SAINT-GOBAIN

THE ESSENTIAL

GLASS FOR FAÇADE

EUROPEAN PRODUCTS & STANDARDS

SEPTEMBER 2025

SAINT-GOBAIN GLASS

OUR PRODUCT AND SERVICE OFFER FOR FAÇADES

We play our part in designing some of the world's most iconic architectural projects, offering a wide range of innovative glazing solutions for façades. Partners such as visionary architects or contractors striving to deliver the ultimate building envelope have helped establish Saint-Gobain Glass as a key glazing supplier to the global construction industry.

Saint-Gobain offers a complete range of energy efficient coated glass; we answer the needs with an adapted offer in Europe and in the different regions of the world, thanks to innovation and the technology developed by Saint-Gobain Glass, to serve comfort and well-being for sustainable construction.

We also offer tailor-made advisory about glass products and technical solutions. Our local sales and specification team can help in choosing the best solutions for your project. In complete transparency, to find a suitable glazing for your project, Saint-Gobain Glass also provides several digital resources and tools, helping to determine the optimal glazing based on its performance values, aesthetic, or carbon footprint, and to compare different solutions. On demand, we also offer virtual rendering of coated glass and physico-realistic image of different glazing products for your own building façade.

GLASS SUBSTRATE

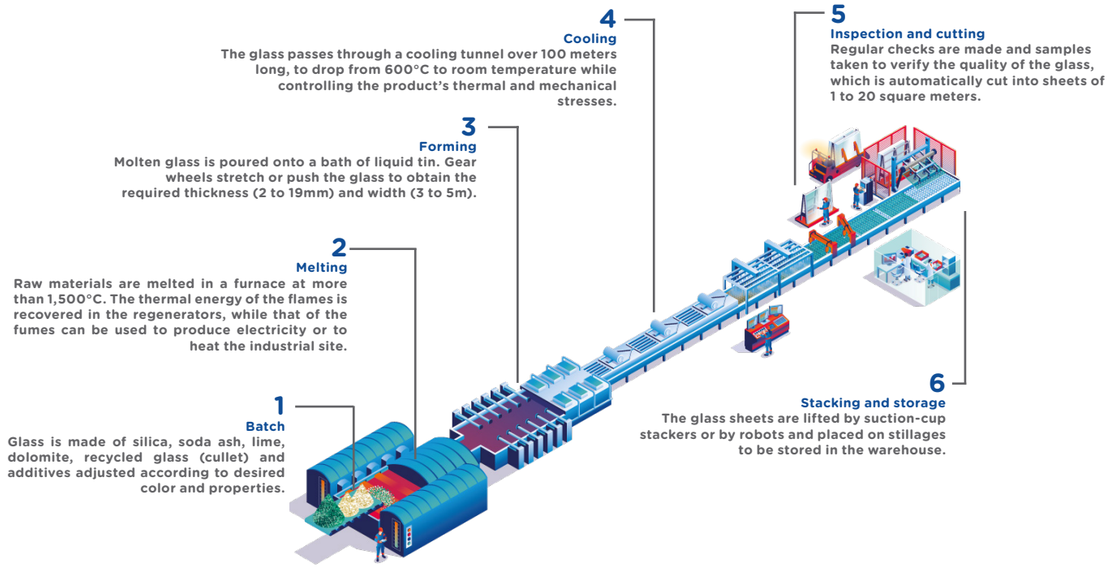
Transparency: clear and extra-clear glass - **PLANICLEAR®** and **DIAMANT®**

PLANICLEAR® high quality clear glass and DIAMANT® highly transparent extra-clear glass provide extreme transparency and ensure more daylight in.

Low embodied carbon glass - **ORAÉ®**

First low-carbon glass on the market with exceptionally low carbon footprint, produced by combining high recycled glass content and renewable energy.

FLAT GLASS MANUFACTURING AT SAINT-GOBAIN GLASS



COATED GLASS

Solar Control Glass - **COOL-LITE®**

Solar control coatings reduce overheating within buildings while letting the daylight in. Offering homogeneous aesthetic for large facade, they help to reduce energy needs, hence operational carbon emissions.

Pages 6 to 15

Low-E glass - **PLANITHERM®** and **ECLAZ®**

In complementarity to solar control glass in double or triple glazing, Low-E glass significantly reduce heat loss to the exterior, saving the energy need for internal heating.

Pages 16-17

Easy maintenance - **BIOCLEAN®**

BIOCLEAN® reduces the required cleaning frequency of glazing, and also reduces the occurrence of external condensation.

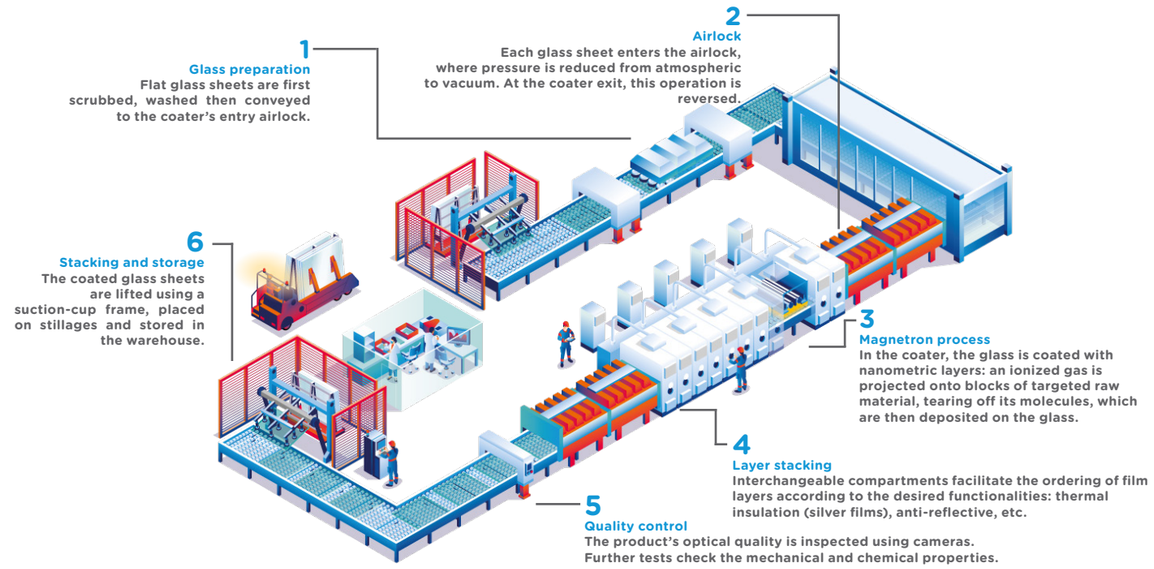
Pages 16-17

Anti-reflective glass - **VISION-LITE®**

Anti-reflective glass is a key asset, especially for shop front projects or sightseeing windows, where reflections on glass must not block the visibility of products.

Pages 16-17

COATED GLASS MANUFACTURING AT SAINT-GOBAIN GLASS



SERVICES FOR COATED GLASS

Easy processing - **EASYPRO®**

Revolutionary and unique temporary surface protection for to-be-tempered coatings.
Developed for the ease of processing, EASYPRO® offers flexibility and productivity and reduces environmental impact.

Page 18

Think big - **OVERLENGTH**

Large scale range of raw glass and coated glass panes up to 18 x 3,21 m.

Page 19

Non-Vision Part - GLASS SPANDRELS

Spandrel glass proposition harmonized to vision glass comprising COOL-LITE® coating in order to assure the homogeneity and the full beauty of the façade.

Pages 20-21

SUSTAINABLE INNOVATIONS

Low embodied carbon glass - ORAÉ®
First low-carbon glass on the market with exceptionally low carbon footprint, produced by combining high recycled glass content and renewable energy.

Page 24

Bird protection - 4BIRD®
Solutions to combine COOL-LITE® solar control glass and visible pattern by birds to help protecting wildlife.

Page 25

Solutions for energy generation - Building Integrated Photovoltaics (BIPV)
Building Integrated Photovoltaics (BIPV) solutions, turning the façade into a source of energy and help our customers to decarbonize their activities.

Page 26

Circular economy - RECYCLING
Support for recycling of old façade and on-site collection of end-of-life glass, treatment and recycling as external cullet in our furnace.

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LOW CARBON MANUFACTURING OF FLAT GLASS
AT SAINT-GOBAIN GLASS

1
Glazing recovery
Recycling glazing at the end of its life has two major advantages: reducing the carbon footprint of glass and preserving exhaustible resources such as sand.

Today, one of the challenges is to structure glazing recovery channels to recycle flat glass in a closed loop.

During renovation or deconstruction projects, the glazing must be removed intact to ensure the quality of the material recovered.

2
Cullet production
Once the glazing has been removed, it is transported to a dismantling site. The different parts of the windows are separated and the glass is dismantled.

The recovered glass is crushed and then sorted and inspected using digital tools to verify its quality.

The secondary raw material resulting from this recycling process is called cullet.

4
Transformation of glass into glazing
Once the flat glass is manufactured, it is transported in an inloader truck to the processing site, where it becomes a glazing unit ready for installation.

Digital tools optimize the flow between sites, reducing transport-related emissions. On the way back to the plant, the truck can be loaded with cullet from the processing scrap.

To reduce road traffic between manufacturing sites, the use of multimodal transport (train and road) is growing rapidly.

3
Flat glass manufacturing
The cullet used to manufacture glass does not emit CO_2 during its melting, which also requires less energy than for virgin raw materials.

The use of low-carbon energy sources, such as biogas and green electricity, further reduces emissions from glass production.

Other industrial innovations also improve energy consumption in the plant. For example, the heat generated by the furnace can be used as energy in other parts of the production line.

DIGITAL TOOLS

Online glazing configurator - Calumen®
All-in-One glazing configurator designed for all building professionals, to determine performances of glazing and find the suitable glazing for projects.

Page 28

Aesthetic rendering - GlassPro
Accurate predictive glass façade physico-realistic rendering to choose and compare two types of glazing or to appreciate the look of Saint-Gobain Glass products on your own building.

Page 28

SPECIALTIES

Safety glass solutions - VETROTECH
Glazed solutions for the safety of people and property: fire protection, attack, bullet and blast resistance.

Page 30

Dynamic glass - SageGlass®
Electrochromic glass that tints and clears to optimize daylight, energy efficiency and comfort, while preventing heat and glare without the need for blinds or shades.

