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THE ESSENTIAL

GLASS FOR FACADES

EUROPEAN PRODUCTS & STANDARDS

GLASS SOLUTIONS FOR FACADES










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.

We respond to your needs with solar and heat control coatings, large dimensions, aesthetics, design, total transparency and sustainable solutions.

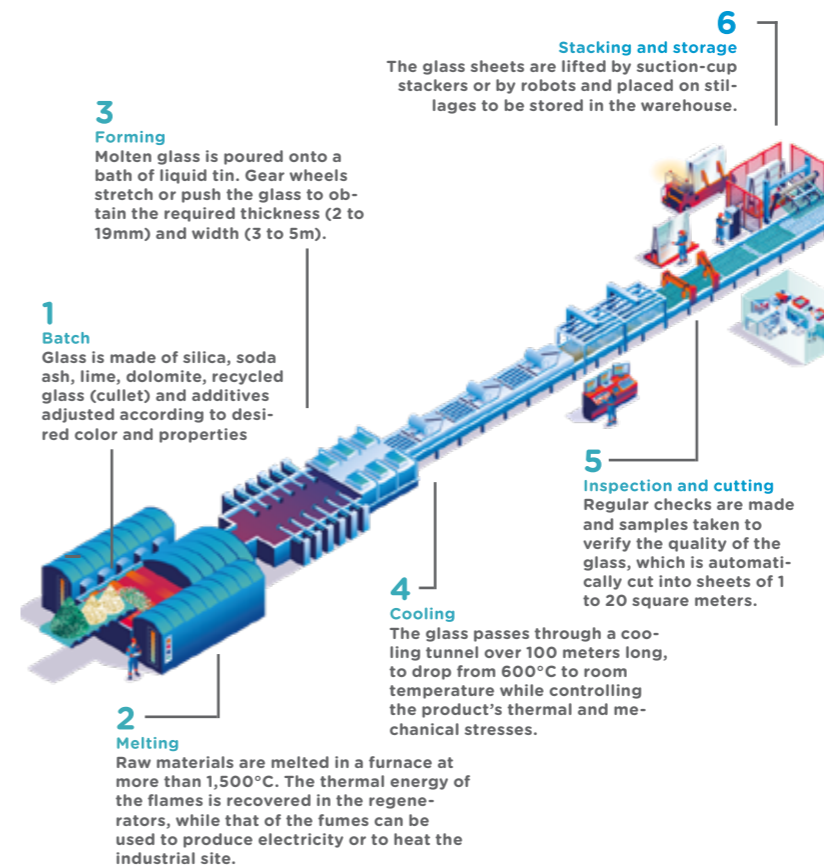
Our major field is specialized in providing glazing products ideal for hospitals, schools, office buildings, homes and other buildings where solar heat reduction and daylight are needed.

www.saint-gobain-glass.com

KEY PERFORMANCE FACTORS

-  **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 by penetration of the glass. The lower the Ug-value is, the better the insulating properties are. Expressed in W/m²K.
-  **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 to 4mm (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 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 (dB).
-  **Carbon footprint (GWP):** The Global Warming Potential corresponds to the whole amount of greenhouse gases (GHG) produced directly and indirectly and is usually measured in equivalent kilograms of CO₂ per m² of glass.

