is removed.	10 Specimen Tested. Does Not Reach 25mm Reference Mark
Properties	Direct Light Transmission, with double-sided co-extruded CESA-Light UV and Light Stabilizers to block harmful UV rays.		
Places to Use	For projects which requires direct light projection, seeking the highest standards and safeguard from the elements.		

LiteGuide Series

LiteGuide



Base Material	Additives
Covestro (Bayer) UV Stabilizer Included Base Resin	LiteGuide light diffusers
Weather Resistance	Advantages
Clariant CESA-Light UV & Light Stabilizers. (UV Resistant + Weather Proof)	<ul style="list-style-type: none"> • Light Diffusing • Indirect Light Transmission • Enhanced Privacy
Interference Color (Reflection)	Warranty
ICE	10 year limited warranty*

*Warranty will only be in affect if ALTSA Installation and Care Instructions are followed.



Weathering Resistant

Single or Double side co-extruded CESA-Light UV and Light Stabilizers.

LiteGuide

Aesthetically pleasing. Breaks up and distributes light evenly. Reduce hot spots and diffuses light.

Base Material

















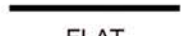















































































100% Virgin Covestro UV stabilizer included master-batch.

LiteGuide Material Properties

Material Typical Properties	Test Method	Results	Remark
Tested on 1.5mm LiteGuide TRIMDEK Sheets			
Tensile Strength @yield (kgf/cm²)	CNS 11335	670	Should exceed 551 (kgf/cm²)
Tensile Elongation (%)	CNS 11335	57	Should exceed 50%
Impact Strength	CNS 12093	No Rupture	Mean Value of 3 Specimen
Change Percent of Yellow Index after Weather Resistance Test (YID)(1200hrs)	ASTM G154 (for 1 cycle) UV-A (340nm): 60°C, 8hrs Condensation: 50°C, 4hrs	ΔYI -0.49	
Visible Light Transmittancy (%LT)	ASTM D1003	88	
Ultraviolet Transmittancy (%)	ASTM D1003	0.20	
Density (ρ)	ASTM D792	1.20 g/cm³	
Heat Resistance	CNS 12093	Burnt portion self extinguishes after burner is removed.	
Properties	LiteGuide provides soft and diffused lighting, reduces direct sunlight penetration while still maintaining high light transmission rates.		
Places to Use	Specially designed for areas which requires ample but inderect lighting. Recommended for warehouse, patios, rainsheds, canopies, carpark, and many more.		

Comparison Table

AL TSA Polycarbonate Sheets Material Properties Comparison Table

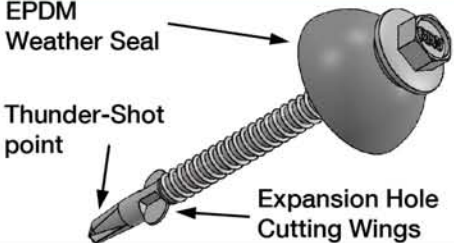
Material		LiteGuide	Solarshield	Pearly Series		Ti-Lite Series				Valuview Series				
Color Choices														
Suitable Profiles	Corrugated Profiles									 				
														
Weather Resistance	CESA-Light Co-Extruded									Optional				
	Raw Material Inclusive													
Warranty	10yrs									Only if CESA-Light Co-Extruded				
	1yr													
Visible Light Transmission Rate		85%	73%	30%	46%	Avg. 15%*				88%	40%	40%	25%*	20%*
Transparent														
Translucent														
Lighting	Direct													
	Diffused													
Shading (Lower VIS)	Excellent													
	Average													
	Minimum													
IR Control (Less Heat)	Excellent													
	Minimum													
	Poor													
Spectrally Selective	Excellent													
	Average													
	Minimum													

*Custom light transmissions are available, subject to minimum order quantity.

The information above is only a general classification. To match your requirements accurately, please consult us or your local distributor for more details. Sample color chips are also available upon request.