Page 31

OUR COATED GLASS FOR FACADES

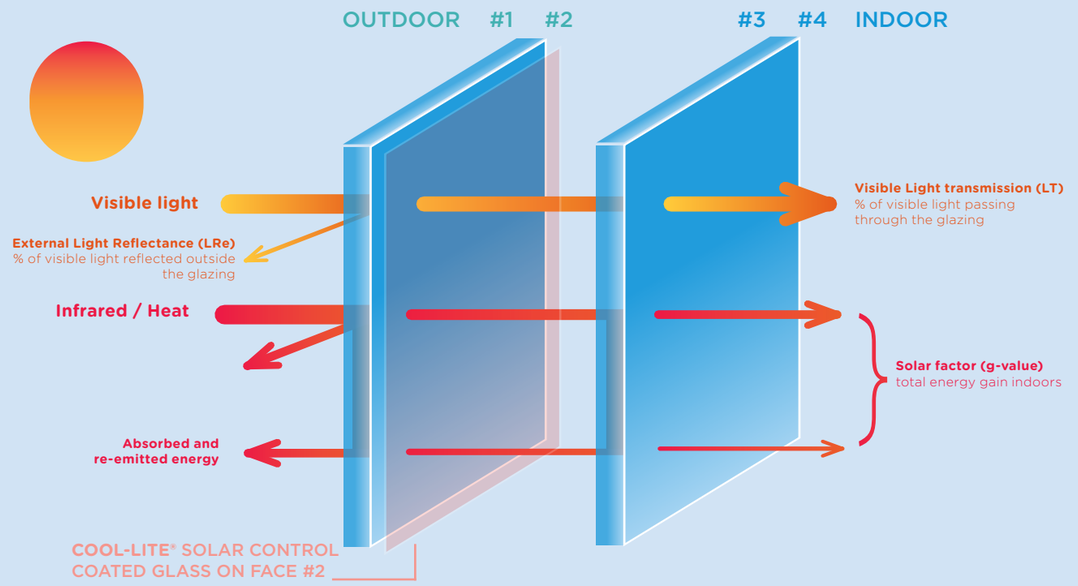
Saint-Gobain Glass offers a complete range of energy efficient coated glass. With solar control, low emissivity, low maintenance and transparency, our glass meets the requirements of low energy consumption buildings.

COOL-LITE® are Saint-Gobain Glass Solar control glass; Assembled in insulating glazing units (IGU), they help reducing overheating within buildings while letting the daylight in. Offering homogeneous aesthetic for large facade, they help to reduce energy needs, hence operational carbon emissions.

The technology behind solar control and low emissivity is a thin transparent coating of metallic oxides, deposited on one or two glass panes of a double or triple glazing unit.

Invisible thermal shield, this coating retains the heat inside the building and captures the sun heat to keep it outside.

KEY PERFORMANCE FACTORS IN INSULATING GLAZING UNIT



Light transmission (LT): Percentage of visible light directly transmitted through the glass.

Reflection outside (LRe): Percentage of visible light directly reflected from the exterior glass surface.

Reflection inside (LRi): Percentage of visible light directly reflected from the interior glass surface.

Ug-value: Measure of the heat loss through the glass due to the difference of temperature between inside and outside. The lower the Ug-value is, the better the insulating properties are. Expressed in W/m^2K.

Solar Factor (g-value): Percentage of solar energy transmitted through the glass.
It measures the ability of a glazing to reduce the heating of the room. The lower the solar factor is, the better it helps to improve the comfort inside of the building.

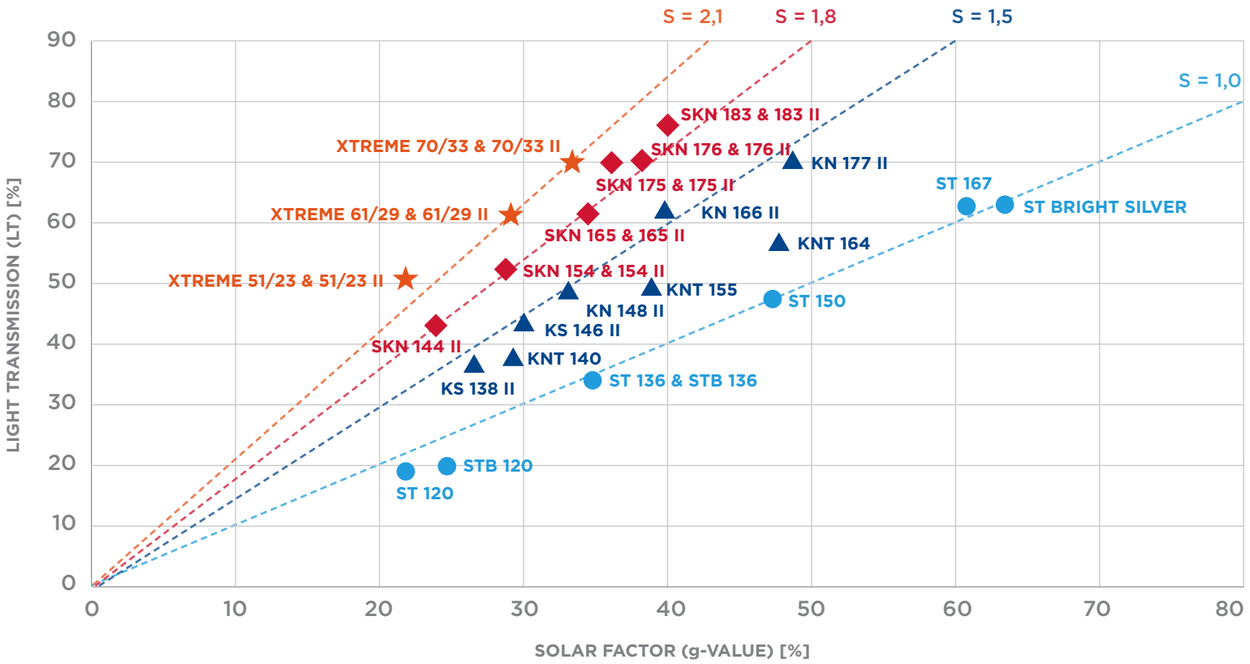
Shading Coefficient (SC): Ratio of the solar factor of a glazing unit to the solar factor of a clear float glass of nominal thickness of 3 mm (0.87). The lower the shading coefficient number, the less heat gain and thus more shading is provided.

Selectivity (LSG): Ratio between the glass' light transmission and solar factor. When the selectivity of the glass is higher than 2, it gives you twice as much visible light versus heat.

Sound reduction (Rw): The weighted sound reduction index (Rw) is a rating to measure and indicate how effective a soundproofing material or system is. This rating is expressed in decibels.

Carbon footprint (GWP): The Global Warming Potential corresponds to the whole amount of greenhouse gases (GHG) emitted directly and indirectly and is usually measured in equivalent kilograms of CO_2 per m^2 of glass.

SOLAR CONTROL GLASS
COOL-LITE®



★ COOL-LITE® XTREME

◆ COOL-LITE® SKN

▲ COOL-LITE® K

● COOL-LITE ST

EXTREMELY SELECTIVE SOLAR CONTROL GLASS
WITH HIGHLY NEUTRAL AESTHETICS

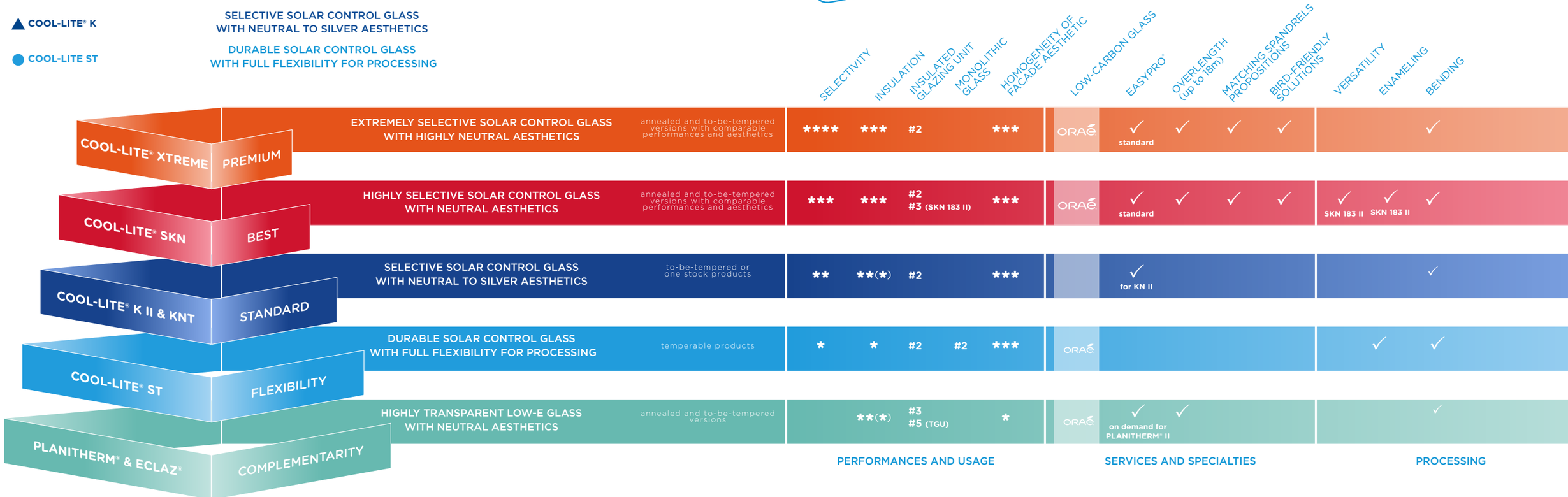
HIGHLY SELECTIVE SOLAR CONTROL GLASS
WITH NEUTRAL AESTHETICS

SELECTIVE SOLAR CONTROL GLASS
WITH NEUTRAL TO SILVER AESTHETICS

DURABLE SOLAR CONTROL GLASS
WITH FULL FLEXIBILITY FOR PROCESSING

Status 10/2024

All values according to EN 410 for standard configuration 6/16/4mm with COOL-LITE® coating on face #2, all panes PLANICLEAR®



HOW TO READ OUR COOL-LITE® PRODUCT NAMES

COOL-LITE® XTREME **Extremely selective solar control coatings (triple silver) with reinforced thermal insulation**

COOL-LITE® XTREME 70 / 33 II

FAMILY: Extremely selective solar control coatings (triple silver)

LIGHT TRANSMISSION in double glass unit 6|16|4 mm

SOLAR FACTOR (g-value) in double glass unit 6|16|4 mm

PROCESSING
II = to-be-tempered
Ø = annealed

COOL-LITE® SKN **Highly selective solar control coatings (double silver) with reinforced thermal insulation**
COOL-LITE® K **Selective solar control coatings (single silver) with good to reinforced thermal insulation**
COOL-LITE® ST **Solar control coatings offering full flexibility for processing**

COOL-LITE® SK N 1 83 II

FAMILY:
S = selective
K = K-value (Ug-Value / low-E performance)

COLOR IN REFLECTION
B = blue
G = golden / grey
N = neutral
S = silver

PROCESSING
T = temperable
L = to-be-laminated

SUBSTRATE
0 = DIAMANT®
1 = PLANICLEAR®
2 = PARSOL® Bronze
3 = PARSOL® Grey
4 = PARSOL® Green
7 = PARSOL® Saphire Blue