FLAT GLASS MANUFACTURING AT SAINT-GOBAIN



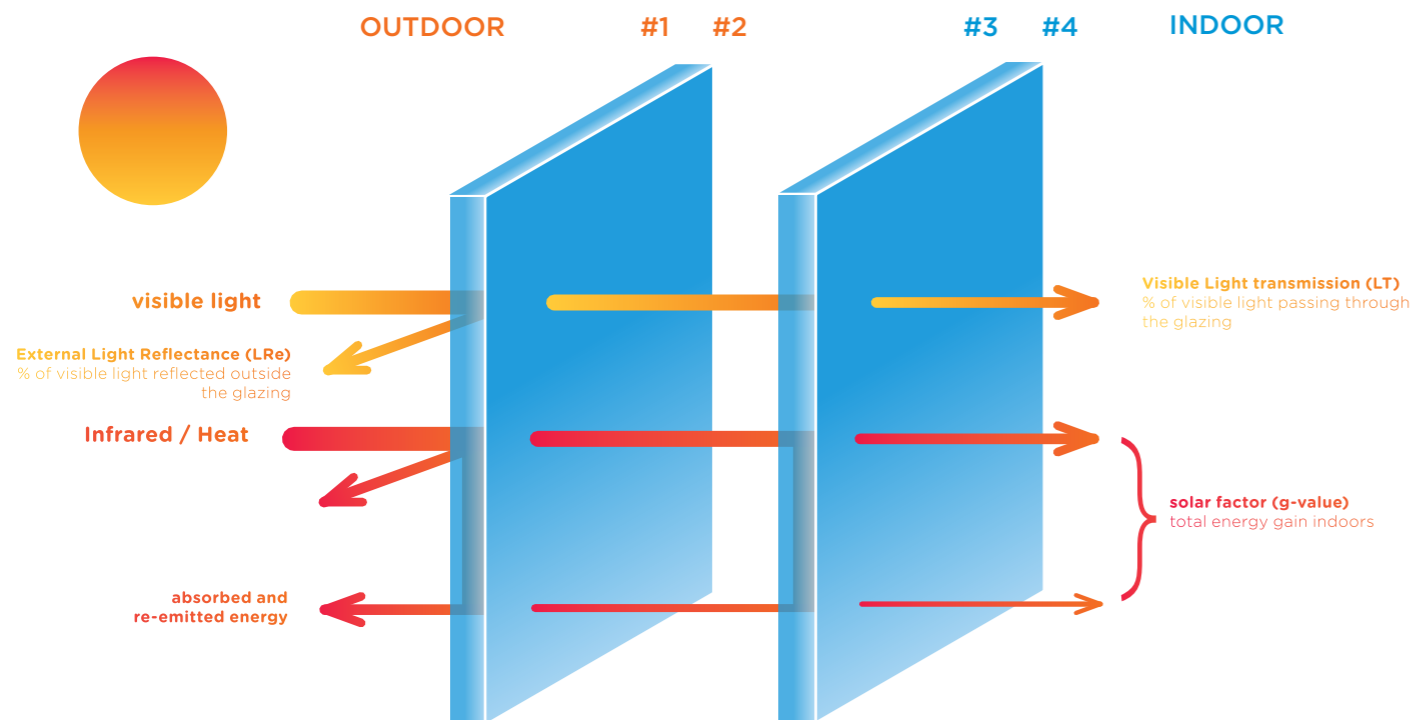
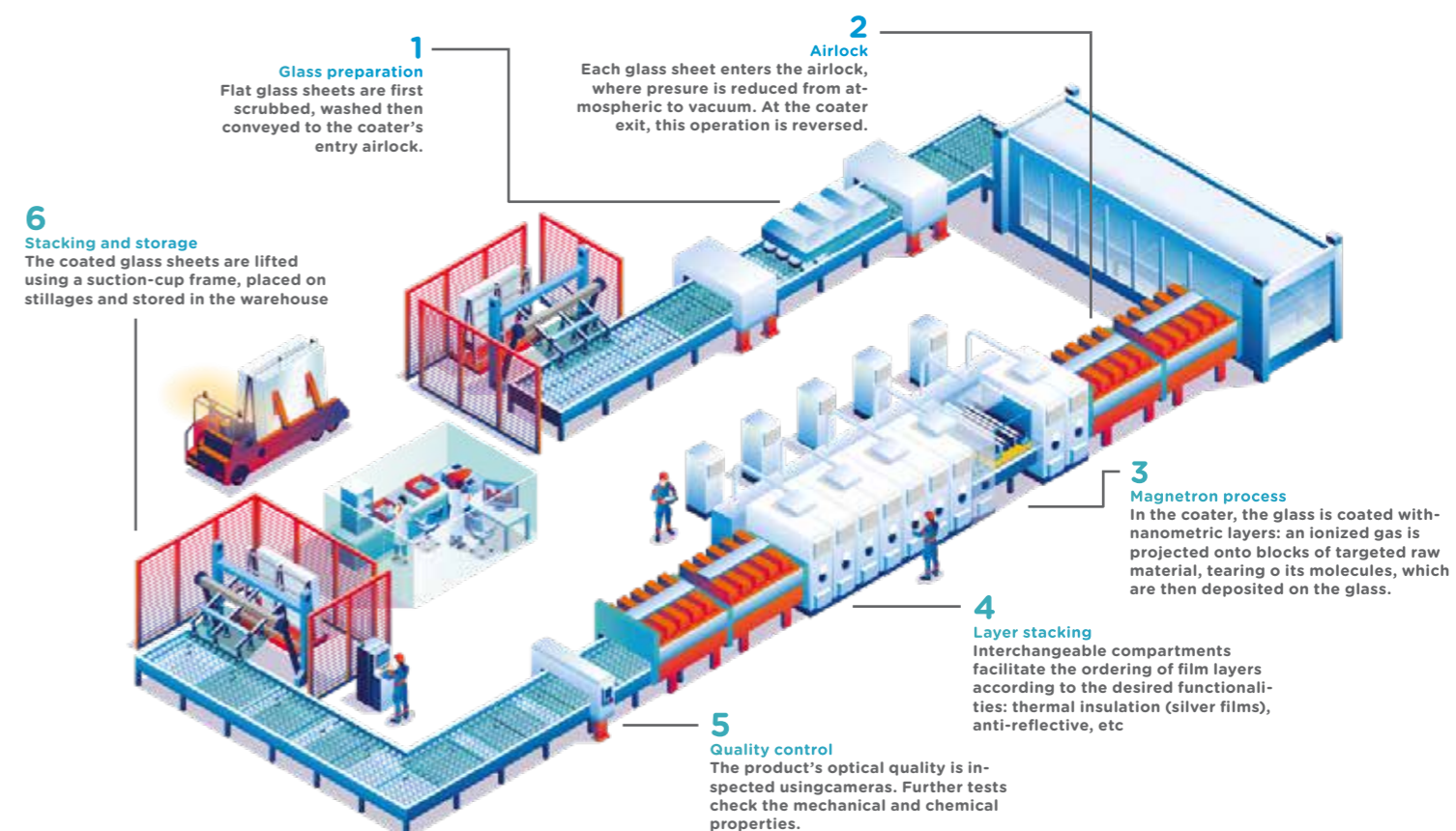
GLASS TECHNOLOGY FOR SUSTAINABLE CONSTRUCTION

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.

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.

The innovation and the technology developed by Saint-Gobain Glass serve comfort and well-being for sustainable construction.

COATED GLASS MANUFACTURING AT SAINT-GOBAIN



KEY ASSETS and FAMILIES

Solar Control Glass - COOL-LITE®

Solar control glass reduce overheating within buildings while letting the daylight in. Offering homogeneous aesthetic for large facade, they also help to reduce heat loss to the exterior.

Low-E glass - PLANITHERM®

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.

Anti-reflective glass - VISION-LITE®

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

Bird protection - 4BIRD®

Series of products combining COOL-LITE® solar control glass and visible pattern by birds to help protecting wildlife.

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 insure more daylight in.

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.

Low Carbon Glass - ORAÉ®

First low carbon glass on the market with exceptionally low carbon footprint, produced by combining high recycled glass content (around 70% of cullet) and renewable energy.

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® KN Selective solar control coatings (single silver) with good to reinforced thermal insulation

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® Sapphire Blue **LIGHT TRANSMISSION** for 6mm monolithic glass **PROCESSING** II = to-be-tempered Ø = annealed

OUR PRODUCT OFFER FOR FACADES

			PERFORMANCES AND USAGE	SERVICES AND SPECIALITIES	PROCESSING									
			SELECTIVITY	INSULATION INSULATED GLAZING UNIT	MONOLITHIC GLASS	HOMOGENEITY OF FACADE AESTHETIC	LOW CARBON GLASS	EASYPRO®	OVERLENGTH (up to 18m)	MATCHING SPANDRELS PROPOSITIONS	BIRD FRIENDLY SOLUTIONS	VERSATILITY	BENDING	
COOL-LITE® XTREME	PREMIUM	EXTREMELY SELECTIVE SOLAR CONTROL GLASS WITH HIGHLY NEUTRAL AESTHETICS	annealed and to-be-tempered versions with comparable performances and aesthetics	****	***	#2	***	ORAÉ	standard	✓	✓	✓	✓	✓ ("II" products)
COOL-LITE® SKN	BEST	HIGHLY SELECTIVE SOLAR CONTROL GLASS WITH NEUTRAL AESTHETICS	annealed and to-be-tempered versions with comparable performances and aesthetics	***	***	#2 (SKN 183 II can be used also on face #3)	***	✓	standard	✓	✓	✓	✓	✓ ("II" products)
COOL-LITE® KN II	STANDARD	SELECTIVE SOLAR CONTROL GLASS WITH NEUTRAL TO SILVER AESTHETICS	to-be-tempered or one stock products	**	***	#2 (KN 177 II can be used also on face #3)	***	✓	for KN II					✓
PLANITHERM®	COMPLEMENTARITY	HIGHLY TRANSPARENT LOW-E GLASS WITH NEUTRAL AESTHETICS	annealed and to-be-tempered versions		***	#5 (TGU)		ORAÉ	on demand for PLANITHERM® II	✓				✓ ("II" products)

