



PCS / Faculdade de Engenharia
(Universidade da Beira Interior)

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Covilhã, 2017.11.10



Desempenho térmico e acústico do vidro nas caixilharias



50 Actividades | Mais de **1000** companhias consolidadas



49%

CONSTRUÇÃO DISTRIBUIÇÃO

POINTP
RAABKARCHER
DAHL
JEWSON
GRAHAM
LA PLATAFORMA



28%

PRODUTOS CONSTRUÇÃO

PAM
PLACO / GYPROC / BRITISH
GYPSUM
WEBER
ISOVER



23%

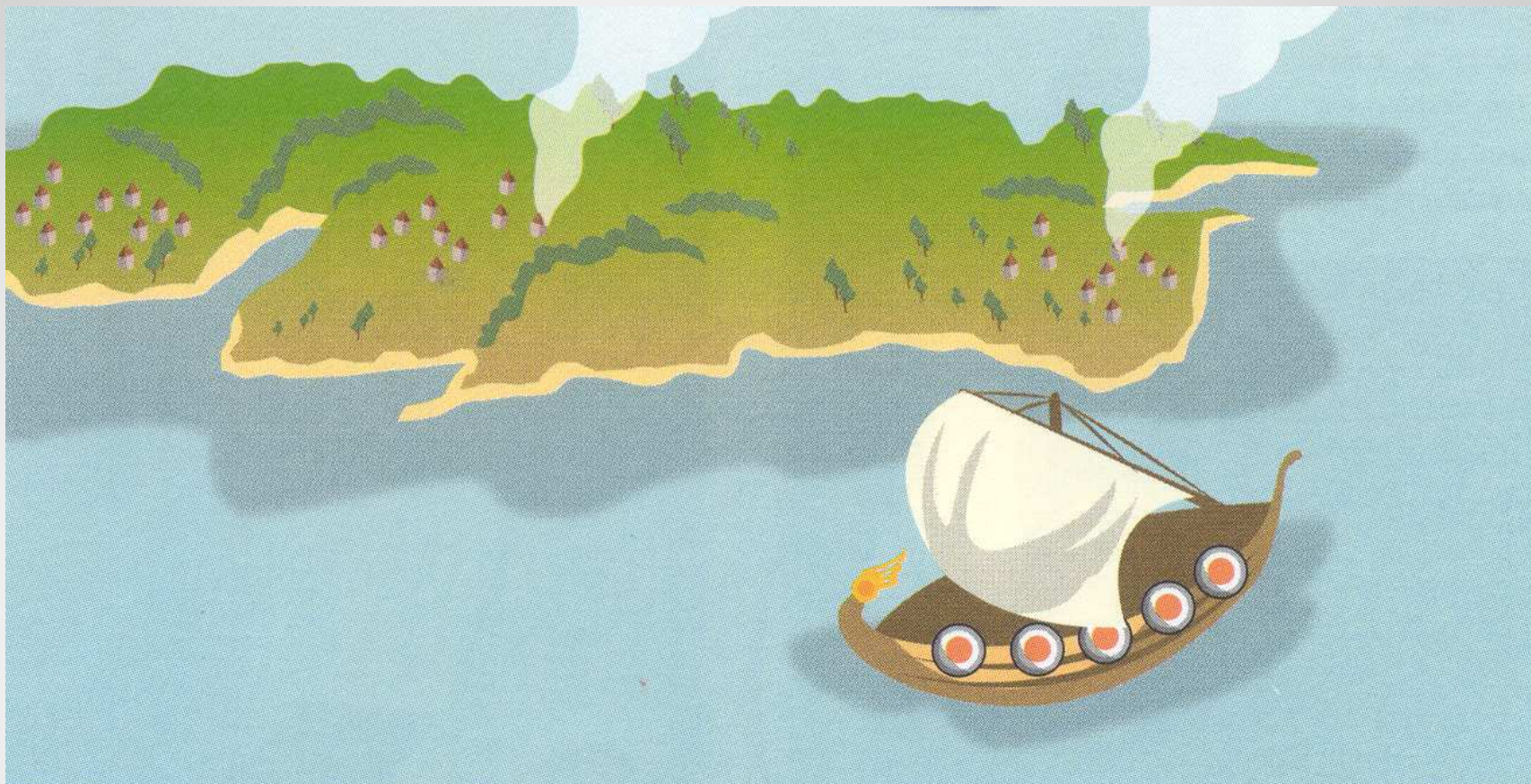
MATERIAIS INOVADORES

Vidro plano (13 % das vendas)
GLASS Industry
BUILDING GLASS EUROPE
SEKURIT
High-Performance Materials
(10%)

A photograph of a modern glass building at night, with a blue-tinted overlay. The building features a prominent glass facade and a series of vertical columns supporting a walkway. The background shows a tall skyscraper.

01

Origem e fascínio do Vidro



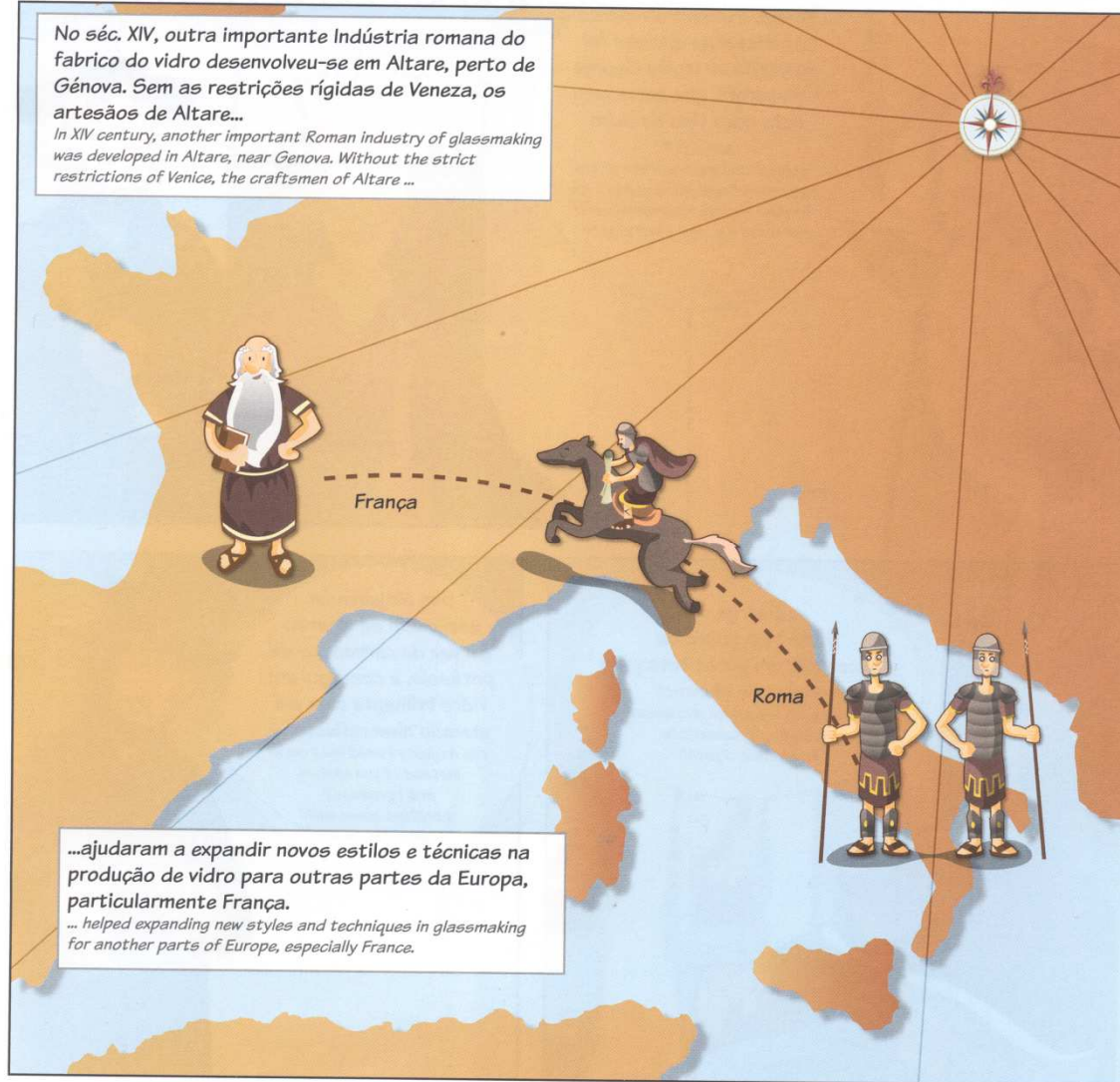
Até ao final do séc. XIII, a maioria da produção de vidro realizou-se na Ilha de Murano, que permitia também um maior controlo dos vidreiros.

No séc. XIV, outra importante indústria romana do fabrico do vidro desenvolveu-se em Altare, perto de Génova. Sem as restrições rígidas de Veneza, os artesãos de Altare...

In XIV century, another important Roman industry of glasemaking was developed in Altare, near Genova. Without the strict restrictions of Venice, the craftsmen of Altare ...