LIGHT TRANSMISSION for 6mm monolithic glass

PROCESSING
II = to-be-tempered
Ø = annealed

OUR COOL-LITE® SOLAR CONTROL COATED GLASS FOR FACADES in Double Glazing Units

DGU II

Coating	color in reflection	to-be-tempered (II)	annealed	Light transmission LT[1] [%] / Solar factor g-value[1] [%]	External reflection LRe [%]	DGU with all panes PLANICLEAR® or: Light transmission LT[1] [%]	Solar factor g-value[1] [%]	Selectivity LT/g-value	External reflection LRe[1] [%]	Internal Reflection LRi[1] [%]	Carbon footprint[7,8] (on PLANICLEAR®/ on ORAE®) [kg CO_2eq./m²]	DGU with all panes DIAMANT®: Light transmission LT[1] [%]	Solar factor g-value[1] [%]	Selectivity LT/g-value	External reflection LRe[1] [%]	Internal Reflection LRi[1] [%]	Carbon footprint[7,8] [kg CO_2eq./m²]	Ug-value[2] [W/m²K]	Processing possibilities: Tempering	Lamination tested towards PVB[4]	Bending[5]	Enamelling[6]
Extremely selective solar control coating with reinforced thermal insulation																						
COOL-LITE® XTREME in double glazing unit (6 | 16 | 4 mm, 90% Argon, coating on face #2) on PLANICLEAR® or DIAMANT® extra-clear glass, also available on low-carbon glass																						
Values given according to the standards EN 410 and EN 673																						
DOUBLE GLAZING UNIT 6 | 16 | 4 mm: Weight 25 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 35(-1;-5) dB																						
COOL-LITE® XTREME 70/33 II with **EASYPRO®**	Neutral	•				**70**	**33**	2.12	**11**	13	43 / 28	71	33	2.15	11	13	45	1.0	•		•	
COOL-LITE® XTREME 70/33	Neutral		•			**70**	**33**	2.12	**11**	13	39 / 24	71	33	2.15	11	13	41	1.0				
COOL-LITE® XTREME 61/29 II with **EASYPRO®**	Neutral	•				**61**	**29**	2.10	**11**	15	43 / 28	62	29	2.14	11	15	45	1.0	•		•	
COOL-LITE® XTREME 61/29	Neutral		•			**61**	**29**	2.10	**11**	14	39 / 24	62	29	2.14	11	14	41	1.0				
COOL-LITE® XTREME 51/23 II with **EASYPRO®**	Neutral	•				**51**	**23**	2.22	**13**	18	43 / 28	52	23	2.26	13	18	45	1.0	•		(•)	
COOL-LITE® XTREME 51/23	Neutral					**51**	**23**	2.22	**13**	18	39 / 24	52	23	2.26	13	18	41	1.0				
Highly selective solar control coating with reinforced thermal insulation																						
COOL-LITE® SKN in double glazing unit (6 | 16 | 4 mm, 90% Argon, coating on face #2) on PLANICLEAR® or DIAMANT® extra-clear glass, also available on low-carbon glass																						
Values given according to the standards EN 410 and EN 673																						
DOUBLE GLAZING UNIT 6 | 16 | 4 mm: Weight 25 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 35(-1;-5) dB																						
COOL-LITE® SKN 183 II with **EASYPRO®**	Neutral	•				**75**	**40**	1.88	**12**	13	43 / 28	76	41	1.85	12	13	45	1.0	•	•	•	•
COOL-LITE® SKN 183	Neutral		•			**75**	**40**	1.88	**12**	13	39 / 24	76	41	1.85	12	13	41	1.0		•		
COOL-LITE® SKN 175 II with **EASYPRO®**	Neutral	•				**70**	**35**	2.00	**14**	15	43 / 28	71	36	1.97	15	16	45	1.0	•		•	
COOL-LITE® SKN 175	Neutral		•			**70**	**35**	2.00	**14**	15	39 / 24	71	36	1.97	15	16	41	1.0				
COOL-LITE® SKN 176 II with **EASYPRO®**	Neutral	•				**70**	**37**	1.89	**13**	15	43 / 28	71	38	1.87	13	15	45	1.0	•	•	•	
COOL-LITE® SKN 176	Neutral		•			**70**	**37**	1.89	**13**	15	39 / 24	71	38	1.87	13	15	41	1.0		•		
COOL-LITE® SKN 165 II with **EASYPRO®**	Neutral	•				**61**	**34**	1.79	**16**	19	43 / 28	62	35	1.77	17	19	45	1.0	•	•	•	
COOL-LITE® SKN 165	Neutral		•			**61**	**34**	1.79	**16**	19	39 / 24	62	35	1.77	17	19	41	1.0		•		
COOL-LITE® SKN 154 II with **EASYPRO®**	Neutral	•				**52**	**28**	1.86	**18**	23	43 / 28	53	29	1.83	19	22	45	1.0	•	•	•	
COOL-LITE® SKN 154	Neutral		•			**52**	**28**	1.86	**18**	23	39 / 24	53	29	1.83	19	22	41	1.0		•		
COOL-LITE® SKN 144 II with **EASYPRO®**	Neutral	•				**42**	**23**	1.83	**20**	15	43 / 28	43	23	1.87	21	15	45	1.1	•	•	•	
Selective solar control coating with reinforced thermal insulation																						
COOL-LITE® KN II in double glazing unit (6 | 16 | 4 mm, 90% Argon, coating on face #2) on PLANICLEAR® or DIAMANT® extra-clear glass																						
Values given according to the standards EN 410 and EN 673																						
DOUBLE GLAZING UNIT 6 | 16 | 4 mm: Weight 25 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 35(-1;-5) dB																						
COOL-LITE® KN 177 II with **EASYPRO®**	Neutral	•				**70**	**48**	1.46	**24**	22	43	71	50	1.42	24	22	45	1.0	•			
COOL-LITE® KN 166 II with **EASYPRO®**	Neutral	•				**61**	**39**	1.56	**23**	26	43	62	41	1.51	24	26	45	1.0	•			
COOL-LITE® KN 148 II with **EASYPRO®**	Neutral	•				**47**	**32**	1.47	**27**	18	43	48	33	1.45	28	18	45	1.0	•			

[1] according to EN 410; [2] according to EN 673; [3] according to EN 12758

[4] Solar control coating in contact with PVB modifies performances and aesthetics. Some restrictions may occur. Please contact us to get the approved list.

[5] Bending results depend on the process/technology used; trials should be done for validation.

[6] Screen-printing/roller coating/spray/digital printing inks and enamels validation is required. Some restrictions may occur, please contact us for details. Printing on coating wihtout EASYPRO®

[7] Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR® and ORAÉ® are calculations made with Calumen® for each composition of insulated glazing unit (IGU) on the basis of the standard EN 15804+A2. Detailed environmental data are documented in the available Environmental Product Declarations (EPD) of PLANICLEAR® and ORAÉ®. Only complete EPD can be verified by an external third party.

[8] All panes of the IGU with the same substrate; first pane respectively annealed or tempered (II) with the same glass compositions; counter panes always annealed

LOOKING FOR OTHER CONFIGURATIONS?
GO TO OUR ONLINE GLAZING CONFIGURATOR!
Calumen®

OUR COOL-LITE® SOLAR CONTROL COATED GLASS FOR FACADES in Double Glazing Units

DGU II

Coating	color in reflection	to-be-tempered (II)	annealed	Light transmission LT[1] [%] / Solar factor g-value[1] [%]	External reflection LRe [%]	DGU with all panes PLANICLEAR®						DGU with PLANITHERM® XN on face #3 (PLANICLEAR)®							Processing possibilities			
						Light transmission LT[1]	Solar factor g-value[1]	External reflection LRe[1]	Internal Reflection LRi[1]	Carbon footprint[7,8] (annealed / tempered)	Ug-value[2]	Light transmission LT[1]	Solar factor g-value[1]	Selectivity LT/g-value	External reflection LRe[1]	Internal Reflection LRi[1]	Carbon footprint[7,8]	Ug-value[2]	Tempering	Lamination tested towards PVB[4]	Bending[5]	Enamelling[6]
				100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50		[%]	[%]	[%]	[%]	[kg CO_2eq./m²]	[W/m²K]	[%]	[%]		[%]	[%]	[kg CO_2eq./m²]	[W/m²K]				
Selective solar control coating with good thermal insulation																						
COOL-LITE® K in double glazing unit (6 | 16 | 4 mm, 90% Argon, coating on face #2) on PLANICLEAR®																						
Values given according to the standards EN 410 and EN 673																						
DOUBLE GLAZING UNIT 6 | 16 | 4 mm: Weight 25 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 35(-1;-5) dB																						
COOL-LITE® KNT 164	Neutral	•				**58**	**47**	**15**	10	39 / 43	1.5	57	42	1.36	13	7	40 / 44	1.1	•	•		
COOL-LITE® KNT 155	Neutral	•				**48**	**38**	**17**	10	39 / 43	1.4	48	35	1.37	16	7	40 / 44	1.1	•	•		
COOL-LITE® KS 146 II	Silver	•				**43**	**30**	**33**	19	43	1.2	42	29	1.45	33	16	44	1.1	•	•		
COOL-LITE® KS 147	Silver		•			**44**	**31**	**43**	38	39	1.1	43	30	1.43	42	34	40	1.1		•		
COOL-LITE® KNT 140	Neutral	•				**38**	**29**	**23**	12	39 / 43	1.3	38	27	1.41	22	9	40 / 44	1.1	•	•		
COOL-LITE® KS 138 II	Silver	•				**37**	**26**	**39**	20	43	1.2	36	25	1.44	38	17	44	1.1	•	•		
COOL-LITE® KG 137 tempered	Gold	•				**35**	**29**	**34**	32	43	1.2	34	27	1.26	33	28	44	1.1	•			
COOL-LITE® KG 137 annealed	Gold		•			**35**	**29**	**31**	29	39	1.2	34	27	1.26	30	25	40	1.1		•		

Coating	color in reflection	to-be-tempered (II)	annealed	Light transmission LT[1] [%] / Solar factor g-value[1] [%]	External reflection LRe [%]	Monolithic glass with coating on face #2						DGU with PLANITHERM® XN on face #3 (PLANICLEAR)®							Processing possibilities			
						Light transmission LT[1]	Solar factor g-value[1]	External reflection LRe[1]	Internal Reflection LRi[1]	Carbon footprint[7,8] (annealed / tempered)	Ug-value[2]	Light transmission LT[1]	Solar factor g-value[1]	Selectivity LT/g-value	External reflection LRe[1]	Internal Reflection LRi[1]	Carbon footprint[7,8]	Ug-value[2]	Tempering	Lamination tested towards PVB[4]	Bending[5]	Enamelling[6]
				100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50		[%]	[%]	[%]	[%]	[kg CO_2eq./m²]	[W/m²K]	[%]	[%]		[%]	[%]	[kg CO_2eq./m²]	[W/m²K]				
Solar control coating offering full flexibility for processing																						
COOL-LITE® ST as monolithic glass 6mm or in double glazing unit (6 | 16 | 4 mm, 90% Argon, coating on face #2) on PLANICLEAR®, also available on ORAÉ low-carbon glass																						
Values given according to the standards EN 410 and EN 673																						
DOUBLE GLAZING UNIT 6 | 16 | 4 mm: Weight 25 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 35(-1;-5) dB																						
COOL-LITE® ST BRIGHT SILVER DIAMANT®	Silver	•				**67**	**71**	**30**	31	18 / 24	5.7	62	52	1.19	32	31	42 / 46	1.1	•	•	•	•
COOL-LITE® ST BRIGHT SILVER PLANICLEAR®	Silver	•				**67**	**69**	**30**	31	17 / 23	5.7	61	50	1.22	32	30	40 / 44	1.1	•	•	•	•
COOL-LITE® ST 167 (on PLANICLEAR®)	Neutral	•				**67**	**69**	**19**	19	17 / 23	5.6	61	49	1.24	21	21	40 / 44	1.1	•	•	•	•
COOL-LITE® ST 150 (on PLANICLEAR®)	Neutral	•				**51**	**56**	**18**	17	17 / 23	5.6	46	38	1.21	19	19	40 / 44	1.1	•	•	•	•
COOL-LITE® ST 136 (on PLANICLEAR®)	Neutral	•				**37**	**44**	**22**	18	17 / 23	5.5	33	28	1.18	23	20	40 / 44	1.1	•	•	•	•
COOL-LITE® STB 136 (on PLANICLEAR®)	Blue	•				**36**	**44**	**18**	15	17 / 23	5.4	32	28	1.14	19	17	40 / 44	1.1	•	•		•
COOL-LITE® ST 120 (on PLANICLEAR®)	Neutral	•				**21**	**30**	**32**	26	17 / 23	5.2	19	17	1.14	32	26	40 / 44	1.1	•	•	•	•
COOL-LITE® STB 120 (on PLANICLEAR®)	Blue	•				**22**	**32**	**21**	29	17 / 23	5.2	20	18	1.11	21	29	40 / 44	1.1	•	•		•

[1] according to EN 410; [2] according to EN 673; [3] according to EN 12758

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[6] Screen-printing/roller coating/spray/digital printing inks and enamels validation is required. Some restrictions may occur, please contact us for details.