OUR PRODUCTS FOR FACADES in Double Glazing Units

Coating	color in reflection	light transmission LT ¹ [%]	solar factor g-value ¹	shading coefficient SC	selectivity LT / g	reflection outside LRe [%]	reflection inside LRI [%]	Ug-value ² [W/m ² K]	weight [kg/m ²]	assessed sound reduction index Rw,P (C, Ctr) ³ [dB]	Carbon footprint ^{9,11} [kg CO ₂ eq/m ²] standard / ORAÉ	processing possibilities		
												to be tempered / annealed	tempering	lamination tested towards PVB ⁴

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® - **new** also available on ORAÉ™ Low-Carbon Glass



Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758

COOL-LITE® XTREME 70/33 II with EASYPRO®	neutral	70	0.33	0.38	2.12	11	13	1.0	25.0	35(-1;-5)	46 / 34 ¹⁰	to be tempered		Yes ⁵
COOL-LITE® XTREME 70/33	neutral	70	0.33	0.38	2.12	11	13	1.0	25.0	35(-1;-5)	39 / 27 ¹⁰			
COOL-LITE® XTREME 61/29 II with EASYPRO®	neutral	61	0.29	0.33	2.10	11	15	1.0	25.0	35(-1;-5)	46 / 34 ¹⁰	to be tempered		Yes ⁵
COOL-LITE® XTREME 61/29	neutral	61	0.29	0.33	2.10	11	14	1.0	25.0	35(-1;-5)	39 / 27 ¹⁰			
COOL-LITE® XTREME 50/22 II	neutral	47	0.21	0.24	2.24	16	18	1.0	25.0	35(-1;-5)	45 / 34 ¹⁰	to be tempered		Yes ⁵

^{*}COOL-LITE® XTREME products are also available on DIAMANT® substrate, with improved LT and neutrality. For details, please contact us.
^{**}COOL-LITE® XTREME products are also available on ORAÉ® substrate, with a lower carbon footprint

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®



Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758

COOL-LITE® SKN 183 II with EASYPRO® new also available on face #3)	neutral	75	0.40	0.46	1.88	12	13	1.0	25.0	35(-1;-5)	46	to be tempered		Yes ⁵
COOL-LITE® SKN 183	neutral	75	0.40	0.46	1.88	12	13	1.0	25.0	35(-1;-5)	39			
COOL-LITE® SKN 175 II with EASYPRO®	neutral	70	0.35	0.40	2.00	14	15	1.0	25.0	35(-1;-5)	46	to be tempered		Yes ⁵
COOL-LITE® SKN 176 II with EASYPRO® Made in RO	neutral	70	0.37	0.43	1.89	13	15	1.0	25.0	35(-1;-5)	46	to be tempered	Yes ⁸	Yes ⁵
COOL-LITE® SKN 176 Made in RO	neutral	70	0.37	0.43	1.89	13	15	1.0	25.0	35(-1;-5)	40			
COOL-LITE® SKN 165 II with EASYPRO®	neutral	61	0.34	0.39	1.79	16	19	1.0	25.0	35(-1;-5)	46	to be tempered	Yes ⁸	Yes ⁵
COOL-LITE® SKN 165	neutral	61	0.34	0.39	1.79	16	18	1.0	25.0	35(-1;-5)	39		Yes ⁸	
COOL-LITE® SKN 154 II with EASYPRO® Made in RO	neutral	52	0.28	0.32	1.85	18	23	1.0	25.0	35(-1;-5)	46	to be tempered	Yes ⁸	Yes ⁵
COOL-LITE® SKN 154	neutral	52	0.28	0.32	1.85	19	22	1.0	25.0	35(-1;-5)	39		Yes ⁸	
COOL-LITE® SKN 144 II with EASYPRO®	neutral	42	0.23	0.26	1.83	20	15	1.1	25.0	35(-1;-5)	39	to be tempered	Yes ⁸	Yes ⁵

^{*}COOL-LITE® SKN products are also available on DIAMANT® substrate, with improved LT and neutrality. For details, please contact us.

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®



Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758

COOL-LITE® KN 177 II with EASYPRO® Made in RO	neutral	70	0.48	0.55	1.46	24	22	1.0	25.0	35(-1;-5)	46	to be tempered		Yes ⁵
COOL-LITE® KN 166 II with EASYPRO® Made in RO	neutral	61	0.39	0.45	1.56	22	26	1.0	25.0	35(-1;-5)	46	to be tempered		Yes ⁵
COOL-LITE® KN 148 II with EASYPRO® Made in RO	neutral	47	0.32	0.37	1.47	27	18	1.0	25.0	35(-1;-5)	46	to be tempered		Yes ⁵

⁴ Solar control coating in contact with PVB modifies performances and aesthetics. Please contact us to get the approved list.

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

⁷ COOL-LITE® SKN 154 may have a slight color deviation in transmission compared to SKN 154 II. Validation by Mock-up is recommended if both versions are used on the same facade.

⁸ This coating can be laminated for use on a facade up to 1.500m² and project must be made from a single production batch from SGG.

⁹ Global Warming Potential (GWP) A1-A3 Stages values with PLANICLEAR® are calculations made with Calumen regarding the composition computed based on the standard EN 15804+A2. Estimations based on the Life Cycle Analysis (LCA) of our products. Only complete Environmental Product Declaration (EPD) can be verified by an external third party.

¹⁰ Global Warming Potential (GWP) A1-A3 Stages: The GWP values with ORAÉ®, are estimations based on our Life Cycle Assessment model. Data were collected during the 4 ORAÉ® campaigns made in 2022. The detailed environmental data will be documented through third party-verified environmental product declarations - EPDs (or FDES in France) - which are currently under development and scheduled for availability in early 2023.

¹¹ All panes of the DGU with the same substrate; first pane respectively annealed or tempered (II) with the same glass compositions; counter panes always annealed.

