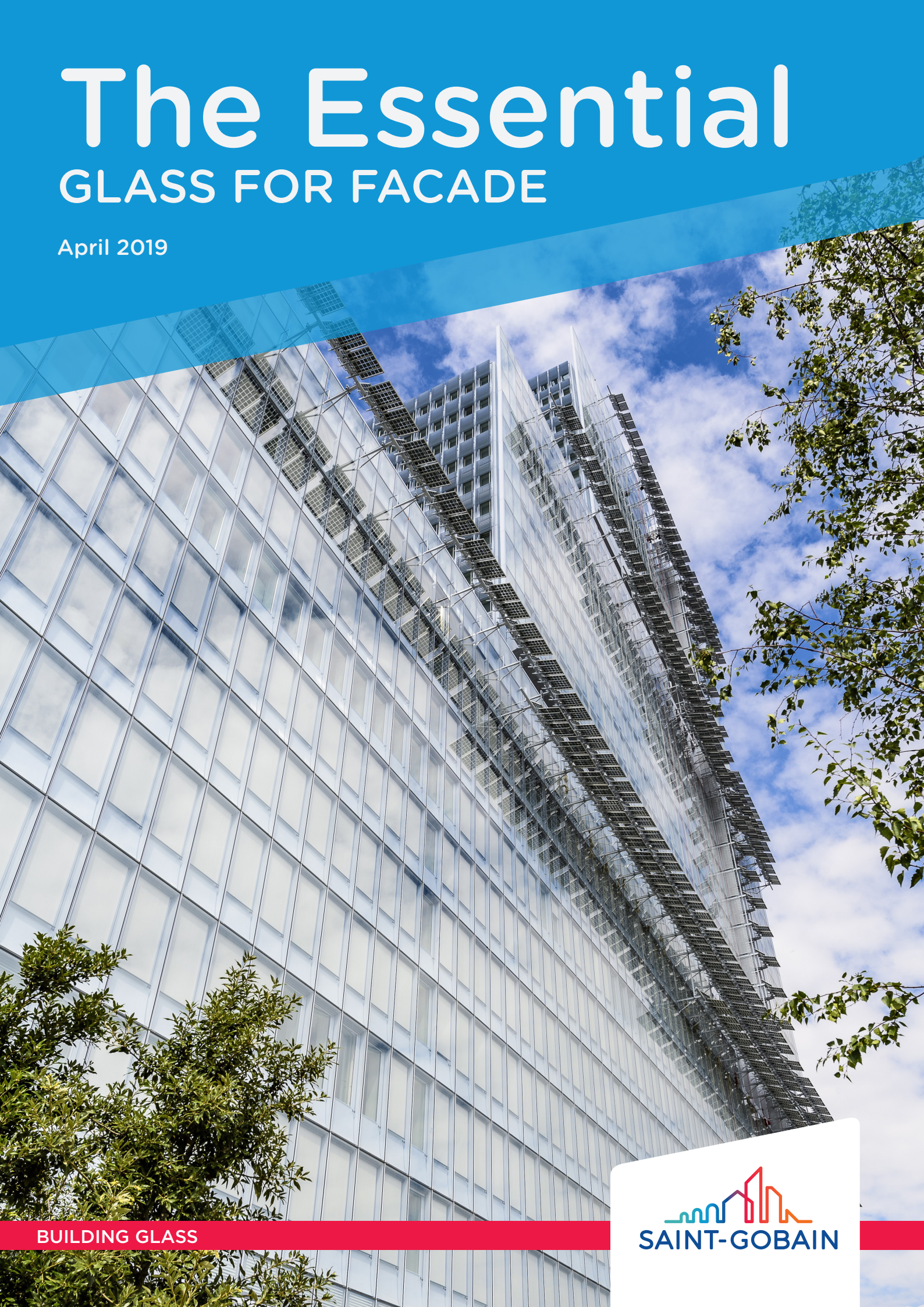
The Essential

GLASS FOR FACADE

April 2019



BUILDING GLASS

SAINT-GOBAIN

GLASS SOLUTIONS FOR **FACADE**

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 as a key glazing supplier to the global construction industry.