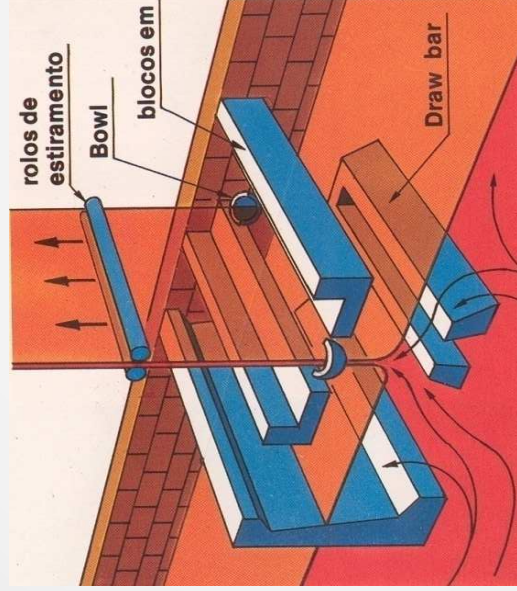
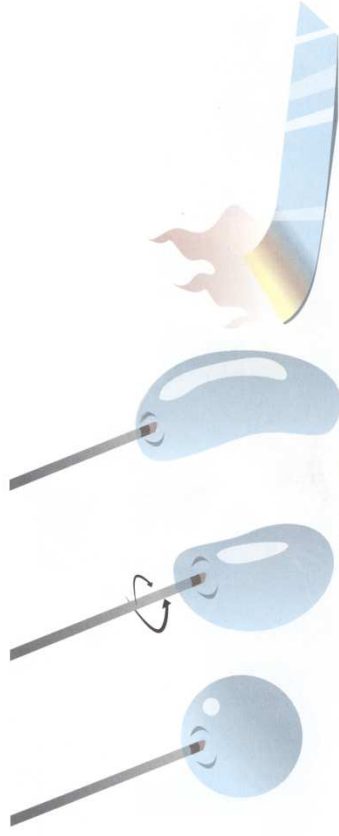
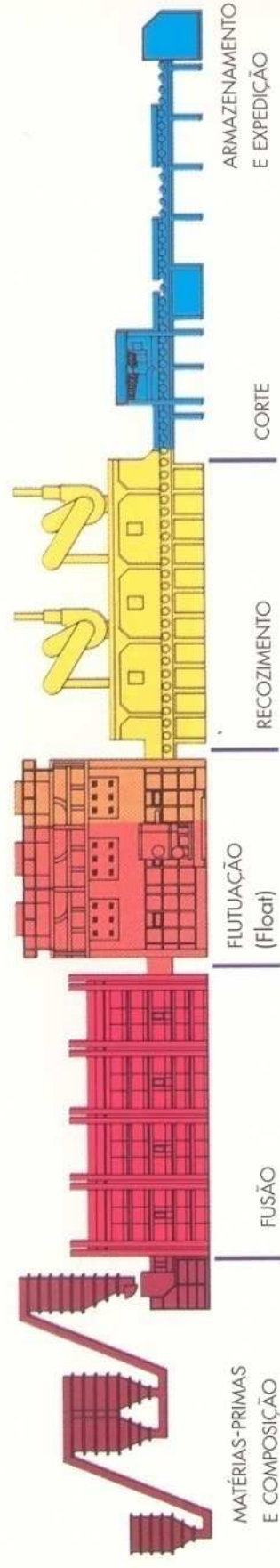
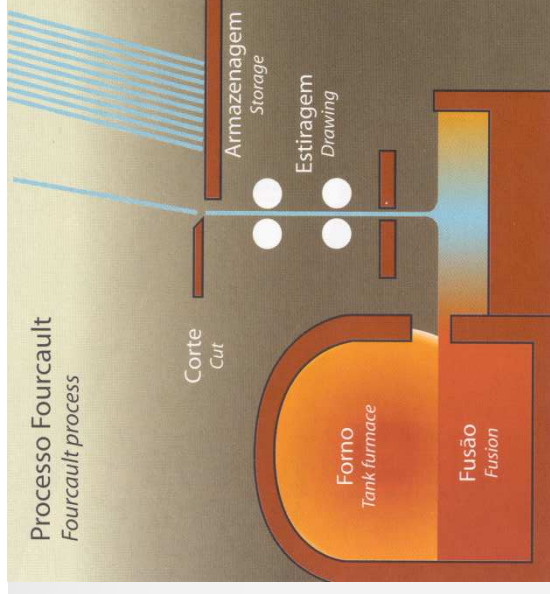
...ajudaram a expandir novos estilos e técnicas na produção de vidro para outras partes da Europa, particularmente França.

... helped expanding new styles and techniques in glassmaking for another parts of Europe, especially France.

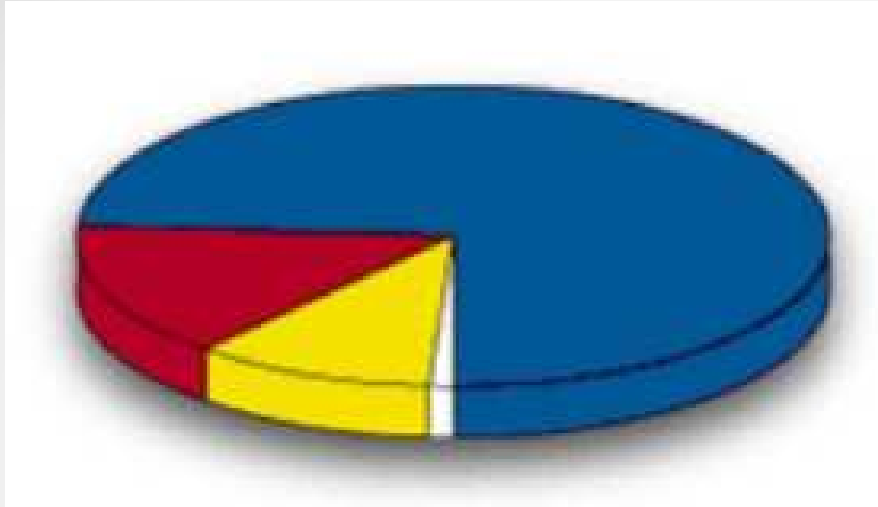


No séc. XIV, os artesãos de Altare, região Romana, ajudaram a expandir técnicas e estilos para outras partes da Europa.

Processo Fourcalt
Fourcalt process



composição SÍLICO-SÓDICO-CÁLCICA.



- **Sílica: 70 % a 72 %**
- **Óxido de Cálcio: 10 %**
- **Óxido de Sódio: 14 %**
- **Óxido / Alumina / Magnésio: 5 %**

Os vidros utilizados na construção Civil têm uma composição SÍLICO-SÓDICO-CÁLCICA.

- ▶ **Um vitrificante, a sílica, sob a forma de areia (70 a 72 %)**
- ▶ **Um fundente, o sódio, sob a forma de carbonato e sulfato (14 %)**
- ▶ **Estabilizantes, à base de óxido de cálcio e magnésio, sob a forma de calcário e dolomite**
- ▶ **Diversos óxidos, como a alumina e a magnésia, que melhoram as propriedades físicas do vidro**
- ▶ **Para certos tipos de vidro, a incorporação de diversos óxidos metálicos, permite conferir-lhes coloração na massa**

Vidro: um material único

Fácil manutenção



Vidro: um material único

Respeita o meio ambiente
100% RECICLÁVEL



Vidro: um material único

Elevada resistência química e
mecânica e longa durabilidade

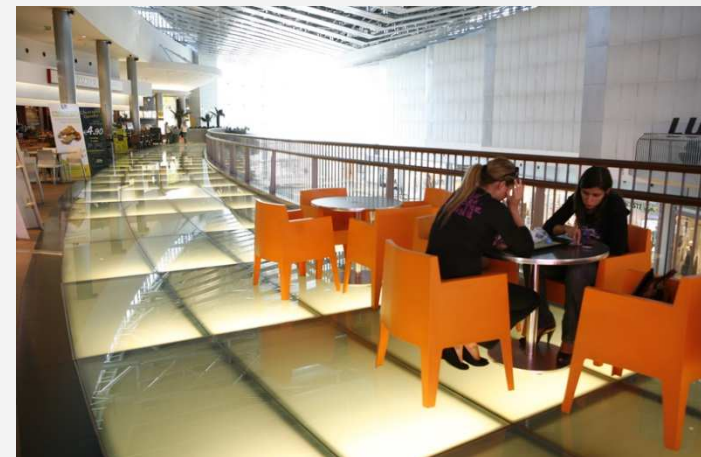


- ▶ VIDRO = INOVAÇÃO
- ▶ VIDRO = PROTECÇÃO DO AMBIENTE
- ▶ VIDRO = ECONOMIA DE ENERGIA / EFICIÊNCIA ENERGÉTICA
- ▶ VIDRO = RECICLÁVEL



VIDRO = CONFORTO

- ▶ ISOLAMENTO TÉRMICO
- ▶ ISOLAMENTO ACÚSTICO
- ▶ SEGURANÇA
- ▶ AUTO-LIMPEZA



Edifícios são o coração do problema

Impactos ambientais



25-40% DE TODA A ENERGIA CONSUMIDA



25-40% LIXO SÓLIDO PRDUZIDO



20% DE TODO O COBSUMO DE ÁGUA



30-40% EFEITO DE ESTUFA POR EMISSÃO DE GASES



A photograph of a modern building at night, featuring a glass facade and a covered walkway with columns. The image is used as a background for the slide.