OUR PRODUCTS FOR FACADES in Triple Glazing Units

coating	color in reflection	light transmission LT ¹ [%]	solar factor g-value ¹	shading coefficient SC	selectivity LT / g	reflection outside LRe [%]	reflection inside LRI [%]	Ug-value ² [W/m ² K]	weight [kg/m ²]	assessed sound reduction index Rw,P (C, Ctr) ³ [dB]	new Carbon footprint ^{9,11} [kg CO ₂ eq/m ²] standard / ORAÉ	processing possibilities		
												to be tempered / annealed	tempering	lamination tested towards PVB ⁴

Extremely selective solar control coating with reinforced thermal insulation

COOL-LITE® XTREME in triple glazing unit (6 | 16 | 4 | 16 | 4 mm, 90% Argon, coating on face #2 with PLANITHERM® XN on face #5) on PLANICLEAR®** - **new** also available on ORAÉ™ Low-Carbon Glass

Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758



COOL-LITE® XTREME 70/33 II with EASYPRO®	neutral	63	0.31	0.35	2.03	13	16	0.5	35.0	36(-1;-5)	66 / 46 ¹⁰	to be tempered		Yes ⁵
COOL-LITE® XTREME 70/33	neutral	63	0.31	0.35	2.03	13	16	0.5	35.0	36(-1;-5)	60 / 40 ¹⁰			
COOL-LITE® XTREME 61/29 II with EASYPRO®	neutral	55	0.27	0.31	2.03	12	17	0.5	35.0	36(-1;-5)	66 / 46 ¹⁰	to be tempered		Yes ⁵
COOL-LITE® XTREME 61/29	neutral	55	0.27	0.31	2.03	12	16	0.5	35.0	36(-1;-5)	60 / 40 ¹⁰			
COOL-LITE® XTREME 50/22 II with EASYPRO®	neutral	43	0.19	0.22	2.26	17	20	0.5	35.0	36(-1;-5)	60 / 46 ¹⁰	to be tempered		Yes ⁵

*COOL-LITE® XTREME products are also available on DIAMANT® substrate, with improved LT and neutrality. For details, please contact us.
**COOL-LITE® XTREME products are also available on ORAÉ® substrate, with a lower carbon footprint

Highly selective solar control coating with reinforced thermal insulation

COOL-LITE® SKN in triple glazing unit (6 | 16 | 4 | 16 | 4 mm, 90% Argon, coating on face #2 with PLANITHERM® XN on face #5) on PLANICLEAR®**

Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758



COOL-LITE® SKN 183 II with EASYPRO®	neutral	67	0.37	0.43	1.81	14	16	0.5	35.0	36(-1;-5)	66	to be tempered		Yes ⁵
COOL-LITE® SKN 183	neutral	67	0.37	0.43	1.81	14	16	0.5	35.0	36(-1;-5)	60			
COOL-LITE® SKN 175 II with EASYPRO®	neutral	63	0.33	0.38	1.91	16	17	0.5	35.0	36(-1;-5)	66	to be tempered		Yes ⁵
COOL-LITE® SKN 176 II with EASYPRO® Made in RO	neutral	63	0.34	0.39	1.85	15	17	0.5	35.0	36(-1;-5)	66	to be tempered	Yes ⁸	Yes ⁵
COOL-LITE® SKN 176 Made in RO	neutral	63	0.34	0.40	1.85	15	17	0.5	35.0	36(-1;-5)	60			
COOL-LITE® SKN 165 II with EASYPRO®	neutral	55	0.31	0.36	1.77	18	20	0.5	35.0	36(-1;-5)	66	to be tempered	Yes ⁸	Yes ⁵
COOL-LITE® SKN 165	neutral	55	0.31	0.36	1.77	18	20	0.5	35.0	36(-1;-5)	60		Yes ⁸	
COOL-LITE® SKN 154 II with EASYPRO® Made in RO	neutral	47	0.26	0.30	1.81	19	23	0.5	35.0	36(-1;-5)	66	to be tempered	Yes ⁸	Yes ⁵
COOL-LITE® SKN 154	neutral	47	0.26	0.30	1.81	20	23	0.5	35.0	36(-1;-5)	60		Yes ⁸	
COOL-LITE® SKN 144 II with EASYPRO®	neutral	38	0.21	0.24	1.81	21	17	0.6	35.0	36(-1;-5)	66	to be tempered	Yes ⁸	Yes ⁵

*COOL-LITE® SKN products are also available on DIAMANT® substrate, with improved LT and neutrality. For details, please contact us.

⁴ Solar control coating in contact with PVB modifies performances and aesthetics. Please contact us to get the approved list.
⁵ Bending results depend on the process/technology used; trials should be done for validation. It will be used PLANITHERM® XN II on face #4.
⁷ COOL-LITE® SKN 154 may have a slight color deviation in transmission compared to SKN 154 II. Validation by Mock-up is recommended if both versions are used on the same facade.
⁸ This coating can be laminated for use on a facade up to 1.500m² and project must be made from a single production batch from SGG.
⁹ Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR® are calculations made with Calumen regarding the composition computed based on the standard EN 15804+A2. Estimations based on the Life Cycle Analysis (LCA) of our products. Only complete Environmental Product Declaration (EPD) can be verified by an external third party.

¹⁰ Global Warming Potential (GWP) A1-A3 Stages: The GWP values with ORAÉ®, are estimations based on our Life Cycle Assessment model. Data were collected during the 4 ORAÉ® campaigns made in 2022. The detailed environmental data will be documented through third party-verified environmental product declarations - EPDs (or FDES in France) - which are currently under development and scheduled for availability in early 2023.
¹¹ All panes of the DGU with the same substrate; first pane respectively annealed or tempered (II) with the same glass compositions; counter panes always annealed.




OUR PRODUCTS FOR FACADES in Triple Glazing Units

coating	color in reflection	light transmission LT ¹ [%]	solar factor g-value ¹	shading coefficient SC	selectivity LT / g	reflection outside LRe [%]	reflection inside Lri [%]	Ug-value ² [W/m ² K]	weight [kg/m ²]	assessed sound reduction index Rw,P (C, Ctr) ³ [dB]	new Carbon footprint ^{9,11} [kg CO ₂ eq/m ²]	processing possibilities		
												to be tempered / annealed	tempering	lamination tested towards PVB ⁴

Selective solar control coating with reinforced thermal insulation

COOL-LITE[®] KN II in triple glazing unit (6 | 16 | 4 | 16 | 4 mm, 90% Argon, coating on face #2 with PLANITHERM[®] XN on face #5) on PLANICLEAR[®]

Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758

COOL-LITE [®] KN 177 II with EASYPRO [®] 	neutral	63	0.44	0.50	1.43	26	23	0.5	35.0	36(-1;-5)	66	to be tempered		Yes ⁵
COOL-LITE [®] KN 166 II with EASYPRO [®] 	neutral	55	0.35	0.40	1.57	23	26	0.5	35.0	36(-1;-5)	66	to be tempered		Yes ⁵
COOL-LITE [®] KN 148 II with EASYPRO [®] 	neutral	42	0.28	0.32	1.50	28	20	0.5	35.0	36(-1;-5)	66	to be tempered		Yes ⁵

⁵ Bending results depend on the process/technology used; trials should be done for validation. It will be used PLANITHERM[®] XN II on face #4.