[7] Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR® and ORAÉ® are calculations made with Calumen® for each composition of insulated glazing unit (IGU) on the basis of the standard EN 15804+A2. Detailed environmental data are documented in the available Environmental Product Declarations (EPD) of PLANICLEAR® and ORAÉ®. Only complete EPD can be verified by an external third party.

[8] All panes of the IGU with the same substrate; first pane respectively annealed and/or tempered (II) with the same glass compositions; counter panes always annealed

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OUR COOL-LITE® SOLAR CONTROL COATED GLASS FOR FACADES in Triple Glazing Units

TGU III

Coating	color in reflection	to-be-tempered (II)	annealed	Light transmission LT[1] [%] / Solar factor g-value[1] [%]	External reflection LRe [%]	TGU with all panes PLANICLEAR® or: Light transmission LT[1] [%]	Solar factor g-value[1]	Selectivity LT/g-value	External reflection LRe[1] [%]	Internal Reflection LRi[1] [%]	Carbon footprint[7,8] (on PLANICLEAR®/ on ORAE®) [kg CO_2eq./m^2]	TGU with all panes DIAMANT®: Light transmission LT[1] [%]	Solar factor g-value[1]	Selectivity LT/g-value	External reflection LRe[1] [%]	Internal Reflection LRi[1] [%]	Carbon footprint[7,8] [kg CO_2eq./m^2]	Ug-value[2] [W/m^2K]	Processing possibilities: Tempering	Lamination tested towards PVB[4]	Bending[5]	Enamelling[6]
				100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50		[%]	[%]		[%]	[%]		[%]	[%]		[%]	[%]						
Extremely selective solar control coating with reinforced thermal insulation																						
COOL-LITE® XTREME in triple glazing unit (6 | 12 | 4 | 12 | 4 mm, 90% Argon, coating on face #2 and PLANITHERM®XN on face #5) on PLANICLEAR® or DIAMANT® extra-clear glass, also available on low-carbon glass																						
Values given according to the standards EN 410 and EN 673																						
TRIPLE GLAZING UNIT 6 | 12 | 4 | 12 | 4 mm: Weight 35 kg/m^2 - Assessed sound reduction Index Rw (C, Ctr)[3]: 36(-1;-5) dB																						
COOL-LITE® XTREME 70/33 II with **EASYPRO®**	Neutral	•				**63**	**31**	2.03	**13**	16	61 / 39	65	31	2.10	13	16	63	0.7	•		•	
COOL-LITE® XTREME 70/33	Neutral		•			**63**	**31**	2.03	**13**	16	57 / 36	65	31	2.10	13	16	59	0.7				
COOL-LITE® XTREME 61/29 II with **EASYPRO®**	Neutral	•				**55**	**27**	2.04	**12**	17	61 / 39	56	27	2.07	13	18	63	0.7	•		•	
COOL-LITE® XTREME 61/29	Neutral		•			**55**	**27**	2.04	**12**	16	57 / 36	56	28	2.00	13	17	59	0.7				
COOL-LITE® XTREME 51/23 II with **EASYPRO®**	Neutral	•				**46**	**21**	2.19	**14**	20	61 / 39	47	21	2.24	14	20	63	0.7	•		(•)	
COOL-LITE® XTREME 51/23	Neutral		•			**46**	**21**	2.19	**14**	20	57/ 36	47	21	2.24	14	20	59	0.7				
Highly selective solar control coating with reinforced thermal insulation																						
COOL-LITE® SKN in triple glazing unit (6 | 12 | 4 | 12 | 4 mm, 90% Argon, coating on face #2 and PLANITHERM®XN on face #5) on PLANICLEAR® or DIAMANT® extra-clear glass, also available on low-carbon glass																						
Values given according to the standards EN 410 and EN 673																						
TRIPLE GLAZING UNIT 6 | 12 | 4 | 12 | 4 mm: Weight 35 kg/m^2 - Assessed sound reduction Index Rw (C, Ctr)[3]: 36(-1;-5) dB																						
COOL-LITE® SKN 183 II with **EASYPRO®**	Neutral	•				**67**	**37**	1.81	**14**	16	61 / 39	69	38	1.82	14	16	63	0.7	•	•	•	•
COOL-LITE® SKN 183	Neutral		•			**67**	**37**	1.81	**14**	16	57 / 36	69	38	1.82	14	16	59	0.7		•		
COOL-LITE® SKN 175 II with **EASYPRO®**	Neutral	•				**63**	**33**	1.91	**16**	17	61 / 39	65	34	1.91	17	18	63	0.7	•		•	
COOL-LITE® SKN 175	Neutral		•			**63**	**33**	1.91	**16**	17	57 / 36	65	34	1.91	17	18	59	0.7				
COOL-LITE® SKN 176 II with **EASYPRO®**	Neutral	•				**63**	**34**	1.85	**15**	17	61 / 36	65	35	1.86	15	18	63	0.7	•	•	•	
COOL-LITE® SKN 176	Neutral		•			**63**	**34**	1.85	**15**	17	57 / 36	65	35	1.86	15	18	59	0.7		•		
COOL-LITE® SKN 165 II with **EASYPRO®**	Neutral	•				**55**	**32**	1.72	**18**	20	61 / 39	57	33	1.73	18	21	63	0.7	•	•	•	
COOL-LITE® SKN 165	Neutral		•			**55**	**32**	1.72	**18**	20	57 / 36	57	33	1.73	18	20	59	0.7		•		
COOL-LITE® SKN 154 II with **EASYPRO®**	Neutral	•				**47**	**26**	1.81	**19**	23	61 / 39	48	27	1.78	19	24	63	0.7	•	•	•	
COOL-LITE® SKN 154	Neutral		•			**47**	**26**	1.81	**20**	23	57 / 36	48	27	1.78	20	23	59	0.7		•		
COOL-LITE® SKN 144 II with **EASYPRO®**	Neutral	•				**38**	**21**	1.81	**21**	17	61 / 39	39	21	1.86	22	18	63	0.7	•	•	•	
Selective solar control coating with reinforced thermal insulation																						
COOL-LITE® KN II in triple glazing unit (6 | 12 | 4 | 12 | 4 mm, 90% Argon, coating on face #2 and PLANITHERM®XN on face #5) on PLANICLEAR® or DIAMANT® extra-clear glass																						
Values given according to the standards EN 410 and EN 673																						
TRIPLE GLAZING UNIT 6 | 12 | 4 | 12 | 4 mm: Weight 35 kg/m^2 - Assessed sound reduction Index Rw (C, Ctr)[3]: 36(-1;-5) dB																						
COOL-LITE® KN 177 II with **EASYPRO®**	Neutral	•				**63**	**44**	1.43	**26**	23	61	65	45	1.44	26	23	63		•			
COOL-LITE® KN 166 II with **EASYPRO®**	Neutral	•				**55**	**36**	1.53	**25**	26	61	57	37	1.54	25	26	63		•			
COOL-LITE® KN 148 II with **EASYPRO®**	Neutral	•				**42**	**28**	1.50	**28**	25	61	44	29	1.52	28	20	63		•			

[1] according to EN 410; [2] according to EN 673; [3] according to EN 12758

[4] Solar control coating in contact with PVB modifies performances and aesthetics. Some restrictions may occur. Please contact us to get the approved list.

[5] Bending results depend on the process/technology used; trials should be done for validation.

[6] Screen-printing/roller coating/spray/digital printing inks and enamels validation is required. Some restrictions may occur, please contact us for details. Printing on coating wihtout EASYPRO®

[7] Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR® and ORAÉ® are calculations made with Calumen® for each composition of insulated glazing unit (IGU) on the basis of the standard EN 15804+A2. Detailed environmental data are documented in the available Environmental Product Declarations (EPD) of PLANICLEAR® and ORAÉ®. Only complete EPD can be verified by an external third party.

[8] All panes of the IGU with the same substrate; first pane respectively annealed or tempered (II) with the same glass compositions; counter panes always annealed

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OUR COOL-LITE® SOLAR CONTROL COATED GLASS FOR FACADES in Triple Glazing Units

TGU III

Coating	color in reflection	temperable or to-be-tempered (II)	annealed	Light transmission LT[1] [%] / Solar factor g-value[1] [%]	External reflection LRe [%]	TGU with PLANITHERM® XN on face #5 (PLANICLEAR®)						TGU with PLANITHERM® XN on face #3 and #5 (PLANICLEAR®)							Processing possibilities			
						Light transmission LT[1]	Solar factor g-value[1]	External reflection LRe[1]	Internal reflection LRi[1]	Carbon footprint[7,8] (annealed / tempered)	Ug-value[2]	Light transmission LT[1]	Solar factor g-value[1]	Selectivity LT / g	External reflection LRe[1]	Internal reflection LRi[1]	Carbon footprint[7,8] (annealed / tempered)	Ug-value[2]	Tempering	Lamination tested towards PVB[4]	Bending[5]	Enamelling[6]
				100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50		[%]	[%]	[%]	[%]	[kg CO² eq/m²]	[W/m²K]	[%]	[%]		[%]	[%]	[kg CO² eq/m²]	[W/m²K]				

Selective solar control coating with good thermal insulation

COOL-LITE® K in triple glazing unit (6 | 12 | 4 | 12 | 4 mm, 90% Argon, coating on face #2 and PLANITHERM® XN on face #5 and/or #3) on PLANICLEAR®

Values given according to the standards EN 410 and EN 673

TRIPLE GLAZING UNIT 6 | 12 | 4 | 12 | 4 mm: Weight 35 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 36(-1;-5) dB

COOL-LITE® KNT 164	Neutral	•			52	39	16	13	57 / 61	0.8	52	37	1.41	14	11	58 / 62	0.7	•	•		
COOL-LITE® KNT 155	Neutral	•			43	32	18	14	57 / 61	0.8	43	30	1.43	17	11	58 / 62	0.7	•	•		
COOL-LITE® KS 146 II	Silver	•			39	26	34	21	61	0.7	38	25	1.52	33	18	62	0.7	•	•		
COOL-LITE® KS 147	Silver		•		40	28	44	36	57	0.7	39	26	1.50	43	33	58	0.7		•		
COOL-LITE® KNT 140	Neutral	•			34	25	24	15	57 / 61	0,8	34	23	1.48	23	12	58 / 62	0.7	•	•		
COOL-LITE® KS 138 II	Silver	•			33	23	40	22	61	0.7	33	22	1.50	39	19	62	0.7	•	•		
COOL-LITE® KG 137 tempered	Gold	•			32	25	34	31	61	0.7	31	24	1.29	33	28	62	0.7	•			
COOL-LITE® KG 137 annealed	Gold		•		32	25	31	29	57	0.7	31	24	1.29	30	26	58	0.7		•		