02

Os nossos
Cientes



Os nossos Clientes

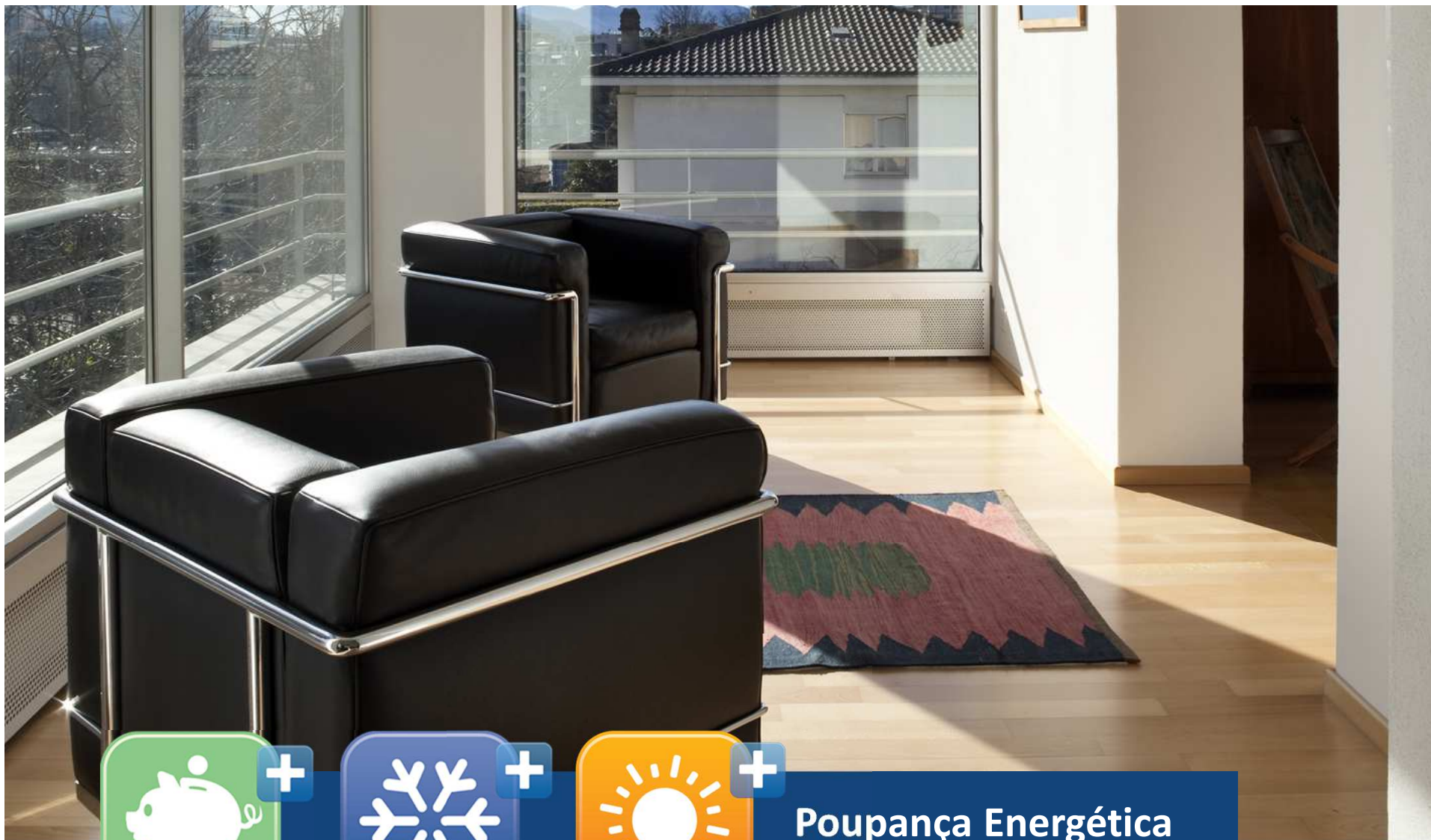
OS NOSSOS CLIENTES SÃO OS PRINCIPAIS ACTORES NO MERCADO DO VIDRO:
ARQUITECTOS, INSTALADORES, TRANSFORMADORES, PRODUTORES E DISTRIBUIDORES
COM ELES, QUEREMOS ATINGIR O OBJECTIVO FINAL:
MELHOR CONFORTO PARA OS UTILISADORES DOS EDIFÍCIOS.



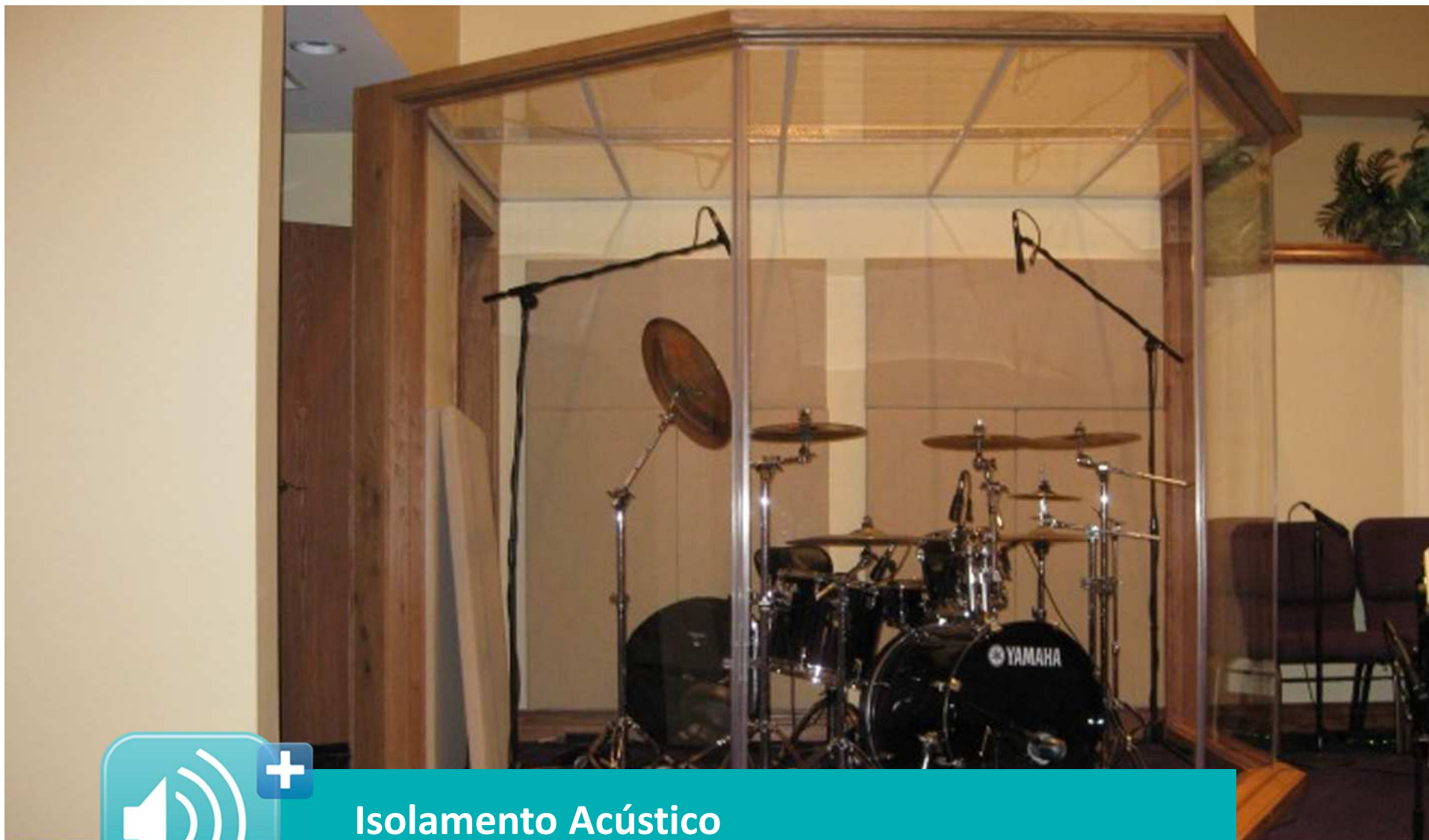
A photograph of a modern glass building at night, with a blue-tinted overlay. The building features a prominent glass facade and a series of vertical columns supporting a walkway. The background shows other tall buildings in a city skyline.