Selective solar control coating with reinforced thermal insulation

COOL-LITE[®] KN II in triple glazing unit (6 | 16 | 4 | 16 | 4 mm, 90% Argon, coating on face #2 with PLANITHERM[®] ONE on face #5) on PLANICLEAR[®]

Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758

COOL-LITE [®] KN 177 II with EASYPRO [®] 	neutral	56	0.38	0.43	1.47	32	32	0.5	35.0	36(-1;-5)	59	to be tempered		Yes ⁵
COOL-LITE [®] KN 166 II with EASYPRO [®] 	neutral	49	0.31	0.35	1.58	28	34	0.5	35.0	36(-1;-5)	59	to be tempered		Yes ⁵
COOL-LITE [®] KN 148 II with EASYPRO [®] 	neutral	37	0.24	0.28	1.54	31	29	0.5	35.0	36(-1;-5)	59	to be tempered		Yes ⁵

⁴ Solar control coating in contact with PVB modifies performances and aesthetics. Please contact us to get the approved list.

⁵ Bending results depend on the process/technology used; trials should be done for validation. It will be used PLANITHERM[®] ONE II on face #4.

⁹ Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR[®] are calculations made with Calumen regarding the composition computed based on the standard EN 15804+A2. Estimations based on the Life Cycle Analysis (LCA) of our products. Only complete Environmental Product Declaration (EPD) can be verified by an external third party

¹¹ All panes of the DGU with the same substrate; first pane respectively annealed or tempered (II) with the same glass compositions; counter panes always annealed.



OUR PRODUCTS FOR FACADES

coating to be tempered / annealed	color in reflection	light transmission LT ¹ [%]	rendering (Ra)	solar factor g-value ¹	selectivity LT / g	reflection outside LRe [%]	reflection inside LRI [%]	Ug-value ² [W/m ² K]	weight [kg/m ²]	assessed sound reduction index Rw,P (C, Ctr) ³ [dB]	new Carbon footprint ^{9,11} [kg CO ₂ eq/m ²]	Description / processing
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Anti-reflective glass

VISION-LITE[®] on DIAMANT[®] for anti-reflectance (STADIP[®] (Laminated glass) and Monolithic glass)*

Values given according to the standards ¹EN 410, ²EN 673 and ³EN 12758

STADIP [®] VISION-LITE [®] (laminated glass 44.2) DIAMANT [®]	extra neutral	97	99	0.84	1.15	1	1	5.5	21.0	34(-1;-2)	32	Coatings on faces #1 and #4 of laminated glass
VISION-LITE [®] II DIAMANT [®] (6 mm)	extra neutral	98	99.5	0.87	1.13	1	1	5.7	15.0	32(-1;-2)	25	Coatings on both sides (#1 & #2) of glass - to be tempered

*For customers who have their own laminating lines, there is available Semi VISION-LITE (to be used, Semi VISION-LITE must be laminated so that the outer faces of the laminated glass are with the anti-reflective coating)

**For advanced thermal insulation in a double-insulated glazing, a VISION-LITE coating on face #2 or #3 will be replaced with a Planitherm[®] XN coating

⁴ Solar control coating in contact with PVB modifies performances and aesthetics. Please contact us to get the approved list.

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

⁹ Global Warming Potential (GWP A1-A3 Stages) values with PLANICLEAR[®] are calculations made with Calumen regarding the composition computed based on the standard EN 15804+A2. Estimations based on the Life Cycle Analysis (LCA) of our products. Only complete Environmental Product Declaration (EPD) can be verified by an external third party

¹¹ All panes of the DGU with the same substrate; first pane respectively annealed or tempered (II) with the same glass compositions; counter panes always annealed.



LOW-E COATINGS for insulated glazing units

Developed for the residential market, Saint-Gobain Glass' Low-E coatings are used in facade in complementarity to COOL-LITE[®] solar control glazing in face #5 of triple glazing units (TGU) for optimized performances and increased thermal insulation.

PLANITHERM[®] - Low-E for insulating glazing units: 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.

Made in RO PLANITHERM[®] XN is a low-emissivity glass that optimizes the energy efficiency of double and triple-glazing units.

Made in RO PLANITHERM[®] ONE offers the lowest emissivity. Mounted in double glazing, it makes it possible to obtain the Ug value = 1.0W/(m².K) in a 4-16 argon-4 mm composition

- PLANITHERM[®] XN and PLANITHERM[®] ONE are available in annealed and to-be-tempered version (identified with II)

OUR TECHNICAL SUPPORT



Professional high level of service is our priority.

We offer tailor-made advisory about glass products and technical solutions.

Static calculations: deflection and stress calculation are performed for different types of glazing under permanent and variable loads combination.

Thermal stress analysis: calculation of maximum temperatures and analysis of the risks of thermal breakage.

Acoustic calculations: computation of sound transmission loss and calculation acoustic insulation parameters.

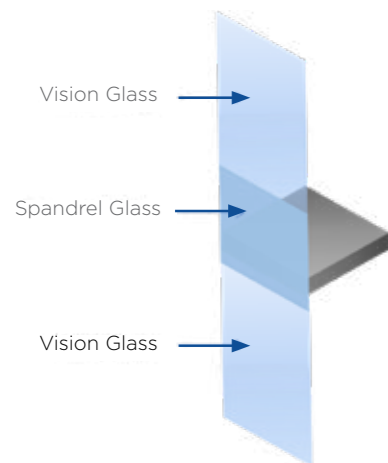
Spectrophotometric calculations: the most important glazing parameters such as light transmission, light reflection, energy absorption, Ug, etc.

Daylight analysis and energy simulation: penetration of natural light on the building floor plan or at working plane level.

Virtual rendering of coated glass: physico-realistic image of different glazing products on your own building facade with GLASSPRO Live.

If you want more information, **please contact your local sales and specification team.**

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.