Solar control coating offering full flexibility for processing

COOL-LITE® ST in triple glazing unit (6 | 12 | 4 | 12 | 4 mm, 90% Argon, coating on face #2 and PLANITHERM® XN on face #5 and/or #3) on PLANICLEAR®, also available on ORAÉ low-carbon glass

Values given according to the standards EN 410 and EN 673

TRIPLE GLAZING UNIT 6 | 12 | 4 | 12 | 4 mm: Weight 35 kg/m² - Assessed sound reduction Index Rw (C, Ctr)[3]: 36(-1;-5) dB

COOL-LITE® ST BRIGHT SILVER DIAMANT®	Silver	•			58	49	36	34	59 / 63	1.0	57	45	1.27	34	31	61 / 64	0.7	•	•	•	•
COOL-LITE® ST BRIGHT SILVER PLANICLEAR®	Silver	•			57	47	35	33	57 / 61	1.0	55	43	1.28	33	30	58 / 62	0.7	•	•	•	•
COOL-LITE® ST 167 (on PLANICLEAR®)	Neutral	•			56	45	24	25	57 / 61	1.0	55	42	1.31	22	22	58 / 62	0.7	•	•	•	•
COOL-LITE® ST 150 (on PLANICLEAR®)	Neutral	•			42	35	21	23	57 / 61	1.0	42	32	1.31	20	20	58 / 62	0.7	•	•	•	•
COOL-LITE® ST 136 (on PLANICLEAR®)	Neutral	•			31	26	24	24	57 / 61	1.0	30	24	1.25	23	21	58 / 62	0.7	•	•	•	•
COOL-LITE® STB 136 (on PLANICLEAR®)	Blue	•			30	26	19	22	57 / 61	1,0	29	23	1.26	19	19	58 / 62	0.7	•	•		•
COOL-LITE® ST 120 (on PLANICLEAR®)	Neutral	•			18	16	33	29	57 / 61	1.0	17	15	1.13	32	26	58 / 62	0.7	•	•	•	•
COOL-LITE® STB 120 (on PLANICLEAR®)	Blue	•			19	17	22	32	57 / 61	1,0	18	15	1.20	21	28	58 / 62	0.7	•	•		•

[1] according to EN 410; [2] according to EN 673; [3] according to EN 12758

[4] Solar control coating in contact with PVB modifies performances and aesthetics. Some restrictions may occur. Please contact us to get the approved list.

[5] Bending results depend on the process/technology used; trials should be done for validation.

[6] Screen-printing/roller coating/spray/digital printing inks and enamels validation is required. Some restrictions may occur, please contact us for details.

[7] Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR® and ORAÉ® are calculations made with Calumen® for each composition of insulated glazing unit (IGU) on the basis of the standard EN 15804+A2. Detailed environmental data are documented in the available Environmental Product Declarations (EPD) of PLANICLEAR® and ORAÉ®. Only complete EPD can be verified by an external third party.

[8] All panes of the IGU with the same substrate; first pane respectively annealed and/or tempered (II) with the same glass compositions; counter panes always annealed

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OUR COMPLEMENTARITY COATED GLASS

OTHERS

Easy maintenance coating: **BIOCLEAN®**

Coating	to-be-tempered	annealed	Description	DGU 6 I 16 I 4 mm							TGU 6 i 12 I 4 I 12 I 4 mm with PLANITHERM® XN on face #5						
				Light transmission LT[1]	Solar factor g-value[1]	Selectivity LT / g	External reflection LRe[1]	Internal reflection LRi[1]	Carbon footprint[7,8]	Ug-value[2]	Light transmission LT[1]	Solar factor g-value[1]	Selectivity LT / g	External reflection LRe[1]	Internal reflection LRi[1]	Carbon footprint[7,8]	Ug-value[2]
				[%]	[%]		[%]	[%]	[kg CO^2 eq/m^2]	[W/m^2K]	[%]	[%]		[%]	[%]	[kg CO^2 eq/m^2]	[W/m^2K]
BIOCLEAN® in insulated glazing unit, 90% Argon, on PLANICLEAR®																	
Values given according to the standards EN 410 and EN 673																	
BIOCLEAN® II	•		to-be-tempered BIOCLEAN® II on face #1	**79**	**76**	1.04	**18**	18	43	2.6	72	57	1.26	20	19	61	1.0
BIOCLEAN®		•	annealed BIOCLEAN® on face #1	**77**	**74**	1.04	**17**	17	39	2.6	70	55	1.27	20	19	57	1.0
BIOCLEAN® SKN 183		•	Bi-coating: BIOCLEAN® on face #1 and COOL-LITE® SKN 183 on face #2	**70**	**38**	1.84	**15**	15	40	1.0	63	35	1.80	17	17	58	0.7
BIOCLEAN® SKN 176		•	Bi-coating: BIOCLEAN® on face #1 and COOL-LITE® SKN 176 on face #2	**66**	**35**	1.89	**16**	17	40	1.0	59	32	1.84	17	19	58	0.7
BIOCLEAN® SKN 165		•	Bi-coating: BIOCLEAN® on face #1 and COOL-LITE® SKN 165 on face #2	**57**	**32**	1.78	**19**	19	40	1.0	52	30	1.73	20	21	58	0.7
BIOCLEAN® SKN 154		•	Bi-coating: BIOCLEAN® on face #1 and COOL-LITE® SKN 154 on face #2	**49**	**26**	1.88	**21**	23	40	1.0	44	24	1.83	22	24	58	0.7

Anti-reflective coating: **VISION-LITE®**

Coating	to-be-tempered	annealed	Description	Light transmission LT[1]	External reflection LRe[1]	Internal reflection LRi[1]
				[%]	[%]	[%]
VISION-LITE® as Laminated glass or Monolithic glass on DIAMANT®						
Values given according to the standards EN 410 and EN 673						
STADIP® VISION-LITE® DIAMANT® (44.2)		•	Coatings on faces #1 and #4 of laminated glass	**97**	**1**	1
VISION-LITE® II DIAMANT® (6 mm)	•		Coatings on both sides (#1 & #2) of glass - to be tempered	**98**	**1**	1
Semi VISION-LITE® II DIAMANT® (6 mm)	•		Coating on one side of the glass - to be tempered / to be laminated	**94**	**5**	5
Semi VISION-LITE® DIAMANT® (6 mm)		•	Coating on one side of the glass - to be laminated	**94**	**5**	5

[1] according to EN 410; [2] according to EN 673

[7] Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR® and ORAÉ® are calculations made with Calumen® for each composition of insulated glazing unit (IGU) on the basis of the standard EN 15804+A2. Detailed environmental data are documented in the available Environmental Product Declarations (EPD) of PLANICLEAR® and ORAÉ®. Only complete EPD can be verified by an external third party.

[8] All panes of the IGU with the same substrate; first pane respectively annealed and/or tempered (II) with the same glass compositions; counter panes always annealed

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LOW-E coatings: **PLANITHERM® and ECLAZ®**

Complementarity to COOL-LITE® solar control glazing in face #3 and/or #5 of double glazing units (DGU) and triple glazing units (TGU) for optimized performances and increased thermal insulation.

Coating	to-be-tempered	annealed	Description
High perfomance Low-E for insulating glazing units			
ECLAZ® - latest generation of Saint-Gobain Glass Low-E coatings for high-end glazing units. Produced by an unique industrial technology, ECLAZ® offers high performance and light transmission.			
ECLAZ® LUMI (ECLAZ®)		•	Perfect for double or triple glazing, mainly in residential and non residential applications. It can reach the value Ug = 0,5 W/(m^2.K) in TGU.
ECLAZ® LUMI II (ECLAZ® II)	•		
ECLAZ® ZEN (ECLAZ® ONE)		•	Best insulating glass that make possible to get 80% of light transmission. In double glazing, it can reach the value of Ug = 1,0 W/(m^2.K) into a composition 4-16 argon-4 mm.
ECLAZ® ZEN II (ECLAZ® ONE II)	•		
Low-E for insulating glazing units			
PLANITHERM® - PLANITHERM® is the range of high performing low-emissive coated glass for insulating glazing units, ensuring high performance in terms of energy efficiency and daylight.			
PLANITHERM® XN		•	Low-emissivity glass that optimizes the energy efficiency of double and triple-glazing units.
PLANITHERM® XN II	•		
PLANITHERM® ONE		•	Mounted in DGU it can reach the Ug-value = 1.0W/(m^2.K) in a 4-16 argon-4 mm composition

EASY PROCESSING
EASYPRO®

EASYPRO® is a revolutionary and unique temporary surface protection developed and offered exclusively by Saint-Gobain Glass. Deposited on to-be-tempered coated glass, it delivers effective protection against mechanical damage as well as ageing, during transport and processing, from deposition of the coating until tempering.

During tempering, EASYPRO® simply burns off without leaving any residue inside or outside the furnace and without any negative impact on the environment or personal health and safety.

Developed for the ease of processing, EASYPRO® offers flexibility and productivity, it

- reduces surface scratches and remakes
- increases shelf life in stock of after cutting
- eliminates time to unseal the pack
- optimizes tempering cycles
- improves tempering quality

EASYPRO® is a sustainable innovation, minimizing waste and saving energy, it

- optimizes loading into trucks and thus the carbon footprint of transport
- reduces the amount of packaging and avoid plastic waste
- reduces the scraps and damages and thus the need to produce new glazing
- offers energy saving benefits by allowing reduced temperature levels in the furnace.

EASYPRO® is an ally for ambitious projects and preserve aesthetic of tempered coated glass, it

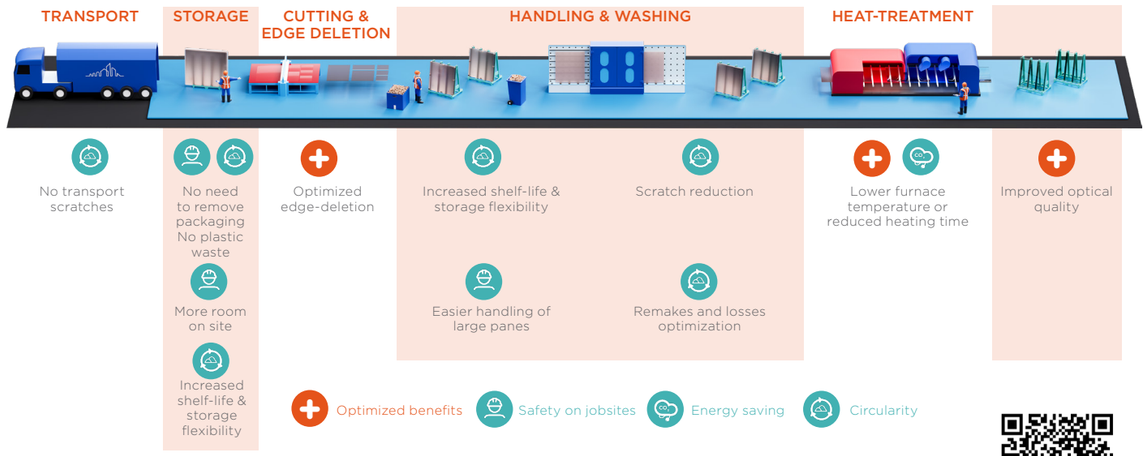
- improves the optical quality of heat-treated glass
- helps to deliver optimal aesthetics for most demanding projects (e.g. with impressive overlength glass)

EASYPRO® protects the following to-be-tempered coatings (on PLANICLEAR®, DIAMANT® or ORAÉ®):

- **COOL-LITE® XTREME II and SKN II** (standard with EASYPRO®)
- **COOL-LITE® KN II** (standard with EASYPRO®)
- EASYPRO® is also available on demand on **PLANITHERM® II** glass

Contact us for individual inquiries or coating availability on the different substrates.