We respond to your needs with solar and heat control, large dimensions, aesthetics, design, total transparency and curved glass.

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-facade-glass.com

KEY PERFORMANCE FACTORS

Light transmission (LT)

Percentage of visible light directly transmitted through the glass.

Reflection outside

Percentage of visible light directly reflected from the exterior 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.

Colour rendering index

Ability of the glass to keep the colours the same as if they were observed without glazing. Measured with a scale from 1 to 100. A low CRI gives a poor representation of colours, and a high CRI gives a natural and bright representation of colours.

Solar Factor (g-value)

Percentage of solar energy transmitted through the glass. It measures the ability of 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.

GLASS TECHNOLOGY FOR **SUSTAINABLE HABITAT**

Saint-Gobain Building Glass Europe offers a complete range of energy efficient coated glass and insulated glazing. 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 serve comfort and well-being for sustainable habitat.

KEY ASSETS

Protection from the sun heat – Solar Control Glass

Solar control glass reduce overheating within buildings whilst letting the daylight in.

Protection from the cold – Low-e Glass

Double or triple glazing significantly reduces heat loss to the exterior, reducing the energy usage for internal heating.

Easy maintenance – BIOCLEAN

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

Total transparency – Anti-reflective glass

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

FOCUS ON 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) or Triple Glazed Units (TGU).
Many processing options are possible.

Contact us for individual inquiries.

OUR PRODUCTS

Values given according to the standards EN 410 & EN 673 - 2011

PRODUCT To be tempered / Annealed coating (if available)	Color in Reflection	LT (%)	Solar Factor g-value	Shading coefficient SC	Selectivity LT / g	External Light Reflectance LRe (%)
WINTER AND SUMMER COMFORT						
High Performance Glass COOL-LITE XT for double glazing (6+16+4mm) on PLANICLEAR or DIAMANT						
COOL-LITE XTREME 70/33	Neutral	70	0,33	0,38	2,12	11
COOL-LITE XTREME 70/33 II	Neutral	70	0,33	0,38	2,12	11
COOL-LITE XTREME 70/33 DIAMANT	Extra clear	71	0,33	0,38	2,15	11
COOL-LITE XTREME 70/33 II DIAMANT	Extra clear	71	0,33	0,38	2,15	11
COOL-LITE XTREME 60/28	Neutral	60	0,28	0,32	2,14	14
COOL-LITE XTREME 60/28 II	Neutral	61	0,28	0,32	2,18	14
COOL-LITE XTREME 60/28 DIAMANT	Extra clear	61	0,28	0,32	2,18	14
COOL-LITE XTREME 60/28 II DIAMANT	Extra clear	62	0,28	0,32	2,21	15
COOL-LITE XTREME SILVER II	Silver	49	0,25	0,29	1,96	30
COOL-LITE XTREME SILVER II DIAMANT	Bright Silver	50	0,25	0,29	2,00	30
COOL-LITE XTREME 50/22 II	Neutral	47	0,21	0,24	2,24	16
COOL-LITE XTREME 50/22 II DIAMANT	Extra clear	48	0,21	0,24	2,29	16
High Performance Glass COOL-LITE SKN for double glazing (6+16+4mm) on PLANICLEAR or DIAMANT						
COOL-LITE SKN 183	Neutral	75	0,40	0,46	1,88	12
COOL-LITE SKN 183 II	Neutral	75	0,40	0,46	1,88	12
COOL-LITE SKN 083	Extra clear	76	0,40	0,47	1,85	12
COOL-LITE SKN 083 II	Extra clear	76	0,41	0,47	1,85	12
COOL-LITE SKN 176	Neutral	70	0,37	0,43	1,89	13
COOL-LITE SKN 176 II	Neutral	70	0,37	0,43	1,89	13
COOL-LITE SKN 076	Extra clear	71	0,38	0,44	1,87	13
COOL-LITE SKN 076 II	Extra clear	71	0,38	0,44	1,87	13
COOL-LITE SKN 165	Neutral	61	0,34	0,39	1,79	16
COOL-LITE SKN 165 II	Neutral	61	0,34	0,39	1,79	16
COOL-LITE SKN 065	Extra clear	62	0,35	0,40	1,77	17
COOL-LITE SKN 065 II	Extra clear	62	0,35	0,40	1,77	17
COOL-LITE SKN 154*	Neutral	50	0,27	0,31	1,85	18
COOL-LITE SKN 154 II	Neutral	50	0,27	0,31	1,85	18
COOL-LITE SKN 054 II	Extra clear	53	0,29	0,33	1,83	18
COOL-LITE SKN 054	Extra clear	53	0,29	0,33	1,83	18
COOL-LITE SKN 145	Neutral	41	0,22	0,25	1,86	19
COOL-LITE SKN 144 II	Neutral	42	0,23	0,26	1,83	20
COOL-LITE®SKN 044 II	Extra clear	43	0,23	0,26	1,87	21