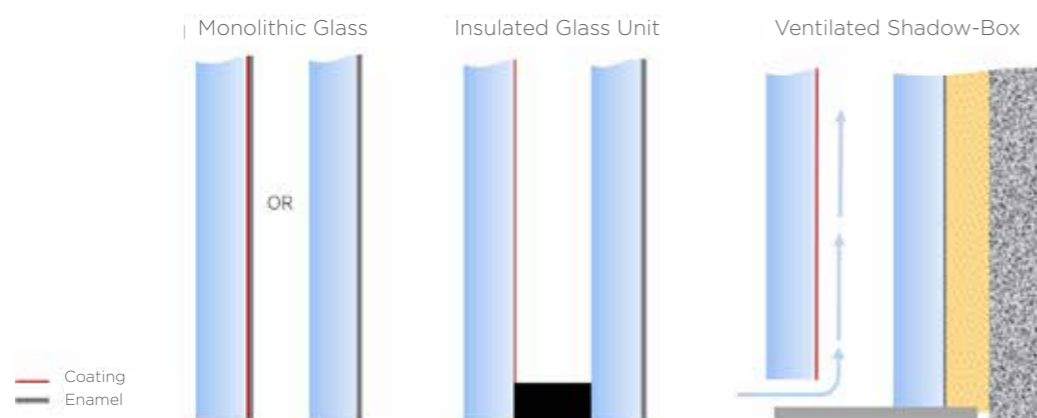
Spandrel made of glass are often used to have a continuous, smooth fully glazed façade. The spandrel glass can be complementary or contrasting in color when compared to the appearance of the vision glass.

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** 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 ¹²
COOL-LITE® KN II, SKN II and XTREME II	No common approval for the enameling of silver-based high performance coatings from the COOL-LITE® KN II, SKN II or XTREME II range

¹² The processor is responsible for the quality control and quality of the final product. Given the variety of enameling products, different operations and practical experiences, each processor should carry out tests with its own equipment.

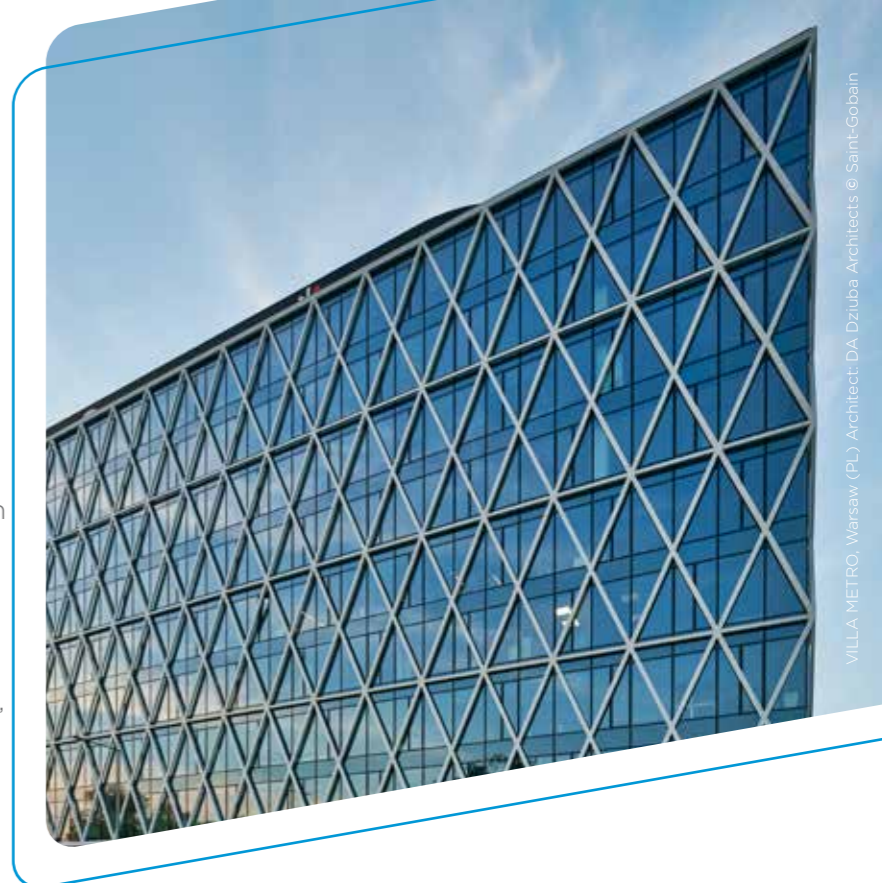
¹³ Contact Saint-Gobain Glass' technical support team for further information and assistance

Ask us for the processing guidelines for our COOL-LITE®, KN (II), SKN (II) or XTREME (II).

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 facade, simply harmonized with it or inversely fully contrasted for offering to the facade an original rythmed design.

In order to accelerate the decision proces 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**, proposition are defined by a coating and the color of the enameled glass (referenced by its RAL) based on a methodology developed by Saint-Gobain Glass¹⁴.



VISION GLASS (standard double glazing unit with coating on #2)	SPANDREL INSULATED GLAZING UNIT (as illustrated page 14)	SPANDREL VENTILATED SHADOW BOX (as illustrated page 14)	SPANDREL MONOLITHIC GLASS (as illustrated page 14)
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COOL-LITE® XTREME (II) PRODUCTS			
XTREME 70/33 (II)	COOL-LITE® XTREME 70/33 II & PLANICLEAR® RAL 7024 or 7026	- ¹⁴	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 50/22 II	COOL-LITE® XTREME 50/22 II & PLANICLEAR® RAL 5008 or 7026	COOL-LITE® ST150 & PLANICLEAR® RAL 7026	- ¹⁴

COOL-LITE® SKN (II) PRODUCTS			
SKN 183 (II)	COOL-LITE® SKN 183 II & PLANICLEAR® RAL 7012 or 7015	- ¹⁴	COOL-LITE® ST150 with RAL 7015
SKN 175 II	COOL-LITE® SKN 175 II & PLANICLEAR® RAL 7015 or 7024	- ¹⁴	COOL-LITE® ST150 with RAL 7024
SKN 176 (II)	COOL-LITE® SKN 176 II & PLANICLEAR® RAL 7024 or 7026	- ¹⁴	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	- ¹⁴
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

¹⁴ So-called “matching” between spandrel and vision glass is a subjective process and is likely to change depending on the observer as well as external conditions. The suggestions presented here are the best results obtain today based on compatibility and existing product range but are not the only possibilities; for some configuration no satisfying solution can be presented here. It is always recommended to proceed to real observation based on 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 GLASSPRO's technology.

With GLASSPRO Live, 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

BETTER FOR THE PLANET

reduced building-related environmental footprint

ENERGY AND CARBON

■ **Reduced embodied carbon emissions:** Buildings account for 39% of global Green House Gas emissions today: to keep on track with the 1.5°C objective of the Paris agreement, it is necessary to reduce building-related emissions.

At Saint-Gobain we want to help our customers to decarbonize their activities. This is why we commit to achieve carbon neutrality in 2050.

We set mid-term targets for 2030 (in absolute terms compared to 2017)

- to reduce our direct and indirect CO₂ emissions (scope 1+2) by 33%
- to reduce our scope 3 CO₂ emissions by 16% for all relevant categories for Saint-Gobain

Pioneer on Environmental Product Declaration (EPD) for more than 10 years, we go now one step further on product transparency, supporting our customers and partners to find the best performing glazing with the lowest carbon footprint.