03

As funções chave
que o vidro oferece



Poupança Energética



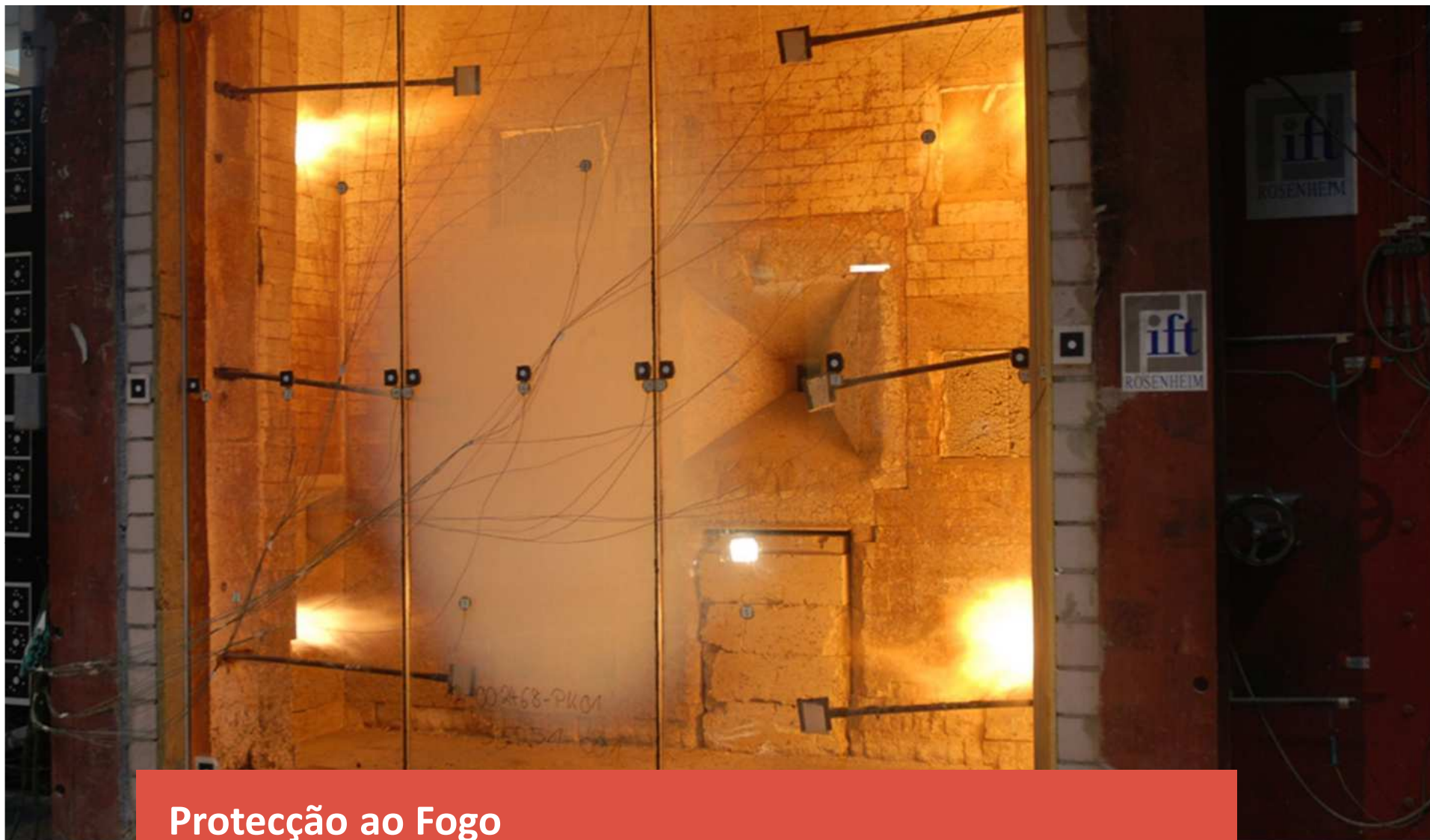
Isolamento Acústico



Segurança



Design & Decoração



Protecção ao Fogo



Iluminação

On

Off



Controlo de Privacidade

Off

On



Day lighting por projecto



04

Business Unit Fachada



**Mercado
Fachadas**

Tendências



Vidro curvo.

Pequenos volumes, grande impacto estético. Curvar vidro de capa é fundamental. Transformadores certificados são a chave.



Fachadas dinâmicas.

Necessários valores g mais dinâmicos . Persianas, taipais, electrocrómicos, capas selectivas . Ao preço de mercado.



Fachada
Em vidro

Vidro de controlo solar
Novos produtos

Vidro – Propriedades Físicas

Vidro Recozido

Obtido por fusão dos seus componentes, sendo à saída do forno sujeito a um tratamento de recozimento para eliminar as tensões Internas.



SGG CLIMALIT®

Vidro Temperado

Obtido a partir do vidro recozido. O vidro é de novo aquecido a 650°C e então submetido a um arrefecimento brusco (têmpera), o que provoca um aumento da sua resistência às tensões mecânicas, além de melhorar as suas condições térmicas. Em caso de ruptura, o vidro fragmenta-se em pequenos bocados limitando o risco de acidente por corte.

Densidade

É de 2,5 o que significa uma massa de 2,5 Kg/m² por mm de espessura para os vidros planos.

Dureza

Tem a dureza 6,5 na escala de Mohs entre a Ortose (6) e o Quartzo (7).

Resistência á Abrasão

É de 16 vezes mais resistente que o granito.



SGG SECURIT®

SGG SECURIT®

Vidro temperado



É um vidro que submetido a um tratamento térmico "têmpera", aumenta consideravelmente a sua resistência aos choques mecânicos e térmicos sem alterar as propriedades espectrofotométricas do produto base.

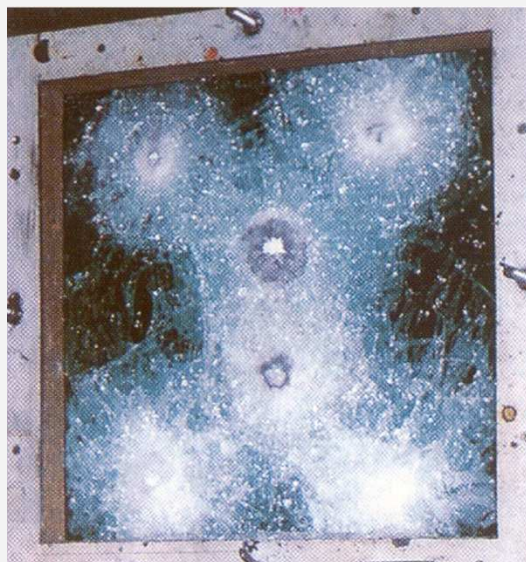
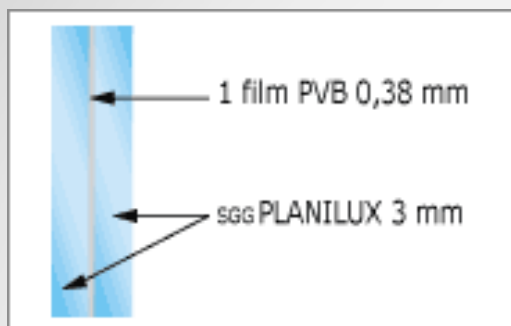
Após este tratamento o vidro é designado SGG SECURIT®

O vidro SGG SECURIT® não pode sofrer corte ou qualquer manufactura. As manufacturas necessárias a executar para determinado projecto, terão de ser realizadas em fábrica antes da têmpera.

EN 12150 – NORMA VIDRO TEMPERADO

SGG STADIP®

Vidro laminado de protecção



Estes vidros laminados de protecção oferecem numerosas soluções para a segurança de pessoas (o vidro fica colado a um filme plástico e provocando menos ferimentos no caso de ruptura) ou de bens (o filme plástico torna mais difícil a violação do espaço).

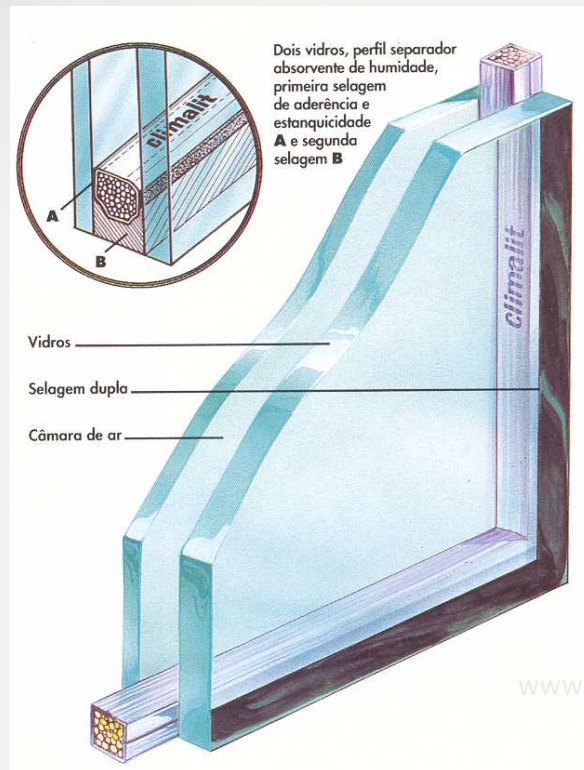
Estes produtos vítreos são conhecidos pelos diferentes níveis de protecção, ao vandalismo, ao roubo, inclusive a armas de fogo.

SGG STADIP® e SGG STADIP PROTECT®

são vidros laminados de protecção em conformidade com a norma EN 12543. São compostos de um ou mais vidros colados entre si através de um ou mais filmes de butiral de polivinil (PVB). Depois da colocação do PVB, é obtida a aderência perfeita por tratamento térmico sob pressão. Em caso de quebra do vidro, os filmes PVB retêm os fragmentos do vidro.

SGG CLIMALIT®

Vidro duplo termo acústico



O Vidro Duplo na construção actual é a resposta :

- ▶ Transparência
- ▶ Conforto térmico e acústico
- ▶ Poupança energética
- ▶ Segurança
- ▶ Controlo ambiental

SGG CLIMALIT® designa o vidro duplo tradicional constituído de dois vidros incolores separados entre si por um perfil metálico que forma uma câmara de ar tratado. Este vidro duplo oferece um Isolamento Térmico aproximadamente duas vezes superior à de um vidro simples. Suas aplicações são bastante vastas na habitação assim como no sector terciário.

O processo consiste em colocar entre os dois vidros uma câmara de ar desidratado ou um gaz que melhora o isolamento. Os dois vidros são separados por um intercaler em alumínio no qual estão contidos agentes desidratantes.

O vidro duplo poderá ser montado segundo a técnica VEP (montagem tradicional) a VEC (vidro exterior colado) para a qual é definida um caderno de encargos específico.

PRINCIPAIS FACTORES A CONSIDERAR NA SELECÇÃO de SGG CLIMALIT ®

Vidro duplo termo acústico

TL - TRANSMISSÃO LUMINOSA

- ▶ Nível percentual de energia luminosa transmitida ao interior admitindo-se , que o raio solar incidente no vidro pelo exterior representa 100% .