* COOL-LITE SKN 154 may have a slight colour deviation in transmission with the SKN 154 II heat treated version. Validation of a prototype is recommended if both versions are used on
*1 Solar control coating in contact with PVB modifies performances and aesthetics. Please contact us to get the approved PVB list.
*2 This coating can be laminated for use on a facade up to 1500m² and project must be made from a single production batch from SGG.
*3 Bending results depend on the process; trials should be done for validation.
*4 Validation should be taken with the digital printing inks and enamels.
*5 Screen-printing, roller coating, spray and digital printing validation required.

U-Value (EN 673) W/m².K)	Possible use as single glazing (coating on surface #)	Coating position on DGU	Processing				Benefits
			Temperable	Lamination (coating #2 inside the laminate)	Bending	Screen-printing & enamelling	
1,0		#2					Properties: Extreme solar control coated glass with enhanced thermal insulation and neutral aesthetics Advantages: - Solar control with the highest selectivity (above 2) - The best of thermal comfort, energy efficiency and savings thanks to reduced loads for air conditioning in summer and heating in winter - Optimum daylight income for visual comfort and elevated mood
1,0		#2	To be tempered		Yes[3]		
1,0		#2					
1,0		#2	To be tempered		Yes[3]		
1,0		#2		Yes[1]			
1,0		#2	To be tempered		Yes[3]		
1,0		#2		Yes[1]			
1,0		#2	To be tempered		Yes[3]		
1,0		#2	To be tempered		Yes[3]		
1,0		#2	To be tempered		Yes[3]		
1,0		#2	To be tempered		Yes[3]		
1,0		#2	To be tempered		Yes[3]		
1,0		#2					**Properties:** High performance solar control coated glass with enhanced thermal insulation **Advantages:** - Solar control with high selectivity - Thermal comfort, energy efficiency and savings thanks to reduced loads for air conditioning in summer and heating in winter - Good daylight income for visual comfort and elevated mood
1,0		#2	To be tempered				
1,0		#2					
1,0		#2	To be tempered				
1,0		#2					
1,0		#2	To be tempered	Yes[1,2]	Yes[3]		
1,0		#2					
1,0		#2	To be tempered	Yes[1,2]	Yes[3]		
1,0		#2		Yes[1,2]			
1,0		#2	To be tempered	Yes[1,2]	Yes[3]		
1,0		#2		Yes[1,2]			
1,0		#2	To be tempered	Yes[1,2]	Yes[3]		
1,0		#2		Yes[1,2]			
1,0		#2	To be tempered	Yes[1,2]	Yes[3]		
1,0		#2	To be tempered	Yes[1,2]	Yes[3]		
1,0		#2		Yes[1,2]			
1.1		#2					
1.1		#2	To be tempered	Yes[1,2]			
1,1		#2	To be tempered	Yes[1,2]			

the same facade.