With Calumen® (www.calumen.com), the free online application calculating the performances of glazing, you can estimate the carbon footprint of any glazing configuration.

■ **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 very low CO₂ impact compared to its benefits.

■ **Increased use of renewable energy:** Once the energy need has been reduced to the minimum, the remaining needed energy should 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 building sector accounts for 40% of the world's raw material consumption¹⁵. Glass is a material which is 100% and infinitely recyclable without losing its mechanical and chemical properties.

Introducing more cullet in our glass has three main environmental virtues:

- Reducing CO₂ emissions
- Preserving natural resources
- Reducing energy consumption

■ **Reduced amount of non-recovered C&D Waste:** The construction sector is a major contributor to solid waste in the world, it is responsible for 40% of solid waste streams¹⁶. At Saint-Gobain Glass we develop networks to collect external cullet to be recycled in our furnaces.

We target to have our glass containing up to 40% cullet by 2030.

SAINT GOBAIN GLASS released its new European Environmental Product Declaration (EPD) in 2021.

The verification has been conducted respecting the latest norm EN15804 +A2.

For a better understanding of our impacts and more transparency, the boundaries of the study for these new EPD have been enlarged. The analysis was made "cradle-to-grave", meaning the assessment started from the extraction of raw material and supplier until the end-of life.

Find all our documentation:
www.greenbuilding.saint-gobain.com



TOM PATTERSON / THE WATER STRATFORD / CA
©Scott Norsworthy

BETTER FOR PEOPLE

enhanced health and wellbeing

HEALTH AND WELLBEING INDOORS

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

■ **Better visual comfort:** Light is crucial for an optimal sense of wellbeing. We innovated 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:** In well-balanced sound environments we are more productive, happier and experience fewer health issues. 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 buildings¹³. The fresher the air we breathe, the healthier we are in the buildings in which we live or work. In line with our health policy and through our eco-Innovation program, 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 makeup of our products. In addition, our glazing products do not emit any VOC as glass is an inert material.



We translate our purpose
MAKING THE WORLD A BETTER HOME
into a strategic commitment and concrete actions:
we care about building better for people and the planet.

But what does that mean?

- Being at our customers and partners' side to innovate and help design, construct and renovate **better buildings** which reduce impact on our planet, enhance people's health and wellbeing, and deliver reduced costs and increased value.
- Providing our customers with **innovative solutions** which improve their performance and support their journey towards more sustainability.
- Advocating for building better to accelerate the market transformation towards better policies, standards and practices.
- Demonstrating our expertise and leadership to **be your preferred partner.**

ORAÉ® - Market's first Low Carbon Glass

NOW AVAILABLE as COOL-LITE® XTREME ORAÉ

The extremely selective solar control product family COOL-LITE® XTREME is now available on ORAÉ® substrate, the new low carbon glass of Saint-Gobain Glass.

With ORAÉ®, Saint-Gobain Glass has achieved a landmark technical breakthrough enabling it to offer the first glass with the lowest embodied carbon 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® XTREME ORAÉ® is a perfect response to the stricter sustainability requirements of the building industry without any compromise on technical or aesthetic performance.



RANGE

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

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

AESTHETICS

ORAÉ® is offering exactly the **same aesthetics** than the regular clear float glass PLANICLEAR®. Combined with COOL-LITE® XTREME, the low external reflection as well as the extremely colour-neutral external appearance creates an excellent combination of function and aesthetics.

SUSTAINABILITY

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

- The exceptionally low carbon footprint of ORAÉ®, produced by combining high recycled glass content (**64% according to ISO 14021:1999**) and renewable electricity. As a result, the new product offers the lowest carbon footprint on the market with a reduction of 42% compared to our regular product.
- The excellent energy performances of the COOL-LITE® XTREME 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.

PERFORMANCES

COOL-LITE® XTREME ORAÉ® provides the **same performances and quality** as COOL-LITE® XTREME PLANICLEAR®, with a much lower carbon footprint.

According to the verified EPD published in april 2023, the ORAÉ® substrate has a **carbon footprint of only 6.64 kg CO₂ eq./m²** (for a 4mm substrate), 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

Contact us for individual inquiries.

4BIRD®

With the 4BIRD® product family, SAINT-GOBAIN GLASS offers a range of solar control glasses with a special focus on an effective bird protection.

4BIRD® products offer sustainable solutions for the preservation of the biodiversity and a wiser energy consumption of building, while keeping a homogeneous and neutral external aesthetic, and allows the architect to design without compromises on aesthetic or performances of the building envelope.



The 4BIRD® family is:

- gathering **several product series**, each series offering a **variety of configurations and designs**.
- offering products and design, compliant with all currently known local regulations and national guidelines. They **meet the recognized 2x2" and 2x4" rules and tighter mandatory or voluntary regulations** like LEED Pilot Credit #55: Bird Collision Deterrence.
- made of products **combined with Saint-Gobain Glass' COOL-LITE® XTREME and SKN solar control coated glass**, offering thus all benefits related to this product family

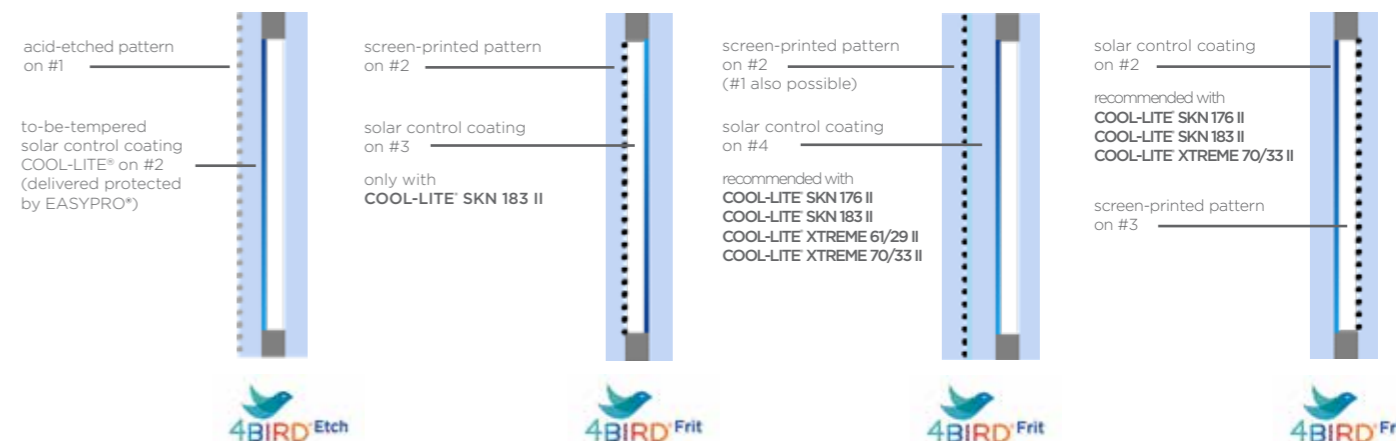


4BIRD®Frit is a series of **specifically screen-printed pattern on #1, #2 or #3** together with selected annealed or to-be-tempered COOL-LITE® solar control coatings on #2 (respectively #4 of laminated glass) or #3 by SAINT-GOBAIN depending of the glazing configuration.