Polycarbonate sheets expands and contracts due to its relatively high coefficient of thermal expansion. A 3-meter-long (10 ft) sheet of polycarbonate for example will expand by approximately 2.1 mm (0.08 in.) for each 10°C (50°F) temperature increase. A 5-meter-long (16 ft) sheet restrained at one end by being butted up against a brick wall can have its free end move by over 10mm (0.4 in.) in the course of a day with a 30°C (86 °F) temperature rise.

PlastXpand Technical Specifications

PlastXpand	Specifications	Head Size mm inch	Drill Capacity mm inch	Length (L) mm inch
 <p>EPDM Weather Seal</p> <p>Thunder-Shot point</p> <p>Expansion Hole</p> <p>Cutting Wings</p>	• #12 - 14 x L	7.9 5/16		40 1 - 9/16
	• C1022 Carbon Steel		0.75 .0295	55 2 - 3/16
	• EPDM Dome Washer	Washer O.D. mm inch	4.5 1/8	65 2 - 9/16
	• EPDM SS Dome Washer		.1772	72 2 - 13/16
	• No. 3 Self Drilling Point	25 1"		
Targeted Use		Surface Treatment / Weather Proof Coating		
Fixing Plastic Sheets to Metal		Australian AS 3566 Standard Class 3 or Class 4 Coating		



ALTSA PlastXpand is designed with a wing feature to cut an enlarged expansion hole in the skylight material to allow for skylight sheet movement under weathering effects. This **expansion hole** will prevent ALTSA Polycarbonate sheets from damage as a result of stress and fatigue due to thermal expansion and contraction. The PlastXpand wing feature is also designed to break off automatically when it comes into contact with the steel substrate.

ALTSA PlastXpand screw includes a dome shaped EPDM (Ethylene Propylene Diene Monomer) washer, which is resistant to ozone and ultraviolet light damage. The EPDM dome washers provide an excellent waterproof seal— even under the most severe weather conditions— if properly installed. The large diameter EPDM dome washer will also provide that perfect water proofing.

The trick is not to overdrive or underdrive the screws. If the screw is not tightened enough, moisture leaks around the washer. An overtightened screw squishes the washer too thin, which can also result in leaks. That is why a good screw gun with a clutch is so important. The adjustable nose allows the user to set the countersink to exactly the right depth.

The Thunder-Shot point on the PlastXpand provides precise positioning and is designed to penetrate batten thickness ranging from 0.75mm~4.5mm. For optimum performance, ALTSA recommends drilling the PlastXpand @1800~2000rpm.

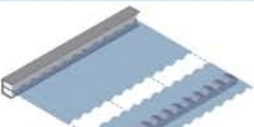

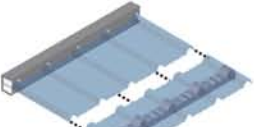

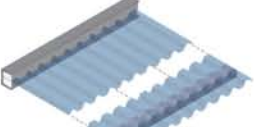
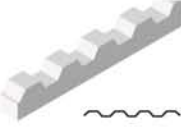
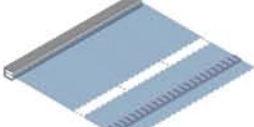
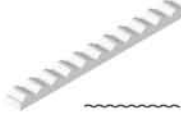






PlastXpand Sealing Washer Installation Problems- Causes and Remedies

Problem	Cause	Remedy
EPDM Dome Washer squashing or bursting out from under the fastener head.	Incorrect product	ALTSA EPDM Dome washers are made for AS Standard Hex Washer Flange Head screws designed for fixing roof or side claddings.
 <p>Excess overtightening</p>	Over tightening of the fastener.	Release the trigger on the driver tool as the fastener meets the metal surface being fixed into.
	Too much pressure is applied to the fastener.	
 <p>Non-perpendicular drilling and insertion.</p>	Fastener not driven at right angles to the cladding.	Hold the fastener at 90 degrees to the cladding.
	Fastener not held at right angles and at the center of the crest or valley of corrugated profile.	Hold the fastener at 90 degrees to the cladding and ensure the fastener is at the center of the profile crest or valley.