Values given according to the standards EN 410 & EN 673 - 2011

PRODUCT To be tempered / Annealed coating (if available)	Color in Reflection	LT (%)	Solar Factor g-value	Shading coefficient SC	Selectivity LT / g	External Light Reflectance LRe (%)
High Performance Glass COOL-LITE KT for double glazing (6+16+4mm) on PLANICLEAR						
COOL-LITE KN 166 II	Neutral	61	0,39	0,45	1,56	22
COOL-LITE KNT 164	Neutral	58	0,47	0,54	1,23	15
COOL-LITE KNT 155	Neutral	48	0,38	0,44	1,26	17
COOL-LITE KNT 140	Neutral	38	0,29	0,33	1,31	23
COOL-LITE KBT 140	Blue	37	0,29	0,33	1,28	24
SUMMER COMFORT						
Solar control Glass COOL-LITE ST for double glazing (6+16+4mm PLANITHERM XN on face #3) on PLANICLEAR						
COOL-LITE ST BRIGHT SILVER / DIAMANT	Silver	61	0,5	0,57	1,22	32
COOL-LITE ST 167	Neutral	61	0,49	0,56	1,24	21
COOL-LITE ST 150	Neutral	46	0,38	0,44	1,21	19
COOL-LITE ST 136	Grey	34	0,28	0,32	1,21	23
COOL-LITE STB 136	Blue	33	0,28	0,32	1,18	19
COOL-LITE ST 120	Silver	18	0,16	0,18	1,13	32
COOL-LITE STB 120	Blue	20	0,18	0,21	1,11	21
WINTER COMFORT						
Low-E glass for double glazing (4+16+4mm) on PLANICLEAR						
PLANITHERM XN	Neutral	82	0,65	0,75	1,26	11
PLANITHERM XN II	Neutral	82	0,65	0,75	1,26	12
PLANITHERM ONE	Neutral	72	0,52	0,60	1,38	22
PLANITHERM ONE II	Neutral	72	0,53	0,61	1,36	22
High Performance Low - E coating for double glazing (4+16+4mm) on PLANICLEAR						
ECLAZ	Neutral	83	0,71	0,82	1,17	12
ECLAZ II	Neutral	83	0,71	0,82	1,17	12
ECLAZ ONE	Neutral	79	0,6	0,69	1,32	15
ECLAZ ONE II	Neutral	79	0,6	0,69	1,32	15
High Performance Low - E coating for triple glazing units (4+14+4+14+4mm) on PLANICLEAR						
ECLAZ	Neutral	83	0,71	0,82	1,17	12
ECLAZ II	Neutral	79	0,6	0,69	1,32	15

*1 Solar control coating in contact with PVB modifies performances and aesthetics. Please contact us to get the approved PVB list.
*2 This coating can be laminated for use on a facade up to 1500m² and project must be made from a single production batch from SGG.
*3 Bending results depend on the process; trials should be done for validation.
*5 Screen-printing, roller coating, spray and digital printing validation required.
*6 Project must be made from a single production batch from SGG.

Ug-Value (EN 673) ($W/m^2.K$)	Possible use as single glazing (coating on surface #)	Coating position on DGU	Processing				Benefits
			Temperable	Lamination (coating #2 inside the laminate)	Bending	Screen-printing & enamelling	
1		#2	To be tempered				**Properties:** Modern solar control coated glass with thermal insulation **Advantages:** - Selective solar control - Thermal insulation for improved energy
1,5		#2	Yes	Yes[1]			
1,4		#2	Yes	Yes[1]			
1,3		#2	Yes	Yes[1]			
1,4		#2					
1,1	#2	#2	Yes	Yes[1]	Yes[3]	Yes[4]	**Properties:** Standard solar control coated glass that can be toughened **Advantages:** - Can be curved - Can be enameled - Can be silk-screen printed
1,1	#2	#2	Yes	Yes[1]	Yes[3]	Yes[4]	
1,1	#2	#2	Yes	Yes[1]	Yes[3]	Yes[4]	
1,1	#2	#2	Yes	Yes[1]		Yes[4]	
1,1	#2	#2	Yes	Yes[1]		Yes[4]	
1,1	#2	#2	Yes	Yes[1]		Yes[4]	
1,1	#2	#2	Yes	Yes[1]		Yes[4]	
1,1		#3					**Properties:** High performance low-emissivity glass **Advantages:** - Enhanced thermal insulation - High daylight income
1,1		#3	To be tempered		Yes[3]		
1,0		#3					
1,0		#3	To be tempered		Yes[3]		
1,1		#3					**Advantages:** - High thermal insulation while insuring natural light intake - Significant positive environmental impact (up to - 20% of the energy bill) - Extreme transparency
1,1		#3	To be tempered				
1,0		#3					
1,0		#3	To be tempered				
1,1		#3					
1,0		#3	To be tempered				