4BIRD®Etch is a series of **specifically acid-etched pattern on #1** together with selected **to-be-tempered COOL-LITE® coatings** protected with EASYPRO® on #2 by SAINT-GOBAIN.

American Bird Conservancy (ABC) has evaluated several 4BIRD®Frit and 4BIRD®Etch configurations and found that they **satisfied ABC's criterion for bird-friendly glass (Material Threat Factor (TF) ≤ 25)**



MORE DETAILS IN OUR DEDICATED 4BIRD® DOCUMENTATION

Contact us for individual inquiries.



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 scratched 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 today the following to-be-tempered coatings (on PLANICLEAR® and DIAMANT®):

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

Contact us for individual inquiries.



**GET TO KNOW MORE
ON OUR EASYPRO®
WEBPAGE**

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 composed of 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.

Such “solar façades” are one of the cleverest way to reduce the environmental impact of a building, producing energy and generating annual savings on the energy bill.

From translucent to fully colored for several uses on the building

BIPV panels are most widely used to replace traditional covering on 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. The module integrates perfectly into the façade and becomes invisible.

On the other side, solar modules with translucent cell spacing, can be used in skylights or in vertical façade or open structure, 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...



**MORE DETAILS
IN OUR DEDICATED BIPV
DOCUMENTATION**

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



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.

iWin®: GLASS AS DATA CARRIER

With iWin®, Saint-Gobain offers a digital service that enables its customers and their customers to track the glazing units before delivery, on the construction site and after installation.

Each insulating glass unit is equipped with an RFID transponder, which is written with an identification number (ID) and can be read with commercial RFID readers.

This ID is stored in a database where customers can retrieve information about the product; e.g. glass build-up or coating, but also order and shipping details.

iWin® thus becomes the link between the digital twin (the data) and its analog counterpart (the product) - the product-integrated, digital delivery bill!

Glazing with the ability to store the access to data and the provision of a database linked to the glass units is a missing piece of the puzzle towards the digitalization of the entire construction industry.

With iWin®, it is therefore possible for the first time to clearly identify building components for years to come that makes documentation easier for all involved, from architects to general contractors to facility managers.

Contact us for individual inquiries.



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 a high performance glazing.

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

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

The glass can be heat-treated, laminated, and processed as multifunctional Insulated Glass Units (IGU) (double Glazed Units (DGU) or triple Glazed Units (TGU)).

Contact us for individual inquiries.



**FIND iWin®
ON
LINKEDIN**

OUR SERVICES AND TOOLS

CALUMEN®: The Reference of Calculation

New version - Launched early 2023



Determine the **light, energy, thermal or acoustic performances of your glazing**; or to find a suitable glazing for your project based on its performance values.

Personalize settings such as type of glazing, type of coating, glass and cavity thickness.

Specify a project, make comparisons between our products, change the configurations and obtain the right product.

new Calumen® now includes a new feature, the **calculation of the carbon footprint of your glazing***, from raw material extraction, to its end of life.

A new Calumen® is coming to be closer to your needs !

- **User friendly:** an easy to use glazing configurator and brand new layout
- **At your service** : tell us about your project and Calumen® will help you find the best solutions
- **Time saving:** save your favorite glass build ups into projects and easily find them back
- And a lot more to come... (Launched early 2023)

Calumen is available on www.calumen.com

*Carbon footprint values presented are estimations based on the Life Cycle Analysis of our products. Only complete Environmental Product Declaration can be verified by an external third party.



DISCOVER AND TRY
CALUMEN
ONLINE

GLASSPRO - The Virtual Rendering of Coated Glass

The GLASSPRO app and GLASSPRO Live are unique services of Saint-Gobain Glass, bringing new perspectives on building design and glazing prototyping through digital simulation. Accurate predictive glass façade physico-realistic rendering reduces the need for physical glass mock-ups, which opens the door to a more sustainable approach for prototyping, and accelerates the decision-making process with regards to selecting the ideal glazing with the desired aesthetics corresponding to your design intention.



GLASSPRO App - The iPad application

GLASSPRO app is an application for Apple iPad 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.

This app, [downloadable on the Apple store](#), shows an accurate and realistic virtual rendering, based on physical properties of the glass.



GLASSPRO Live - The on-demand service

GLASSPRO Live is Saint-Gobain Glass' on-demand service of glass facade rendering. It allows architects to appreciate the look of Saint-Gobain Glass glazing products on their own building, as if it was real, before it's even built!

Ask for your glazing configuration to be represented on high definition "physico-realistic" images under a variety of lightning conditions and even on your own building 3D rendering.

To request the service, please [contact your local sales and specifier team](#).

Website SAINT-GOBAIN GLASS



Discover our product range to find the ideal glass for your project which responds the best to your expectations.

Find also our services, the apps and calculation tools you need in the website www.saint-gobain-glass.com

You may select your area/country to have our local offer and dedicated products

INSTAGLASS - The Reference Project Website for Glass Facades



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

Discover inspirational sustainable design of living spaces and distinctive building that make our environment worth living in

www.saint-gobain-glass.com/instaglass

GREEN BUILDING WEBSITE: For sustainable construction



Discover how all Saint-Gobain products and solutions can contribute to achieving credits in green building certifications.

Explore our certifications among different international labels such as LEED, BREEAM, DGNB, HQE or even WELL.

Find all the needed documentation for certification process. Saint-Gobain solutions covers numerous applications such as facades, ceilings, floors, foundations, roofs, walls, and many others.

www.greenbuilding.saint-gobain.com

CALUWIN: Comfort by numbers



Calculate quickly and easily:

- The whole U-value (Uw value)
- Surface temperatures
- The condensation risk in the glass edge area
- Energy savings thanks to warm edge spacer

Caluwin is available on www.caluwin.com



**SCAN ME AND DISCOVER
SAINT-GOBAIN GLASS
FACADE REFERENCES**



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