Recommended Accessories for Corrugated Profiles

Item	Purpose	Illustration	Material	Dimensions
Curved Washer	Crest Fixing		Gavanized Steel w/Bonded EDPM	O.D.: 38mm I.D.: #12 EPDM: 2mm
	Vally Fixing		Gavanized Steel	O.D.: 38mm I.D.: #14
EPDM Dome Washer	Standard Fixing Applications		EPDM	O.D.: 25mm I.D.: #14
EPDM Dome w/Stainless Washer	High-Wind Area Fixing Applications		Stainless Steel Washer w/Dome EPDM	O.D. (EPDM): 25mm O.D. (SS): 22mm I.D.: #14

Recommended Eaves Infill Foam Strips for Corrugated Profiles End Sealing

Example	Profile	Eaves Infill Foam	Length	Color	Material
	ROMA		1065mm x 25mm	WHITE & BLACK	EVA & EPE
	TRIMDEK		815mm x 25mm		
	GRECA		1400mm x 25mm		
	MINI		1200mm x 25mm		
	JEMPAL		753mm x 25mm		
	PUMA		765mm x 25mm		
	JAGUAR		765mm x 25mm		

Handling and Storage

- A** AL TSA Polycarbonate sheets should be transported and stored horizontally, on a flat, sturdy pallet whose dimensions are equal to or larger than the sheets themselves. The sheets must be secured and fastened to the pallet during transportation and handling on site. It is possible to stack the sheets with the longer sheets at the bottom and the shorter on top, leaving no unsupported overhang. (*Figure a.)
- B** While moving a pallet with a forklift, always use forks as long as the sheets' width. Shorter forks on a wider pallet may cause damage to the sheets.
- C** AL TSA Solid Flat and Hollow sheets leave the factory in white and clear, watertight polyethylene film on top. The PE film should be taken off as close to the actual time of installation as possible. Corrugated sheets are packed in bags of 5, 10, 20, 30, 40, or 50 pieces in polyethylene bags. Storage of the sheets should be in a covered, dry, ventilated place, away from direct sunlight and rain. (*Figure b.)
- D** Avoid leaving the sheet pallet in the rain, even if still wrapped, for extended periods, as water may condense inside the hollow core. Extended exposure to direct sunlight may cause heat buildup, softening the protective film, fusing it to the sheet face, making removal difficult or impossible.
- E** Avoid leaving the sheets stored unwrapped, with their ends open, for more than a few days, as dust may collect inside the hollows.
- F** Important! Never cover the pallet with, or place on the pallet, materials that collect heat or are good heat conductors (e.g. dark objects, metal profiles or pipes, steel sheets etc.) They may collect and deliver excess heat, and damage the sheets.
- G** When necessary to store the pallet in the open, cover it with a white opaque polyethylene sheet, cardboard, or any other insulating material, taking care to cover the pallet completely.
- H** Avoid dragging the panel on the ground, scraping it against the structural elements, or any other sharp or rough objects, to prevent the panel from getting scratched.

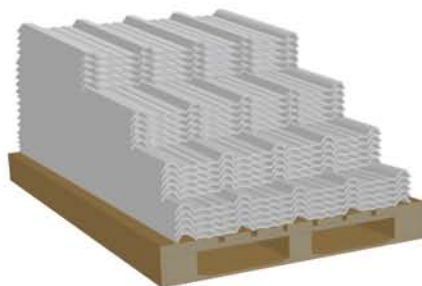


Figure a.



Figure b.

Cleaning and Maintenance

- A** Fillers, oil, paint or adhesive on the surface should be removed by isopropyl alcohol with soft cloth (avoid any vinyl based fabric) as soon as possible. Rinse immediately with clean, cold water.
- B** Do not clean polycarbonate sheets with benzene, gasoline, acetone, or tetra chloromethane*.
*For a complete list of chemicals to avoid, please refer to the pages "Chemical Resistance".
- C** Avoid cleaning PC sheets with detergents under strong sunlight or while it's being bent to prevent cracks.
- D** Use clean, lukewarm water or neutral detergents (ex. mild dishwashing detergent) utilizing a soft sponge or cloth made from 100% cotton to remove any dust or stains. Never use abrasive or high alkaline cleaners and dry with a soft cotton cloth (avoid any vinyl based fabric). to reduce water spotting.
- E** When using a pressure washer, do not allow the spray tip to come too close to the panel, as it could have enough pressure to penetrate or tear the panel.