U - COEF. TRANSMISSIVIDADE TÉRMICA

- ▶ É a quantidade de energia , transmitida por hora através de um vidro com 1 m² de superfície , quando a diferença de temperatura do ar exterior com o interior é de 1° C .

$$W/m^2.^{\circ}K = 1,17 \text{ kcal}/m^2.h.^{\circ}C$$

Ae - ABSORÇÃO ENERGÉTICA

- ▶ Nível percentual de energia solar absorvida pelo vidro admitindo se , que o raio solar incidente no vidro pelo exterior representa 100%

DETERMINAÇÃO DAS ESPESSURAS

- RAS – Regulamento de Segurança e Acções para Estruturas de Edifícios e Pontes
- DTU 39 ; Timoshenko

Regulamentação para a eficiência energética e acústica nos edifícios

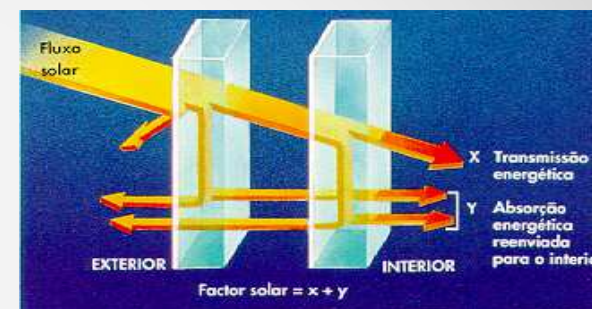
- ▶ Decreto-lei 79/2006 4 de Abril (RCCTE e RSECE)
- ▶ Decreto-lei 129/2002 (REGULAMENTO DOS REQUISITOS ACÚSTICOS DOS EDIFÍCIOS)

SEGURANÇA

Decreto Lei 130 /2013

- Regulamento 765 /2008 do Parlamento Europeu

g - FACTOR SOLAR



SISTEMA DE MONTAGEM

TRADICIONAL – VEP
(vidro montado com bites)
ESTRUTURAL GLAZING – VEC
(vidro exterior colado)
AGRAFADO – VEA
(vidro exterior agrafado)

$_{SGG} CLIMAPLUS / _{SGG} CLIMALIT PLUS$
=
ISOLAMENTO TÉRMICO REFORÇADO
(Vidros Termicamente Eficientes)

A emissividade é uma propriedade de superfície. Quando duas superfícies se encontram, uma em frente à outra, e a temperaturas diferentes, trocam calor por radiação, em função da emissividade. A emissividade normal do vidro clássico é igual a 0,89; a dos vidros com « capa de baixa emissividade » (em ingles low-E) pode atingir 0,03. A emissividade é utilizada para calcular o coeficiente U dos vidros duplos. Ver as gamas SGG COOL-LITE K, SK e SGG PLANITHERM.

ISOLAMENTO TÉRMICO

Vidros ITR: SGG CLIMALIT PLUS com SGG PLANITHERM / PLANISTAR

SGG CLIMALIT

Monolítico



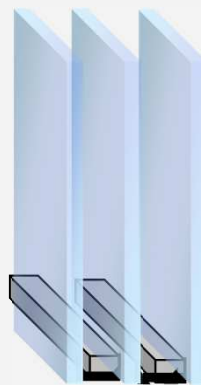
5,7 W/m²K

V.D



3,3 W/m²K
a
2,7 W/m²K

V.T.



2,9 W/m²K
a
1,6 W/m²K

SGG CLIMALIT PLUS

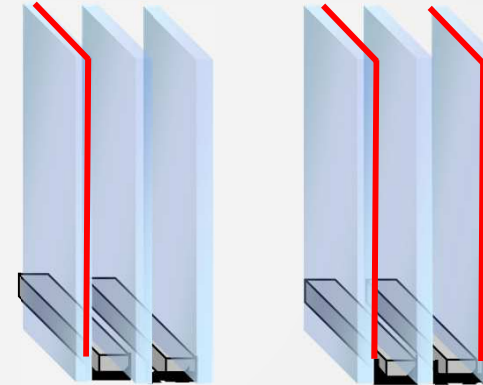
ISOLAMENTO TÉRMICO REFORÇADO (ITR)

Vidro Duplo
ITR



2,5 W/m²K
a
1,0 W/m²K

Vidro Triplo
ITR



2,6 W/m²K
a
0,9 W/m²K

2,0 W/m²K
a
0,5 W/m²K

**MINISTÉRIO DO AMBIENTE, ORDENAMENTO
DO TERRITÓRIO E ENERGIA**

Portaria n.º 379-A/2015

de 22 de outubro

Tabela I.01

**Coefficientes de transmissão térmica superficiais de referência
de elementos opacos e de vãos envidraçados, U_{ref} [W/(m².°C)]**

U _{ref} [W/(m ² .°C)]		Zona Climática					
		Portugal Continental					
Zona corrente da envolvente:		Com a entrada em vigor do presente regulamento			A partir de 1 de janeiro de 2016		
		I1	I2	I3	I1	I2	I3
em contacto com o exterior ou com espaços não úteis com coeficiente de redução de perdas b _{tr} >0.7	Elementos opacos verticais	0,50	0,40	0,35	0,50	0,40	0,35
	Elementos opacos horizontais	0,40	0,35	0,30	0,40	0,35	0,30
em contacto com outros edifícios ou espaços não úteis com coeficiente de redução de perdas b _{tr} ≤0.7	Elementos opacos verticais	1,00	0,80	0,70	0,80	0,70	0,60
	Elementos opacos horizontais	0,80	0,70	0,60	0,60	0,60	0,50
Vãos envidraçados (portas e janelas) (U _w)		2,90	2,60	2,40	2,80	2,40	2,20
Elementos em contacto com o solo		0,50			0,50		
		Regiões Autónomas					
Zona corrente da envolvente:		Com a entrada em vigor do presente regulamento			A partir de 31 de dezembro de 2015		
		I1	I2	I3	I1	I2	I3
em contacto com o exterior ou com espaços não úteis com coeficiente de redução de perdas b _{tr} >0.7	Elementos opacos verticais	0,80	0,65	0,50	0,70	0,60	0,45
	Elementos opacos horizontais	0,55	0,50	0,45	0,45	0,40	0,35
em contacto com outros edifícios ou espaços não úteis com coeficiente de redução de perdas b _{tr} ≤0.7	Elementos opacos verticais	1,60	1,50	1,40	0,90	0,80	0,70
	Elementos opacos horizontais	1,00	0,90	0,80	0,70	0,70	0,60
Vãos envidraçados (portas e janelas) (U _w)		2,90	2,60	2,40	2,80	2,40	2,20
Elementos em contacto com o solo		0,50			0,50		

Nota: Os requisitos de referência indicados na presente tabela, poderão ser progressivamente atualizados até 2020, por forma a incorporar estudos referentes ao custo-benefício dos mesmos, bem como aos níveis definidos para os edifícios de necessidade de energia quase-nulas.

Tabela I.05B

Requisitos energéticos — Coeficientes de transmissão térmica superficiais máximos admissíveis de elementos opacos e de vãos envidraçados, $U_{máx}$ [W/(m².°C)]

$U_{máx}$ [W/(m ² .°C)]		Zona climática		
Portugal Continental				
Zona corrente da envolvente:		A partir de 31 de dezembro 2015		
		I1	I2	I3
em contacto com o exterior ou com espaços não úteis com coeficiente de redução de perdas $b_{tr}>0.7$	Elementos opacos verticais	0,50	0,40	0,35
	Elementos opacos horizontais	0,40	0,35	0,30
Vãos envidraçados (portas e janelas) (U_w)		2,80	2,40	2,20
Regiões Autónomas				
Zona corrente da envolvente:		A partir de 31 de dezembro 2015		
		I1	I2	I3
em contacto com o exterior ou com espaços não úteis com coeficiente de redução de perdas $b_{tr}>0.7$	Elementos opacos verticais	0,70	0,60	0,45
	Elementos opacos horizontais	0,45	0,40	0,35
Vãos envidraçados (portas e janelas) (U_w)		2,80	2,40	2,20

Nota 1: Os requisitos indicados na presente tabela, poderão ser progressivamente atualizados até 2020, por forma a incorporar estudos referentes ao custo-benefício dos mesmos, bem como aos níveis definidos para os edifícios de necessidade de energia quase-nulas.

Nota 2: O cumprimento dos requisitos previstos ao nível dos vãos envidraçados poderá ser avaliado tendo em conta o contributo de eventuais dispositivos de proteção, podendo nesta circunstância basear-se no respetivo valor de U_{wdn} .



Glass industry releases new evidences of glazing benefits to sustainable buildings

Brussels, 10 January 2013: Glass for Europe releases new evidences of glazing benefits to sustainable buildings. The latter were gathered by David Strong Consulting in a recent study on the distinctive benefits of glazing, which highlights the socio-economic contributions of glazed areas to sustainability in the built environment.

"Getting daylight into buildings is a key element of sustainable building design. It not only saves energy but it greatly enhances the health, happiness and well-being of occupants", explained David Strong after having analysed the positive impact of daylight in healthcare, educational buildings, workplace, retails buildings and living places.

"Glass is unique among building materials because of its ability to transmit daylight and sunlight and to provide a view to the outside world. Therefore, glass influences the interior quality of buildings in many more ways than does any other construction material" said Rick Wilberforce, Chairman of the External Relations Committee of Glass for Europe.

Inovação em Capas: Níveis de diferenciação



Performance

Selectividade
Reflectividade
Emissividade



Estética

Cor em reflexão
Cor em transmissão
Homogeneidade da cor (Delta E)



Transformação

Protecção temporária da capa
Robustez da Capa
Produção

Capas Magnetron em vidro float



Mono capa de prata

Planitherm Ultra N
Cool-Lite K



Dupla capa de prata

Cool-Lite SKN
Planistar



Tripla capa de prata

Cool-Lite Xtreme / II

Vidros baixo emissivos (Low E)

SGG PLANITHERM e SGG PLANISTAR ONE

		TL	g	U	I.S.
SGG CLIMALIT PLUS com:					
	SGG PLANISTAR ONE	70	0,38	1,5	1,8
	SGG PLANITHERM 4S II	65	0,43	1,5	1,5
	SGG PLANITHERM ONE II	70	0,49	1,5	1,4
	SGG PLANITHERM XN II	80	0,61	1,6	1,3
SGG CLIMALIT com:					
	Ambos em SGG PLANICLEAR	81	0,76	2,8	1,1

SELECTIVIDADE ↑

Todas as soluções adoptadas são: 6-12-44.1 capa em face 2 e ar tratado

Vidros Termicamente Eficientes

SGG CLIMALIT PLUS 6/12 ar/6 com:	TL	U	g	IS
SGG COOL-LITE XTREME 70/33 II	70	1,54	0,33	2,12
SGG COOL-LITE XTREME 60/28 II	61	1,54	0,29	2,10
SGG COOL-LITE XTREME 50/22 II	47	1,54	0,22	2,14
SGG COOL-LITE SKN 176 II	70	1,54	0,37	1,89
SGG COOL-LITE SKN 154 II	52	1,54	0,29	1,79
SGG COOL-LITE SKN 165 II	61	1,54	0,35	1,74
SGG COOL-LITE SKN 144 II	42	1,61	0,24	1,75

SELECTIVIDADE



Quatro gerações de SGG COOL-LITE

'Selectividade' faz toda a diferença !