Values given according to the standards EN 410 & EN 673 - 2011

PRODUCT To be tempered / Annealed coating (if available)	Color in Reflection	LT (%)	Solar Factor g-value	Shading coefficient SC	Selectivity LT / g	External Light Reflectance LRe (%)
SELF CLEANING GLASS						
Easy maintenance with BIOCLEAN for double glazing (6 + 16 + 4mm) on PLANICLEAR						
BIOCLEAN II	Neutral	80	0,76	0,87	1,05	17,7
BIOCLEAN-e	Neutral	80	0,76	0,87	1,05	17,7
BIOCLEAN-e XTREME 60/28	Neutral	58	0,27	0,31	2,15	17
BIOCLEAN-e SKN 176	Neutral	68	0,36	0,41	1,89	16
BIOCLEAN-e SKN 165	Neutral	59	0,33	0,38	1,79	19
BIOCLEAN-e SKN 154	Neutral	51	0,27	0,31	1,89	22
ANTI-REFLECTIVE GLASS						
VISION-LITE on DIAMANT						
VISION-LITE (Laminated Glass 44.1) DIAMANT	Extra Clear	97	0,85	0,97	1,14	1,1
VISION-LITE II DIAMANT (6mm)	Extra Clear	98	0,87	1,00	1,13	1,3
Semi VISION-LITE II (6mm)	Extra Clear	94	0,88	1,01	1,07	4,9
Semi VISION-LITE (6mm)	Extra Clear	94	0,9	1,03	1,04	4,7

*5 Screen-printing, roller coating, spray and digital printing validation required.

Ug-Value (EN 673) ($W/m^2.K$)	Possible use as single glazing (coating on surface #)	Coating position on DGU	Processing				Benefits
			Temperable	Lamination (coating #2 inside the laminate)	Bending	Screen-printing & enamelling	
2,6		#1	To be tempered				**Properties:** Clear self-cleaning glass **Advantages:** - Easy maintenance: the dirt is less adherent - Low cleaning frequency - High and clear vision with cloudy weather - Visual appearance very close to a classic glass
2,6		#1	Yes				
1,0		#1 #2					
1,0		#1 #2					
1,0		#1 #2					
1,0		#1 #2					
5,6		#1 #4				Yes[5]	**Properties:** Antireflective glass **Advantages:** - Extreme transparence & High color neutrality - Very low light reflection - Security and safety when laminated - Can be tempered (VISION-LITE II)
5,6		#1 #2	To be tempered			Yes[5]	
5,6		#1	To be tempered			Yes[5]	
5,8		#1					

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.

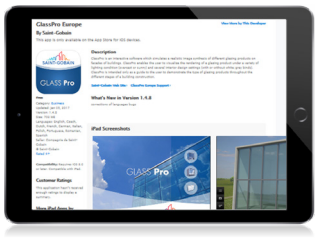
Daylight analysis and energy simulation: penetration of natural light on the building floor plan or at working plane level.

If you want more information, please contact us at: bge-façade@saint-gobain.com.

OUR SERVICES

GLASSPRO: The Virtual Rendering of Glass

The iPad application



Choose your glazing thanks to an interactive software which stimulates a realistic image of different glazing products on the facades of a building.