List of Harmful Chemicals

The following chemicals listed are potentially harmful to ALTSA polycarbonate products and cause embrittlement.

- | | | |
|------------------------------------|----------------------------|---------------------------|
| 1 Acetic Aldehyde | 21 Cyclohexanone | 41 Tetrachloroethane |
| 2 Strong Acetic Acid | 22 Cyclonexene | 42 THF |
| 3 Acetone | 23 Dimethylformamide | 43 Tetralin |
| 4 Acrylonitrile | 24 Dioxin | 44 Thiophense |
| 5 Amonia Water | 25 Ethylmanine | 45 Toluene |
| 6 Saturated Ammonium Fluoride | 26 Ether | 46 10% Trichloroamine |
| 7 Saturated Ammonium Chloride | 27 PVC | 47 Xylene |
| 8 Benzene | 28 2-Ethanolamine | 48 Ammonium hydroxide |
| 9 Bezonic Acid | 29 30% Formic Acid | 49 Chlorohydrocarbon |
| 10 Benzyl Alcohol | 30 Gasoline | 50 Ketone |
| 11 Brominated Calcium Nitrate | 31 Methacrylic Acid Methyl | 51 Methyl – Ethyl Ketone |
| 12 Carboic Acid | 32 Nitrobenzene | 52 Dichloromethane |
| 13 Carbon Disulfide | 33 Nucleolus | 53 Polyvinyl Chloride |
| 14 Carbon Tetrachloride | 34 Pyridine | 54 Ethylene Hydroxide |
| 15 5% Potassium Hydroxide Solution | 35 Petroleum | 55 Sodium Hydroxide |
| 16 5% Sodium Hydroxide Solution | 36 Benzyl Ethanol | 56 Nitric Acid |
| 17 Chlorobenzene | 37 Phenol | 57 Cement |
| 18 Cloroform | 38 Cloroperoxide | 58 Oil dripped from Pipe |
| 19 Lilca | 39 Strong Prionic Acid | 59 Chemical Aqua |
| 20 Cresol | 40 Stryrene | 60 Phosphorus Trichloride |

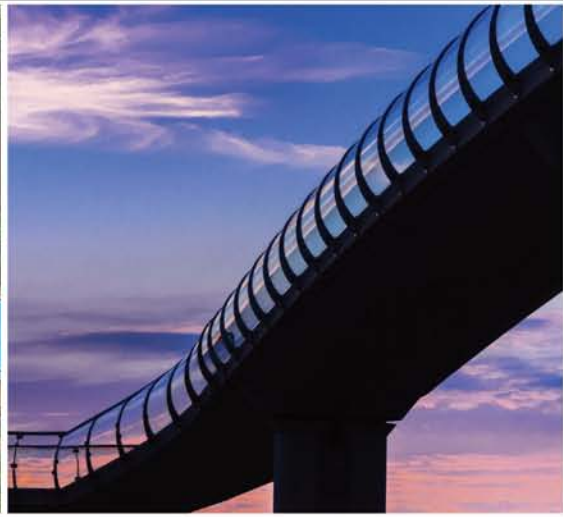
Caution

To maximise the life of your ALTSA polycarbonate sheets, ALTSA Plastics recommends avoid exposing your polycarbonate sheeting to excess heat from patio heaters. ALTSA recommends a distance of 1M kept between the sheets and the heater, adequate ventilation at all times and temperature to be below 90°C beneath the sheeing. If temperature underneath your sheet rises above 90°C, immediatly remove the patio heater from underneath the polycarbonate sheeting.



Although many of the commercially available shading compounds can be used with ALTSA polycarbonate sheets, care must still be taken prior to applying; it is best to test the compound on a non-critical location to ensure that it can be removed from the sheet.

It is important not to use vinyl materials which are incompatible with polycarbonate to clean the surface. Any breakage resulting from the polycarbonate sheets coming in contact with any of the chemicals in the list would completely void warranty.







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