XTREME 60/28
60% trans.luminosa
28% factor solar
 $S = 2.14$



SKN 165
60% trans.luminosa
34% factor solar
 $S = 1.79$



KT 164
58% trans.luminosa
47% factor solar
 $S = 1.23$



ST 167
62% trans.luminosa
61% factor solar
 $S = 1.01$





Diferenciação com vidro de controlo solar altamente selectivo

Cool Lite **SKN 144 II** = A ser temperado

Cool Lite **SKN 145** = Não temperável

(Não casa com SKN 145 com SKN144 II)

	TL	RLe	Rli	g	Ug	Selectividade
SGG COOL-LITE SKN145	40%	19%	15%	0,22	1,0	1,82
SGG COOL-LITE SKN144 II	40%	20%	12%	0,23	1,1	1,74



**Diferenciação com vidro
de controlo solar
altamente selectivo**

Aspecto bonito e neutro

	TL	RLe	Rli	g	Ug	Selectividade
SGG COOL-LITE SKN176 II	71%	13%	15%	0,37	1,0	1,89
SGG COOL-LITE SKN174 II *	69%	11%	12%	0,41	1,1	1,68

*foi descontinuado em Junho 2017

A photograph of a modern building with a glass facade, showing multiple floors with balconies and large windows. The building is set against a clear blue sky. A semi-transparent white box is overlaid on the left side of the image, containing text.

Diferenciação com vidro de controlo solar altamente selectivo

A ser temperado
Neutro/aspecto gris

	TL	RLe	Rli	g	Ug	Selectividade
SGG COOL-LITE Xtreme 60/28 II	61%	14%	18%	0,28	1,0	2,14



Diferenciação com vidro
de controlo solar
altamente selectivo

Aspecto extremamente neutro

	TL	RLe	Rli	g	Ug	Selectividade
SGG COOL-LITE Xtreme 70/33 II DGU	70%	14%	16%	0,33	1,0	2,12



Bem Vindo ao CalumenLive

A Ferramenta para todos os Detalhes Técnicos do seu Vidro. CalumenLive é Gratuito e vai ajudá-lo a encontrar o Vidro mais adequado para os seus Projectos

REGISTAR

LOGIN



Simple e Eficiente

As Regras de Cálculo e o Relatório Técnico de CalumenLive são validados pelo Relatório 11923R-



2 Formas de Calcular

Pode usar CalumenLive para encontrar o Vidro que vai de encontro aos seus Requisitos Técnicos ou para



←

→

↺

↻

http://calumenlive.com/home#

CalumenLive

Ficheiro

Editar

Ver Favoritos

Ferramentas

Ajuda

×

Compartilhar navegador

WebEx

Sites Sugeridos

Web Slice Gallery

https--www.bpinet

Portugal

ISO9050 m1.5-2003

ARTUR REYNOLDS BRANDÃO

PT

Bem Vindo ao CalumenLive

A Ferramenta para todos os Detalhes Técnicos do seu Vidro.

Por favor seleccione que Funcionalidade de CalumenLive deseja usar

NEW

http://calumenlive.com/find-glazing

if.atcsg.net

Acesso à Internet

Vodafone-40C9C3

Acesso à Internet

13:37

02-04-2017

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[Compartilhar navegador](#) [WebEx](#)

Sites Sugeridos Web Slice Gallery https://www.bpinet

Calumen Live - Reverse

http://calumenlive.com/find-glazing#

CalumenLive

Portugal EN410-2011 ARTUR REYNOLDS BRANDÃO PT

41 Configurações de Vidro Disponíveis para [EN410-2011]

Clique num Registo para ver os Resultados detalhados

No.	Nome do Vidro	Ug	g	TL	RLe	Rw (C;Ctr)*	RatR	EN356**
1	6 (16 Argon 90) 4 COOL-LITE XTREME 60-28 F2	1.0	28	60	14	34 (-1,-4)	30	NPD
2	6 (16 Argon 90) 10 COOL-LITE XTREME 60-28 F2	1.0	28	59	14	NPD	NPD	NPD
3	6 (16 Argon 90) 4 PLANISTAR ONE F2	1.0	38	72	14	34 (-1,-4)	30	NPD
4	6 (16 Argon 90) 4 COOL-LITE SKN 154 F2	1.0	28	52	19	34 (-1,-4)	30	NPD
5	6 (16 Argon 90) 10 COOL-LITE SKN 154 F2	1.0	28	51	19	NPD	NPD	NPD

II VIDRO DUPLO

CONFORTO NO INVERNO

Ug (W/m².K)

CONFORTO NO VERÃO

g (%)

CONFORTO LUMINOSO

Transmissão Luminosa TL (%)

REFLEXÃO EXTERIOR

DL e (%)

if.atcsg.net
Acesso à Internet

Vodafone-40/C9C3
Acesso à Internet

1339 02-04-2017

The screenshot displays the Google Play Store interface for the 'Glass Compass' app. The app is developed by Saint-Gobain and is currently 'Unrated' with 134 reviews. The interface includes a top navigation bar with options like 'Apps', 'My apps', 'Shop', 'Games', 'Family', 'Editors' Choice', 'Account', 'Redeem', 'My wishlist', 'My Play activity', and 'Parent Guide'. The app details section shows the app icon, name, developer, and a green 'Install' button. Below the app details, there are sections for 'Similar' apps, including 'Glass Vision' and 'Saint-Gobain Sh...'. The bottom of the screen shows a Windows taskbar with various icons and a system clock displaying 00:08 on 12-09-2017.