NOW OPTIMIZED FOR AN EVEN EASIER AND SUSTAINABLE PROCESSING



GET TO KNOW MORE ON OUR EASYPRO® WEBPAGE

THINK BIG!
OVERLENGTH

To answer a major trend in architecture, we think big. Our large-scale range now includes glass panes with dimensions up to:

18 x 3,21 m

The benefits are revolutionary:
- greater design possibilities,
- spectacular optical highlights,
- larger evenly shaped facades,
- panoramic views while benefiting from high performance glazing.

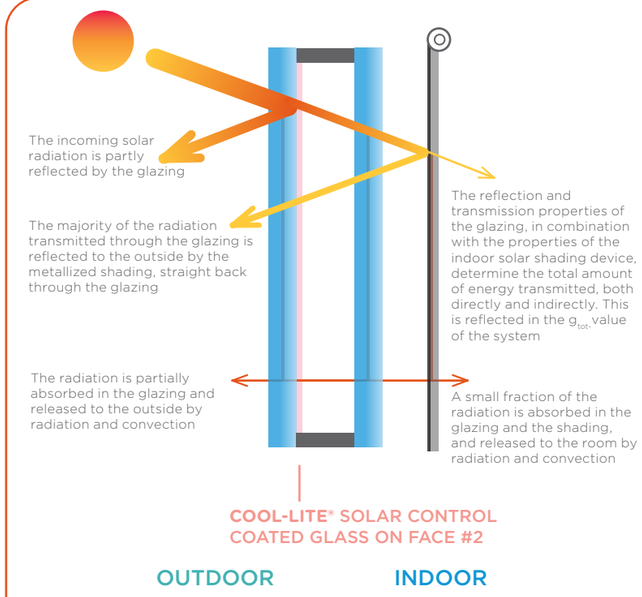
Coatings available, on DIAMANT®, PLANICLEAR® or ORAÉ® (in 8, 10 and 12 mm):

- **COOL-LITE® XTREME II**
- **COOL-LITE® SKN II**
- **PLANITHERM® II**

The glass can be heat-treated, laminated, and processed as multifunctional Double Glazed Units (DGU) or Triple Glazed Units (TGU).

Contact us for individual inquiries.

DYNAMIC FAÇADE
COMBINING HIGH PERFORMANCE GLASS AND INTERNAL SHADING



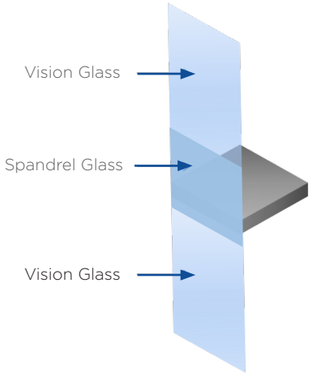
Highly selective solar contral glazings combined with reflective interior roller shades keep out up to 91% of the incoming solar radiation. The solution also manages effectively glare, while providing good visual contact with the outdoors.

The intelligent combination of solar control glass and metallized interior shading optimizes the g_{tot}-value, resulting in efficient solar protection while ensuring a pleasant thermal comfort and glare-free indoor environment. This results is a very low g_{tot}-value of down to 0.09.

Whether you are planning an office building, a school, a museum or an hotel such dynamic façade solution can be a good fit to achieve a good balance between energy, carbon and comfort performance, while being cost-effective.

Contact us for more details.

NON-VISION PART
GLASS SPANDRELS



Spandrel glass or non-vision glass are used on several buildings to conceal essential components that no one wants to see and are typically located below or on top of the vision glass on each floor of the building.

Spandrel made of glass are often used to have a continuous, smooth fully glazed façade. The spandrel glass can be complementary or contrasting in color when compared to the appearance of the vision glass.

Whatever the aesthetic sought, Saint-Gobain Glass offers complete services to achieve the desired design and propose spandrel glass harmonized to vision glass in order to assure the homogeneity and the full beauty of the façade.

The main component of glass spandrel is the opaque colored glass, comprising uniform enameling on one side of the glass. There are several kinds of spandrel, all presenting some advantages or drawbacks (cost, flexibility, aesthetic, maintenance, thermal performance…).

In the following we are considering 3 configurations:

- a **monolithic glass** which may comprise a COOL-LITE® ST or ST BRIGHT SILVER coating with enamel on #2
- an **insulated glazing unit (IGU)** with Saint-Gobain Glass solar control coatings on #2 and enamel on #4
- a **"Shadow-Box"** configuration with ventilated cavity, of similar composition comparable to the IGU.

ENAMELING ON COOL-LITE® SOLAR CONTROL COATINGS

Enamels are firstly developed for printing on standard raw soda-lime based float glass. During the tempering process of the glass, the enamels melt and fuse permanently to the glass surface to form a colored ceramic layer. For some applications, there may be a need of enameling coated glass, among others glass spandrels. The processing possibilities are given in the products tables (page 6 to 17). Hereafter a summary for our main COOL-LITE® products families.

COOL-LITE® Family	Enameling and Silk-Printing [9]
COOL-LITE® ST & STB	Can be enameled[10]
COOL-LITE® ST BRIGHT SILVER	Can be enameled[10], **however**, it is not recommended to print COOL-LITE® ST BRIGHT SILVER with dark ceramic colors
COOL-LITE® KN II, KNT, SKN II and XTREME II	No common approval for the enameling of silver-based high performance coatings from the COOL-LITE® KN II, KNT, SKN II or XTREME II range Exception done for some specific designs for COOL-LITE® SKN183 II[10]

[9] The processor is responsible for the quality control and quality of the final product. Given the variety of enameling products and practical experiences, each processor should carry out tests with its own equipment. [10] Contact Saint-Gobain Glass' technical support team for further information and assistance.

Ask us for the processing guidelines for our different COOL-LITE® coatings families and on ceramic print on COOL-LITE®

Depending of the desired design of the building, the spandrels can have different «look» and «match» with the vision glass in order to achieve an uninterrupted, pure glass façade, simply harmonized with it or inversely fully contrasted for offering to the façade an original rythmed design.

In order to accelerate the decision process and reduce the number of mock-ups, Saint-Gobain Glass have defined a set of **propositions of spandrels harmonizing with the vision glass for the 3 configurations mentioned before**.

For each solar control coated glass from the **COOL-LITE® SKN (II) and XTREME (II) families**, propositions are defined by a coating and the color of the enameled glass (referenced by its RAL) based on a methodology developed by Saint-Gobain Glass[11].

VISION GLASS (standard double glazing unit with coating on #2)	SPANDREL INSULATED GLAZING UNIT (as illustrated page 20)	SPANDREL VENTILATED SHADOW BOX (as illustrated page 20)	SPANDREL MONOLITHIC GLASS (as illustrated page 20)
COOL-LITE® XTREME (II) PRODUCTS			
XTREME 70/33 (II)	COOL-LITE® XTREME 70/33 II & PLANICLEAR® RAL 7024 or 7026	-[11]	COOL-LITE® ST167 with RAL 5008
XTREME 61/29 (II)	COOL-LITE® XTREME 61/29 II & PLANICLEAR® RAL 7015 or 7026	COOL-LITE® ST167 & PLANICLEAR® RAL 7021	COOL-LITE® ST167 with RAL 7026
XTREME 51/23 (II)	COOL-LITE® XTREME 51/23 II & PLANICLEAR® RAL 7024 or 7015	COOL-LITE® ST150 & PLANICLEAR® RAL 5008	COOL-LITE® ST150 with RAL 7015
COOL-LITE® SKN (II) PRODUCTS			
SKN 183 (II)	COOL-LITE® SKN 183 II & PLANICLEAR® RAL 7012 or 7015	-[11]	COOL-LITE® ST150 with RAL 7015
SKN 175 (II	COOL-LITE® SKN 175 II & PLANICLEAR® RAL 7015 or 7024	-[11]	COOL-LITE® ST150 with RAL 7024
SKN 176 (II)	COOL-LITE® SKN 176 II & PLANICLEAR® RAL 7024 or 7026	-[11]	COOL-LITE® ST150 with RAL 7015
SKN 165 (II)	COOL-LITE® SKN 165 II & PLANICLEAR® RAL 7024 or 7026	COOL-LITE® ST150 & PLANICLEAR® with RAL 7021	-[11]
SKN 154 (II)	COOL-LITE® SKN 154 II & PLANICLEAR® RAL 5008 or 7026	COOL-LITE® ST150 & PLANICLEAR® with RAL 5008	COOL-LITE® ST150 with RAL 7012
COOL-LITE® KN II PRODUCTS			
KN 148 II	COOL-LITE® KN 148 II & PLANICLEAR® RAL 7012 or 7024	-[11]	-[11]
KN 166 II	COOL-LITE® KN 166 II & PLANICLEAR® RAL 7035 or 5008	-[11]	-[11]
KN 177 II	COOL-LITE® KN 177 II & PLANICLEAR® RAL 7017 or 7024	-[11]	-[11]

[11] So-called "matching" between spandrel and vision glass is a subjective appreciation and is likely to change depending on the observer as well as external conditions. The suggestions presented here are the best results up-to-know based on compatibility and existing product range but are not the only possibilities; for some configurations, no satisfying solution can be presented here. It is always recommended to proceed to real observation based on a visual mock-up.

Accurate predictive physico-realistic rendering helps to refine the choice in specifying and designing with glass for the building facade. It also allows to reduce the influence of the lighting and environmental conditions as well as save time and money. Pictures of the above propositions are now available using Saint-Gobain Glass GlassPro's technology.

With GlassPro LIVE, the Saint-Gobain Glass' on-demand service of glass facade rendering, architects are allowed to appreciate the look of coated glass as well as spandrels on their own project, as if it was real, before it's even build, with more possibilities in the spandrels configurations.

For more information, contact your local sales and specification team.

SUSTAINABLE CONSTRUCTION BY SAINT-GOBAIN GLASS

In everything we do at Saint-Gobain Glass, we are guided by the engaging purpose of the Saint-Gobain Group: Making the World a Better Home.

Our mission is to facilitate the shift towards sustainable construction by offering solutions that prioritize both sustainability and performance. This means that we strive to deliver innovation, design and cost-efficiency through better buildings, reduced environmental impacts and improved indoor conditions for the health and well-being of occupants.

We understand that sustainable construction is not just about the process but also how the building will be used.
For this purpose, we provide our customers with innovative solutions that support their journey towards sustainability, and we advocate for better policies, standards, and practices within the construction market.

BETTER FOR THE PLANET
Reduced building-related environmental footprint

ENERGY AND CARBON

- Reduced embodied carbon emissions: The construction industry contributed 37% of global carbon emissions in 2021, including the embodied carbon part that can be released over a building's life cycle. As new buildings become more energy efficient, the importance of reducing embodied carbon emissions grows. this is why we launched in 2022 the first low-carbon glass on the market, ORAÉ®.

We assess the environmental impact of our glass solutions and ensure transparent communication by publishing Environmental Product Declarations (EPD). Thanks to our glazing configurator Calumen®, it is now possible to estimate the carbon footprint of any kind of glazing.