Compare two types of glazing with a personalized rendering of a glazing product under a variety of lightning conditions and several interior design settings through two different environments (urban and countryside to avoid representative issues).

This app shows an accurate and realistic virtual rendering, based on physical properties of the glass. Compared to real glass mock-ups, this mean a significant saving in time, zero costs and less papers, transport and carbon footprint.

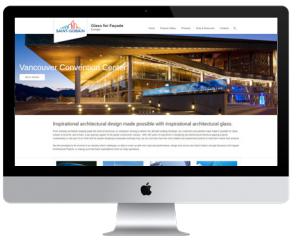
The on-demand service

Ask for your glazing to be represented under a variety of lightning conditions and several interior design settings thanks to our 2 scenes just like in the app. With our on-demand service, you can also ask for us to stimulates a realistic image of different glazing products on your own building facade.

Visualize and compare all Saint-Gobain glazing products on high definition 3D synthesis images called "physico-realistic" under a variety of lightning conditions and even on your own building 3D rendering.

To request the service, please contact us by mail at bge-facade@saint-gobain.com.

Website FACADE: The Façade library



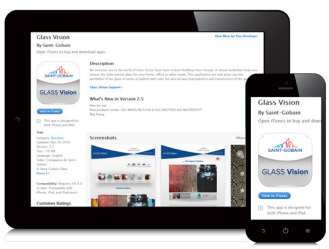
Discover our Product Range to find the ideal glass for your project which responds the best to your expectations.

Explore our Gallery of Projects to see our accomplishments on finished projects.

Find the apps and calculation tools you need in Tools & Resources. Product brochures, a technical glossary and BIM files are also available.

Contact our team through the website.
Access URL: www.saint-gobain-facade-glass.com

GLASS VISION: The realistic app for glass



Visualize translucent glass in real-time and with a realistic aesthetic.

Discover a large range of Saint-Gobain glass products with an augmented reality technique.

Chose the right glass for offices, shopping center or any other project.

CALUMEN LIVE: The Reference of Calculation

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.

CalumenLive is now available on www.calumenlive.com

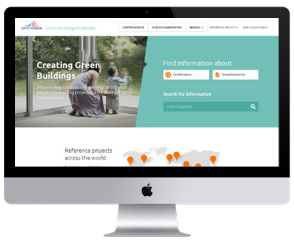
CALUWIN: Comfort by numbers

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

Access URL: www.caluwin.com

GREEN BUILDING WEBISTE: For sustainable habitat



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 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.

Access URL: www.greenbuilding.saint-gobain.com (launch in 2018)

OUR MISSION IS TO CREATE GREAT LIVING PLACES AND IMPROVE DAILY LIFE, WHILE PRESERVING THE FUTURE OF ALL.

BUILDING GLASS EUROPE

Les Miroirs
18 avenue d'Alsace
92400 Courbevoie
FRANCE
www.saint-gobain-building-glass.com

bge-facade@saint-gobain.com

@SaintGobainBuildingGlassEurope

Saint-Gobain Building Glass Europe

@saintgobain

GLASS FOREVER

This commitment is driven by our Glass Forever program, with the help of all our stakeholders: employees, customers, partners, suppliers.

From small seeds to big rivers, our vision is to grow our business and to differentiate, while improving our environmental footprint and increasing our contribution to people's wellbeing.

EPD VERIFIED

In the frame of the "Glass Forever" sustainable vision, Saint-Gobain Building Glass Europe issued 18 new verified Environmental Product Declarations (EPD), covering more than 165 different glazing configurations. They describe in detail the glazing's environmental footprint, from raw material extraction to exiting the plant. Today, this is one of the key requirements for green building labelling schemes like LEED v4, BREEAM, HQE, DGNB.

SAINT-GOBAIN

December 2018.

©Paris Court; Architect: Renzo Piano Building Workshop; Project owner: Artélia, led by Bouygues Construction Île-de-France; Photographer: Laurent Zylberman-Graphix-Images
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