Seleccione & simule o Controlo Solar – Onde quer que esteja

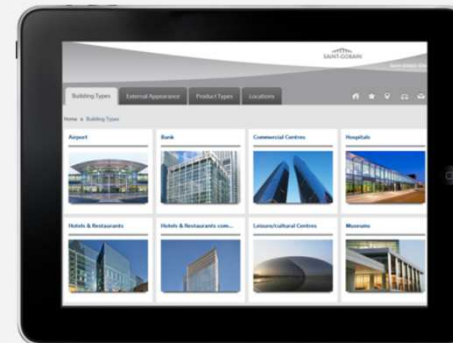
GLASS Pro

Rendimento de cor
virtual



GLASS Façade

Fototeca



CONFORTO, POUÇANÇA E COMPROMISSO COM O MEIO AMBIENTE

O seu vidro em
3 PASSOS

Acesso Fabricantes

INICIO

CLIMALIT PLUS

JANELAS

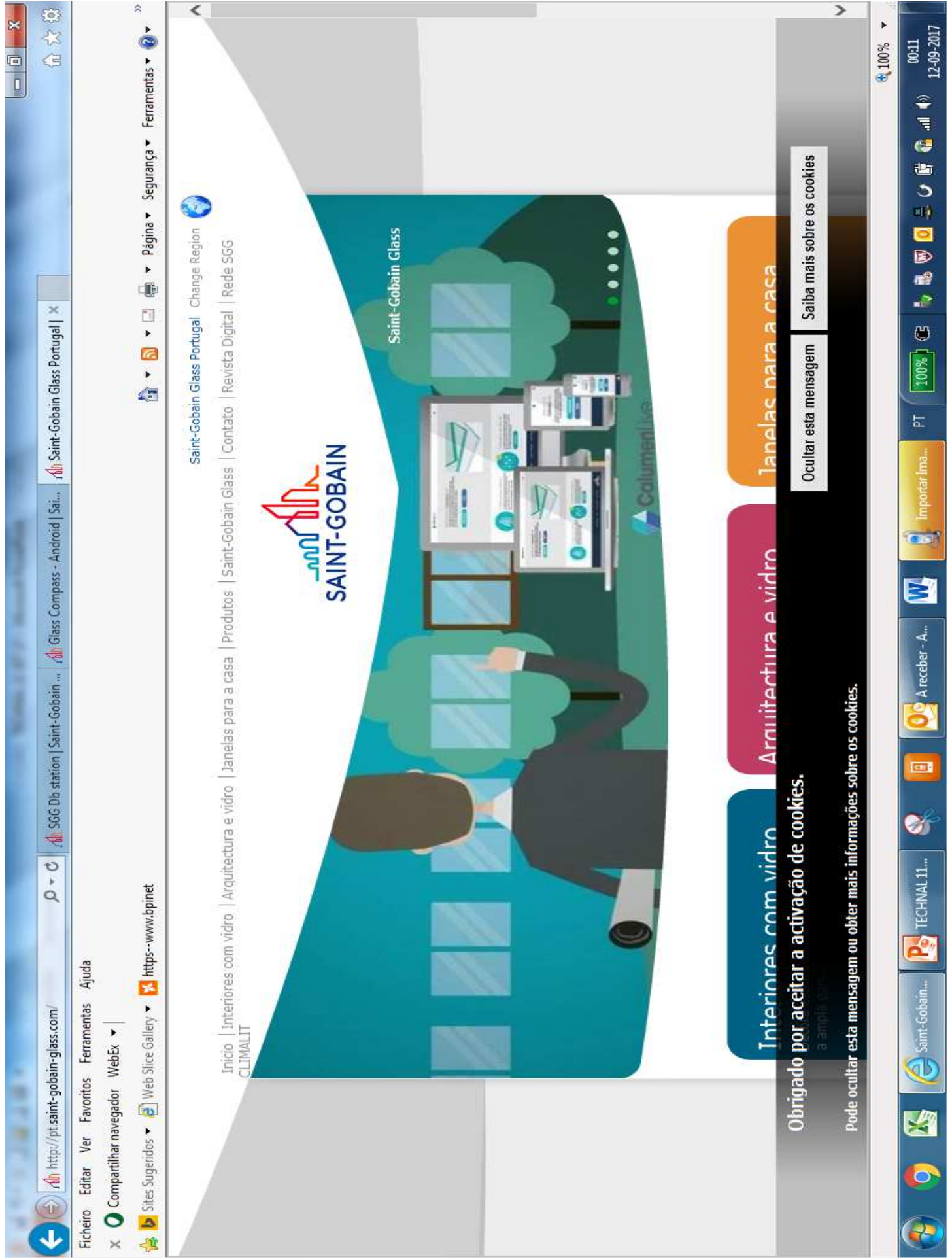
BENEFICIOS

FABRICANTES

Escolha o seu vidro
ideal em apenas 3
passos

Use de cookies

ACETABULAR

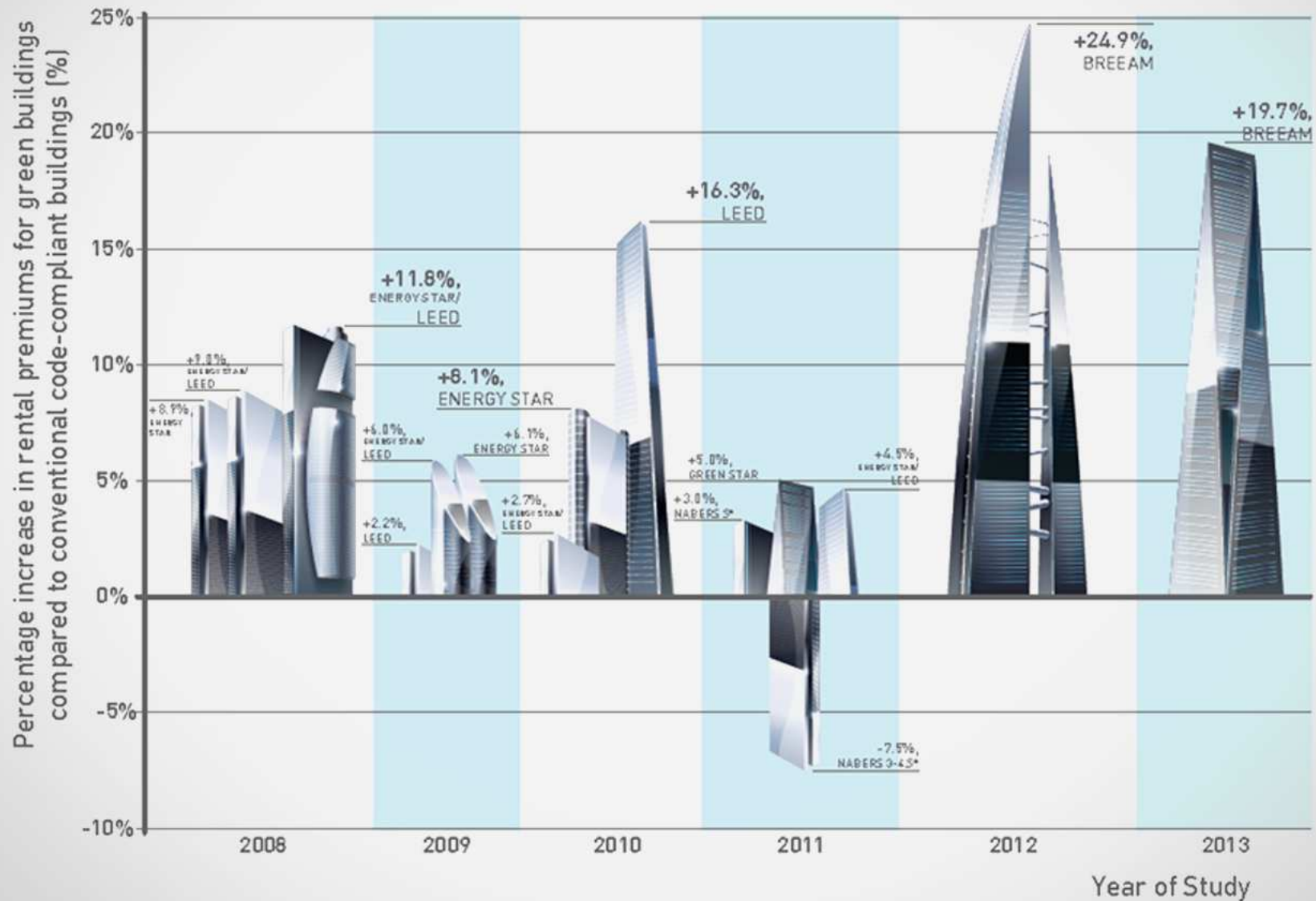


A photograph of a modern building with a series of peaked roofs and large glass facades, illuminated from within at dusk. The sky is a deep blue. In the foreground, a curved path made of light-colored stones leads towards the building, flanked by low-lying green vegetation.

Going Green

**Avaliações do Ciclo de vida
Declaração ambiental de produto**

Ganhe mais dinheiro com edifícios verdes







SAINT-GOBAIN
GLASS



GLASSOLUTIONS
SAINT-GOBAIN

OCTOBER 2012

Environmental Product Declaration

In conformity with International Standards ISO 14025, ISO 14040 & ISO 14044

AFNOR Registration Number N° 08-262: 2011

SGG CLIMAPLUS® SOLAR CONTROL

6-12-6 mm

Solar control and Low Emissivity Double Glazed Units

Others configuration studied:

- 6-16-6 mm
- 8-16-6 mm
- 8-16-44.2 mm
- 10-16-66.2 mm
- 12-16-44.2 mm

The environmental impacts of this product have been assessed over its whole life cycle.

Its Environmental Product Declaration has been verified by an independent third party.





Version n°2.3

Download all our EPDs:

[illegible]

Definitions

4. Product contribution to assessing health risks and quality of life inside buildings in accordance with NF P-01-010 §7		
Product contribution	Related paragraph	Explanations (conversion values, considerations...)
Indoor air quality	§ 4.1.1	VOC: emissions (mg/m ² /day) a) polyurethane (VOC = 20 µg/m ³) (standard 0.071 mg/m ³ at 23°C) b) polyurethane seal VOC = 1 (µg/m ³) (standard 0.001 mg/m ³) Refrigerants: emissions as natural refrigerants measured
		Fluoro and particulate emissions: not relevant for glass
To assess health risks		Minor-organisms and mould: some residues can be on the glass surface, but they do not produce air degradation. These impacts may be considered as negligible (EN 12460, EN 121666)
Water quality		There is no impact. No migration of glass components takes in contact with water (EN 12460, EN 121666)
Hygrothermal comfort	§ 4.2.1	Contribution to thermal comfort due to diurnal insulation (EN 15103: 1.0 to 1.6 U-value), contribution to thermal comfort due to radiation (EN 15103: 0.01 to 0.02 U-value), distortion of the cold wall phenomenon and contribution to the surface of the glass in deep rooms
To the quality of life	§ 4.2.2	Contribution to acoustic comfort (EN 15103: 0.01 to 0.02 U-value) Contribution to visual comfort (average range: light, according to surface colour and luminance in depth...) a) daylight factor (EN 15103: 0.01 to 0.02 U-value) b) daylight factor (EN 15103: 0.01 to 0.02 U-value) c) daylight factor (EN 15103: 0.01 to 0.02 U-value) d) daylight factor (EN 15103: 0.01 to 0.02 U-value) e) daylight factor (EN 15103: 0.01 to 0.02 U-value) f) daylight factor (EN 15103: 0.01 to 0.02 U-value) g) daylight factor (EN 15103: 0.01 to 0.02 U-value) h) daylight factor (EN 15103: 0.01 to 0.02 U-value) i) daylight factor (EN 15103: 0.01 to 0.02 U-value) j) daylight factor (EN 15103: 0.01 to 0.02 U-value) k) daylight factor (EN 15103: 0.01 to 0.02 U-value) l) daylight factor (EN 15103: 0.01 to 0.02 U-value) m) daylight factor (EN 15103: 0.01 to 0.02 U-value) n) daylight factor (EN 15103: 0.01 to 0.02 U-value) o) daylight factor (EN 15103: 0.01 to 0.02 U-value) p) daylight factor (EN 15103: 0.01 to 0.02 U-value) q) daylight factor (EN 15103: 0.01 to 0.02 U-value) r) daylight factor (EN 15103: 0.01 to 0.02 U-value) s) daylight factor (EN 15103: 0.01 to 0.02 U-value) t) daylight factor (EN 15103: 0.01 to 0.02 U-value) u) daylight factor (EN 15103: 0.01 to 0.02 U-value) v) daylight factor (EN 15103: 0.01 to 0.02 U-value) w) daylight factor (EN 15103: 0.01 to 0.02 U-value) x) daylight factor (EN 15103: 0.01 to 0.02 U-value) y) daylight factor (EN 15103: 0.01 to 0.02 U-value) z) daylight factor (EN 15103: 0.01 to 0.02 U-value)
Visual comfort	§ 4.2.3	Contribution to visual comfort (average range: light, according to surface colour and luminance in depth...)
Acoustic comfort	§ 4.2.4	Contribution to acoustic comfort (EN 15103: 0.01 to 0.02 U-value)
Thermal comfort	§ 4.2.5	Contribution to thermal comfort (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.6	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.7	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.8	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.9	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.10	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.11	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.12	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.13	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.14	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.15	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.16	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.17	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.18	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.19	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.20	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.21	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.22	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.23	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.24	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.25	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.26	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.27	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.28	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.29	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.30	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.31	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.32	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.33	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.34	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.35	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.36	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.37	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.38	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.39	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.40	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.41	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.42	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.43	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.44	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.45	Contribution to indoor space (average range: light, according to surface colour and luminance in depth...)
Indoor atmosphere	§ 4.2.46	Contribution to indoor atmosphere (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.47	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor climate	§ 4.2.48	Contribution to indoor climate (average range: light, according to surface colour and luminance in depth...)
Indoor air quality	§ 4.2.49	Contribution to indoor air quality (average range: light, according to surface colour and luminance in depth...)
Indoor environment	§ 4.2.50	Contribution to indoor environment (average range: light, according to surface colour and luminance in depth...)
Indoor space	§ 4.2.51	Contribution to indoor space (average range: light, according to surface colour and