- Increased energy efficiency: We are recognized as an innovative company and we developed for decades magnetron coated glass to improve the energy performance of buildings, whatever the climatic zone. Applying coatings on our glass has a low CO_2 impact compared to its benefits.

- Increased use of renewable energy: Once the energy need has been reduced to the minimum, the remaining need can be supplied with renewable and decarbonized sources, locally produced if possible. And what if this source of energy was the façade? This is today possible with Building Integrated Photovoltaic (BIPV) solutions.

RESOURCES AND CIRCULARITY

- Reduced use of non renewable resources : The construction industry currently represents a 40% share of global raw material consumption[12].
As a result, it has a big role to play in improving how we use resources efficiently. Our objective is to increase the incorporation of cullet, or recycled glass fragments, in the manufacturing of our float glass to 40% by the year 2030.

- Reduced amount of non-recovered construction and demolition waste: The construction sector is a major contributor to solid waste in the world, it is responsible for 40% of solid waste streams[13]. At Saint-Gobain Glass, we promote recycling of cullet from external sources, which we then use again in our furnaces.

[12] Global Alliance for Buildings and Construction, Global Status Reports 2017
[13] World Health Organization, Combined or Multiple Exposure to Health Stressors in Indoor Built Environments (2014)

BETTER FOR PEOPLE
Enhanced health and wellbeing

HEALTH AND WELL-BEING INDOORS

- Better thermal comfort: A balanced thermal environment is essential to feel comfortable. Within our approach for sustainable construction, buildings must keep the ideal indoor temperature all year long. We apply on our glass a thin transparent coating acting as an invisible thermal shield, they capture the sun heat to keep it outside, for a better thermal comfort.

- Better visual comfort: Natural light is crucial for an optimal sense of well-being. We continuously innovate to bring a maximum of daylight inside buildings while keeping the insulation performances of our glazings. Natural light contributes positively on mood, productivity and sleep quality.

- Better acoustics: We are more productive, happier and experience fewer health issues in environments where sounds are well-balanced. Our acoustic glazing improves the sound insulation of a building. It brings calm inside.

- Improved indoor air quality: We spend more than 90% of our time inside buildings. The fresher the air we breathe, the healthier we are in the indoor spaces in which we live or work. In line with our health policy and our aim to mainstream sustainability in innovation, we strive to phase out from our products' portfolio toxic substances.

For more transparency, we published 7 content declarations that offer detailed information on the make-up of our products. In addition, our glazing products do not emit any volatile organic compound, (VOC) as glass is an inert material.

DISCOVER MORE ON OUR SUSTAINABLE CONSTRUCTION WEBPAGE


THE IVY HOUSE, Bristol, UK © John Rees

LOW EMBODIED CARBON GLASS

ORAÉ®

The highly selective solar control products of the COOL-LITE® XTREME and SKN families are available on ORAÉ® substrate, the world's first low-carbon glass.

COOL-LITE® XTREME ORAÉ

COOL-LITE® SKN ORAÉ

With ORAÉ®, Saint-Gobain Glass has achieved a landmark technical breakthrough enabling it to offer a low embodied carbon glass on the façade market thanks to a substantial R&D effort and the excellence of our industrial teams. This innovation will help to significantly reduce the carbon footprint of construction and accelerate the development of the circular economy.

Intended for use in the glazed parts of a facade, COOL-LITE® ORAÉ® is a perfect response to the stricter sustainability requirements of the building industry without any compromise on technical or aesthetic performance.

SUSTAINABILITY

COOL-LITE® ORAÉ® provides the best of both embodied and operational carbon levels, thanks to:

- The glass substrate ORAÉ®, with its low carbon footprint verified by an Environmental Product Declaration (EPD), produced by combining a very high recycled glass content (cullet) and renewable electricity.
- The excellent energy performances of the COOL-LITE® XTREME or COOL-LITE® SKN coatings, which already drastically reduce carbon emissions generated by energy consumption, when using the building thanks to its high performance in terms of daylight intake, solar control and thermal insulation.

RANGE

COOL-LITE® XTREME ORAÉ® and COOL-LITE® SKN ORAÉ® are available in standard sizes and thicknesses (4, 6, 8 and 10mm).

In complementarity to COOL-LITE® XTREME ORAÉ® and COOL-LITE® SKN ORAÉ® assembled in double or triple glazing, the uncoated ORAÉ® as well as our low-e PLANITHERM® ORAÉ® and ECLAZ® ORAÉ® are also available for the counter panes.

For opaque parts of buildings and double-skin façades, ORAÉ® can also be combined with COOL-LITE® ST.

AESTHETICS

ORAÉ® is offering exactly the **same aesthetics** than the regular clear float glass PLANICLEAR®.

Combined with COOL-LITE® XTREME or COOL-LITE® SKN ORAÉ® the low external reflection as well as the colour-neutral external appearance creates an excellent combination of function and aesthetics.

PERFORMANCES

COOL-LITE® XTREME ORAÉ® and COOL-LITE® SKN ORAÉ® provide the **same performances and quality** as respectively COOL-LITE® XTREME or COOL-LITE® SKN on PLANICLEAR®, with a much lower carbon footprint.

EPD VERIFIED

According to its verified EPD, the **ORAÉ®** substrate has a **carbon footprint of only 6.64 kg CO_2 eq./m²** (for a 4mm substrate), bringing a **reduction of 42%** compared to our European standard product PLANICLEAR®.

Coated, processed and assembled in insulated glazing unit, the reduction is then around 30% to 40%.

GET TO KNOW MORE ON OUR ORAÉ® WEBPAGE

CHECK OUR EPD OF ORAÉ® AND COATED ORAÉ® IN SEVERAL THICKNESSES

CHECK OUR C2C CERTIFICATION FOR ORAÉ®

BIRD PROTECTION

4BIRD®

With 4BIRD®, Saint-Gobain Glass offers a full range of solutions to answer the growing demands of bird friendly glass and glazing.

Gathering several possibilities to combine Saint-Gobain Glass COOL-LITE® solar control coated glass with certified pattern made using different processing technologies, 4BIRD® offers both a sustainable solution for the preservation of the biodiversity and a wiser energy consumption of building[14], while keeping a homogeneous and neutral external aesthetic for the entire façade.

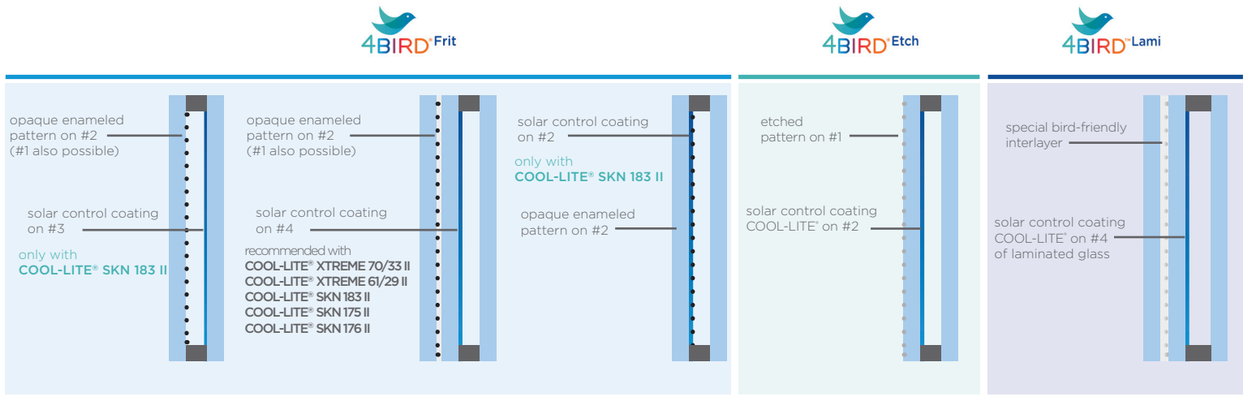
Following existing guidelines and expert's recommendations, 4BIRD® offers several configurations and approved designs. The different proposed configurations were evaluated by the American Bird Conservancy (ABC) and found that they satisfied ABC's criterion for bird-friendly glass (Material Threat Factor (TF) ≤ 25).

4BIRD® are turnkey solutions to help our customers to answer to projects where bird protection is needed, while having the same aesthetics and performances for the entire building. There are variety of possibilities to answer to all projects and visions.

4BIRD® Frit — 4BIRD® Frit offers several possibilities to combine an opaque enameled pattern together with selected COOL-LITE® solar control coatings of Saint-Gobain Glass in different configurations.

4BIRD® Etch — 4BIRD® Etch features an etched pattern directly on face #1 together with selected COOL-LITE® solar control coatings on face #2 of the same glass pane. Several designs can be etched on the glass surface.

4BIRD™ Lami — 4BIRD® Lami ensures the possibility to combine commercially available bird-friendly interlayers with Saint-Gobain Glass solar control coatings of the COOL-LITE® family for an effective protection.



[14] All products of the 4BIRD® family are comprising Saint-Gobain Glass' COOL-LITE® XTREME and SKN solar control coated glass, offering thus all benefits related to this product family

MORE DETAILS IN OUR DEDICATED 4BIRD® DOCUMENTATION

SUSTAINABLE SOLUTIONS FOR ENERGY GENERATION
BUILDING INTEGRATED PHOTOVOLTAICS (BIPV)

At Saint-Gobain we want to help our customers to decarbonize their activities. This is why we offer, with specific partners, Building Integrated Photovoltaics (BIPV) solutions, turning the façade to a source of energy.

BIPV panels are designed solar modules that replace conventional façade coverings and are integrated in the building skin. More than just traditional covering, they deliver renewable energy to the building.

Solar façades are one of the cleverest ways to reduce the environmental impact of a building. BIPV helps designers to comply with building codes that specify the maximum primary energy consumption of the building or even the amount of renewable energy to be generated on-site by the building.

Furthermore, BIPV for vertical façades and pitched roofs are generating financial earnings by reducing the electricity need from the grid, as well as revenues by selling excess electricity to the grid.


Design Solar Facade Appartment Building Basel ©Megasol Energie

From translucent to fully colored for several uses on the building

BIPV panels are most widely used to cover non-transparent parts of the façade (e.g. spandrels areas). Thanks to the latest technologies it is today possible to have modules combining high efficiency and appealing aesthetics, with a large range of colors and textures that can meet any design requirement of the architect.
The module integrates perfectly into the façade and the solar technology becomes invisible.

Moreover, solar modules with translucent cell spacing, can be used in skylights, in vertical façade, or open structure, also in double or triple glazing units, letting light coming in.

More than for the façade (as insulated glazing units, curtain wall or ventilated façade), BIPV panels can turn any part of a building into an active energy producing part, such as rooftop, balcony railings or canopies...

Countless design for an easy integration in all projects

BIPV is a “construction material” that adapt to all designs by offering:

- Countless colors, in several tones and intensities
- Various glass structures and finishes
- Numerous geometries with a large range of sizes and shapes possible

A profitable investment turning the façade to a source of energy

Solar building envelope made with BIPV turns passive building into an energy producing solar skin which is amortized within few years, before becoming profitable power plants.

Our offer being based on specific partnerships with BIPV manufacturers depending on the country, please contact us for individual inquiries.

CIRCULAR ECONOMY
RECYCLING

Global resource consumption is expected to double by 2060[15] as the global economy is rapidly expanding, resulting insignificant environmental impacts and ressources shortage. Addressing the issue of scarce resources is necessary to reduce the extraction and use of virgin raw materials.

At Saint-Gobain Glass, we put circularity at the heart of our activities. We doubled the recycled content in our products since 2011 and we commit to increase the percentage of cullet (scraps of glass) used in the production of our float glass to 40% by 2030.

Glass, known for its durability, has the incredible quality of being completely recyclable, and it can be recycled endlessly, without any compromise in its mechanical or chemical attributes.

Incorporating more cullet into our glass production yields to significant environmental benefits:

- 700 kg CO_2eq. (scopes 1, 2, and 3) per ton of cullet.
- and preserving at the same time 1.2 tons of natural resources.

At Saint-Gobain Glass, we aim to increase cullet coming from external sources. Buildings approaching the end of their lifespan should be viewed as a valuable resource of materials. We achieved a remarkable fivefold increase in the amount of cullet from end-of-life glazing used in our products by 2023.

We have a deep knowledge on what can be considered as cullet, and for any demolition or renovation project, Saint-Gobain Glass is here to offer you consistent support built on experience gained through over 10 years of implemented recycling initiatives.

Saint-Gobain Glass Recycling

We established a network of partners, called Saint-Gobain Glass Recycling, in 5 countries including France, and Germany, with others working on implementing similar networks committed to recycling of end-of-life glazing.

The recycled glass generated at our partners' sites is used afterwards in the manufacturing of new glass production at our float lines.

[15] [1] OECD: Global Material Resources Outlook to 2060, Economic Drivers and Environmental Consequence

LEARN MORE ABOUT OUR RECYCLING INITIATIVES

PIRAEUS TOWER
©Nikos Daniilidis /Cgi Konstantinos Koudounis

GATE:01 FRÖSUNDAVIC
©Lasse Olsson Foto

Fully recycled façade, we closed the loop

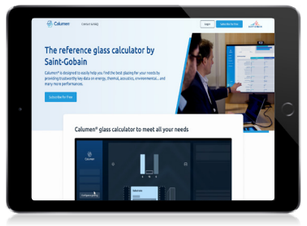
The Piraeus Tower in Greece is a landmark building coming back to life after more than 40 years of emptiness. In 2022, 125 tons of end-of-life glass were collected from the tower, then treated and recycled as external cullet in the furnace of the Saint-Gobain Glass float plant in Calarasi, Romania. The new façade has been refurbished with new glazing units composed of the high-performance solar control glass COOL-LITE® XTREME 70/33 II.

35 years ago, Norwegian architect Niels Torp designed the headquarters of airline SAS in the north of Stockholm. During the recent refurbishment of the huge complex, the glazing had to be completely replaced to meet today's requirements for thermal and visual comfort. In line with circular economy, more than 40 tons of glass from the old façade were collected and processed into cullet. It was then recycled into the furnace of the Saint-Gobain Glass float plant in Torgau, Germany.

For these projects, Saint-Gobain Glass has been a leader in recovery and recycling of post-consumer cullet in its glazings by establishing successful partnerships networks.

OUR DIGITAL TOOLS AND SERVICES

CALUMEN® - THE REFERENCE GLAZING CALCULATOR BY SAINT-GOBAIN GLASS



DISCOVER AND TRY CALUMEN ONLINE

Calumen® is a glazing configurator designed for all building professionals, whatever their level of expertise in glass products: architects, designers, engineering offices, consultants, façade makers, window manufacturers, glass processors and general contractors.

- Determine the light, energy, thermal or acoustic performances of your glazing
- Find a suitable glazing for your project based on its required performance values
- Personalize settings such as type of glazing, type of coating, glass and cavity thickness
- Get an illustration of the aesthetic of the façade
- Make comparisons between our products to do the best choice
- Save your glazing configuration for further access at any time
- Calculate the carbon footprint of your glazing*

Free and user-friendly (online version without software to install):
Calumen® is the perfect tool for finding the right glass for architectural projects of any size.
Join our thousands of users and create an account on Calumen® here:
www.calumen.com

* Carbon footprint values presented are estimations based on the Life Cycle Analysis of our European products (A1-A3). Only complete Environemental Product Declaration can be verified by an external third party. The value is calculated regarding the composition computed based on the standard EN 15804+A2 (2019).

GlassPro - THE PHYSICO-REALISTIC GLASS RENDERING SERVICE BY SAINT-GOBAIN GLASS

Saint-Gobain Glass makes easier the choice of glazing for architects with GlassPro, the digital service that enables professionals to accurately predict the future appearance of their façades, going far beyond traditional renderings. A tool that radically transforms the decision-making process.

GlassPro consists of 3 services:

GlassPro APP: USER-FRIENDLY APP FOR INITIAL GLAZING SELECTION WITH HIGH-DEFINITION VISUALIZATION

GlassPro APP is an application which enables the user to visualize virtually all Saint-Gobain Glass' standard glazing products. Choose and compare two types of glazing under a variety of lightning conditions and several interior design settings through two different environments.

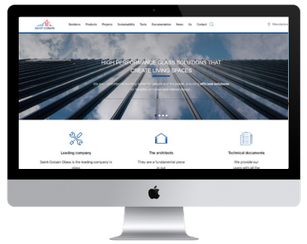
GlassPro LIVE - THE ON-DEMAND SERVICE

GlassPro Live, Saint-Gobain Glass' on-demand service of glass facade rendering, allows architects to obtain a faithful simulation of their project's future appearance.

GlassPro 360 - THE VIRTUAL REALITYSERVICE

GlassPro 360, the latest Virtual Reality service further optimizes the user experience by enhancing the immersive and comparative functions of GlassPro Live

WEBSITE SAINT-GOBAIN GLASS



Find all the information about our products and services and our latest news on our international website!

Discover our product range, services, and tools to find the ideal glass for your project which respond the best to your needs.

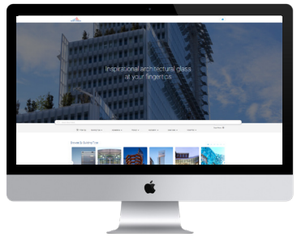
Find out more about our sustainability approach and our commitments and actions in terms of decarbonisation and circularity.

The website is also the place to find our latest news, or a quick access to our EPDs and certifications.

www.saint-gobain-glass.com

This international website is also a place to find out the link to our detailled local offer and contact in our different regions.

CALUMEN® GALLERY - THE REFERENCE PROJECT WEBSITE FOR GLASS FAÇADES



Come and explore our architectural references around the world showing a wide range of glass solutions, innovations and aesthetic options for the building envelope.

Discover buildings with exceptional design, offering sustainable living spaces and making our environment worth living in.
www.saint-gobain-glass.com/calumen-gallery

EXPLORE OUR PRODUCT OFFER AND ARCHITECTURAL REFERENCES ON OUR WEBSITE

FIRE-RATED AND HIGH-SECURITY GLASS SOLUTIONS
VETROTECH

vetrotech SAINT-GOBAIN

HIGH-SECURITY AND FIRE-RATED GLASS SOLUTIONS FOR THE PROTECTION OF PEOPLE AND PROPERTY

Vetrotech is specialized in the development, production and distribution of sustainable fire-rated and high-security glasses for the building and marine sectors.

Vetrotech solutions can be combined with Saint-Gobain Glass glazing solutions to provide aesthetics, design and comfort and offer optimum protection for people and property while meeting highest architectural demands.

STANDARD LIFE-SAFETY SOLUTION

Fire and/or High security

\+

EXTENDED RANGE OF FEATURES

EXTRA SAFETY
- Protection
- Alarm
- Clear view

COMFORT
- Noise control
- Dynamic privacy
- Screens
- Extra clear
- Climate control

DESIGN
- Colouring
- Screen printing
- Digital printing
- Shapes
- Curving
- Edging

ENERGY EFFICIENCY
- Double glazing
- Triple Glazing
- ORAÉ®
- low-carbon glass

=

YOUR CUSTOMIZED SOLUTION

Life-safaty & Multifunctionality

With over 45 years of experience, Vetrotech brings proven expertise, enabling it to advise and support you with the most suitable systems and custom solutions for any application or risk scenario.
For more information: vetrotech.com

CHECK VETROTECH SOLUTIONS GUIDE

SMART TINTABLE GLAZING
SAGEGLASS

SageGlass® SAINT-GOBAIN

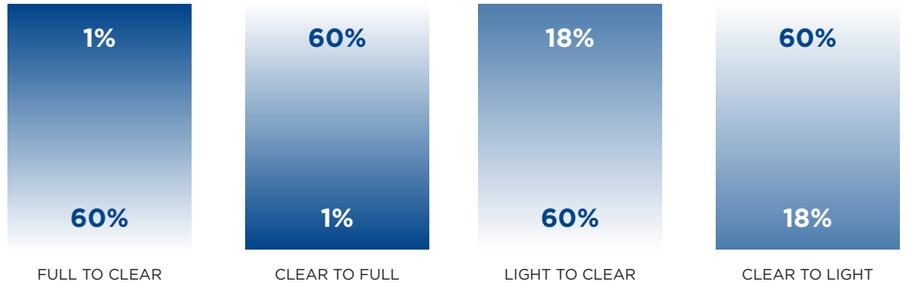
As the global leader in smart window technology, SageGlass® helps create buildings that enhance occupant wellness.

SageGlass® electrochromic glass tints or clears automatically, optimizing both light and thermal comfort in a space, without the need for blinds or shades.

With SageGlass® smart windows, your buildings can feature a lot of windows, without compromising on energy efficiency and performance.

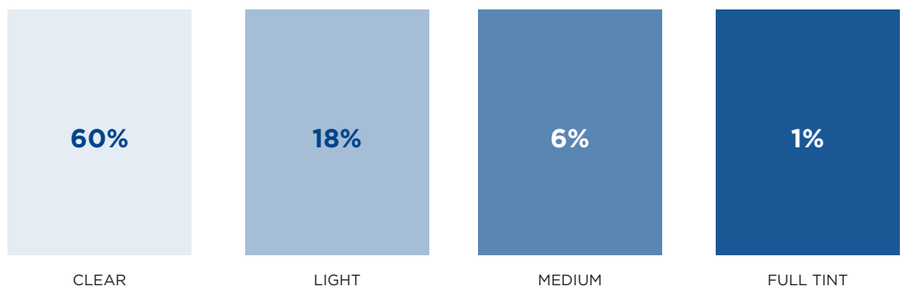
SageGlass® offers an array of smart glass solutions to suit different application needs

HARMONY® STATES



SageGlass Harmony® can tint on a gradient, providing the perfect balance of daylight and glare control, and features four standard tint states.

CLASSIC STATES (STANDARD STATES)



Values in % represent the Visible Light Transmission.

GET TO KNOW MORE ABOUT SAGEGLASS PRODUCTS AND OFFER

SCAN THE QR CODES
TO DISCOVER OUR LATEST DOCUMENTATIONS

BROCHURE
THE ESSENTIAL EUROPE

SAINT-GOBAIN GLASS FAÇADE
REFERENCE BOOKS

www.saint-gobain-glass.com

glass.facade@saint-gobain.com

@saint-gobain glass facade

SAINT-GOBAIN

SAINT-GOBAIN GLASS

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12 place de l'Iris
92400 • Courbevoie
France

Cover:
REDMOLEN - COPENHAGEN, DENMARK
Architect Vilhelm Lauritzen Architects, COBE Architects
Photos ©Pihl Koncernen
Product(s) COOL-LITE® SKN 176 & ECLAZ® LUMI