Health data

3. Environmental impacts representative of construction products in accordance with NF P 01-010					
No	Environmental impact	Indicator rate by the Reference Life			
		4-16	6-16	4-12	4-15
1	Consumption of energy resources	6.16	6.16	6.16	6.16
2	Consumption of energy resources	16.1	21.5	15.3	18.4
3	Renewable energy	0.013	0.013	0.013	0.013
4	Fossil energy	2.4	2.7	1.4	1.7
5	Renewable energy	0.02	0.02	0.02	0.02
6	Fossil energy	0.01	0.01	0.01	0.01
7	Global warming potential	0.01	0.01	0.01	0.01
8	Acidification potential	0.01	0.01	0.01	0.01
9	Global warming potential	0.01	0.01	0.01	0.01
10	Acidification potential	0.01	0.01	0.01	0.01
11	Global warming potential	0.01	0.01	0.01	0.01
12	Acidification potential	0.01	0.01	0.01	0.01
13	Global warming potential	0.01	0.01	0.01	0.01
14	Acidification potential	0.01	0.01	0.01	0.01
15	Global warming potential	0.01	0.01	0.01	0.01
16	Acidification potential	0.01	0.01	0.01	0.01
17	Global warming potential	0.01	0.01	0.01	0.01
18	Acidification potential	0.01	0.01	0.01	0.01
19	Global warming potential	0.01	0.01	0.01	0.01
20	Acidification potential	0.01	0.01	0.01	0.01
21	Global warming potential	0.01	0.01	0.01	0.01
22	Acidification potential	0.01	0.01	0.01	0.01
23	Global warming potential	0.01	0.01	0.01	0.01
24	Acidification potential	0.01	0.01	0.01	0.01
25	Global warming potential	0.01	0.01	0.01	0.01
26	Acidification potential	0.01	0.01	0.01	0.01
27	Global warming potential	0.01	0.01	0.01	0.01
28	Acidification potential	0.01	0.01	0.01	0.01
29	Global warming potential	0.01	0.01	0.01	0.01
30	Acidification potential	0.01	0.01	0.01	0.01
31	Global warming potential	0.01	0.01	0.01	0.01
32	Acidification potential	0.01	0.01	0.01	0.01
33	Global warming potential	0.01	0.01	0.01	0.01
34	Acidification potential	0.01	0.01	0.01	0.01
35	Global warming potential	0.01	0.01	0.01	0.01
36	Acidification potential	0.01	0.01	0.01	0.01
37	Global warming potential	0.01	0.01	0.01	0.01
38	Acidification potential	0.01	0.01	0.01	0.01
39	Global warming potential	0.01	0.01	0.01	0.01
40	Acidification potential	0.01	0.01	0.01	0.01
41	Global warming potential	0.01	0.01	0.01	0.01
42	Acidification potential	0.01	0.01	0.01	0.01
43	Global warming potential	0.01	0.01	0.01	0.01
44	Acidification potential	0.01	0.01	0.01	0.01
45	Global warming potential	0.01	0.01	0.01	0.01
46	Acidification potential	0.01	0.01	0.01	0.01
47	Global warming potential	0.01	0.01	0.01	0.01
48	Acidification potential	0.01	0.01	0.01	0.01
49	Global warming potential	0.01	0.01	0.01	0.01
50	Acidification potential	0.01	0.01	0.01	0.01
51	Global warming potential	0.01	0.01	0.01	0.01
52	Acidification potential	0.01	0.01	0.01	0.01
53	Global warming potential	0.01	0.01	0.01	0.01
54	Acidification potential	0.01	0.01	0.01	0.01
55	Global warming potential	0.01	0.01	0.01	0.01
56	Acidification potential	0.01	0.01	0.01	0.01
57	Global warming potential	0.01	0.01	0.01	0.01
58	Acidification potential	0.01	0.01	0.01	0.01
59	Global warming potential	0.01	0.01	0.01	0.01
60	Acidification potential	0.01	0.01	0.01	0.01
61	Global warming potential	0.01	0.01	0.01	0.01
62	Acidification potential	0.01	0.01	0.01	0.01
63	Global warming potential	0.01	0.01	0.01	0.01
64	Acidification potential	0.01	0.01	0.01	0.01
65	Global warming potential	0.01	0.01	0.01	0.01
66	Acidification potential	0.01	0.01	0.01	0.01
67	Global warming potential	0.01	0.01	0.01	0.01
68	Acidification potential	0.01	0.01	0.01	0.01
69	Global warming potential	0.01	0.01	0.01	0.01
70	Acidification potential	0.01	0.01	0.01	0.01
71	Global warming potential	0.01	0.01	0.01	0.01
72	Acidification potential	0.01	0.01	0.01	0.01
73	Global warming potential	0.01	0.01	0.01	0.01
74	Acidification potential	0.01	0.01	0.01	0.01
75	Global warming potential	0.01	0.01	0.01	0.01
76	Acidification potential	0.01	0.01	0.01	0.01
77	Global warming potential	0.01	0.01	0.01	0.01
78	Acidification potential	0.01	0.01	0.01	0.01
79	Global warming potential	0.01	0.01	0.01	0.01
80	Acidification potential	0.01	0.01	0.01	0.01
81	Global warming potential	0.01	0.01	0.01	0.01
82	Acidification potential	0.01	0.01	0.01	0.01
83	Global warming potential	0.01	0.01	0.01	0.01
84	Acidification potential	0.01	0.01	0.01	0.01
85	Global warming potential	0.01	0.01	0.01	0.01
86	Acidification potential	0.01	0.01	0.01	0.01
87	Global warming potential	0.01	0.01	0.01	0.01
88	Acidification potential	0.01	0.01	0.01	0.01
89	Global warming potential	0.01	0.01	0.01	0.01
90	Acidification potential	0.01	0.01	0.01	0.01
91	Global warming potential	0.01	0.01	0.01	0.01
92	Acidification potential	0.01	0.01	0.01	0.01
93	Global warming potential	0.01	0.01	0.01	0.01
94	Acidification potential	0.01	0.01	0.01	0.01
95	Global warming potential	0.01	0.01	0.01	0.01
96	Acidification potential	0.01	0.01	0.01	0.01
97	Global warming potential	0.01	0.01	0.01	0.01
98	Acidification potential	0.01	0.01	0.01	0.01
99	Global warming potential	0.01	0.01	0.01	0.01
100	Acidification potential	0.01	0.01	0.01	0.01
101	Global warming potential	0.01	0.01	0.01	0.01
102	Acidification potential	0.01	0.01	0.01	0.01
103	Global warming potential	0.01	0.01	0.01	0.01
104	Acidification potential	0.01	0.01	0.01	0.01
105	Global warming potential	0.01	0.01	0.01	0.01
106	Acidification potential	0.01	0.01	0.01	0.01
107	Global warming potential	0.01	0.01	0.01	0.01
108	Acidification potential	0.01	0.01	0.01	0.01
109	Global warming potential	0.01	0.01	0.01	0.01
110	Acidification potential	0.01	0.01	0.01	0.01
111	Global warming potential	0.01	0.01	0.01	0.01
112	Acidification potential	0.01	0.01	0.01	0.01
113	Global warming potential	0.01	0.01	0.01	0.01
114	Acidification potential	0.01	0.01	0.01	0.01
115	Global warming potential	0.01	0.01	0.01	0.01
116	Acidification potential	0.01	0.01	0.01	0.01
117	Global warming potential	0.01	0.01	0.01	0.01
118	Acidification potential	0.01	0.01	0.01	0.01
119	Global warming potential	0.01	0.01	0.01	0.01
120	Acidification potential	0.01	0.01	0.01	0.01
121	Global warming potential	0.01	0.01	0.01	0.01
122	Acidification potential	0.01	0.01	0.01	0.01
123	Global warming potential	0.01	0.01	0.01	0.01
124	Acidification potential	0.01	0.01	0.01	0.01
125	Global warming potential	0.01	0.01	0.01	0.01
126	Acidification potential	0.01	0.01	0.01	0.01
127	Global warming potential	0.01	0.01	0.01	0.01
128	Acidification potential	0.01	0.01	0.01	0.01
129	Global warming potential	0.01	0.01	0.01	0.01
130	Acidification potential	0.01	0.01	0.01	0.01
131	Global warming potential	0.01	0.01	0.01	0.01
132	Acidification potential	0.01	0.01	0.01	0.01
133	Global warming potential	0.01	0.01	0.01	0.01
134	Acidification potential	0.01	0.01	0.01	0.01
135	Global warming potential	0.01	0.01	0.01	0.01
136	Acidification potential	0.01	0.01	0.01	0.01
137	Global warming potential	0.01	0.01	0.01	0.01
138	Acidification potential	0.01	0.01	0.01	0.01
139	Global warming potential	0.01	0.01	0.01	0.01
140	Acidification potential	0.01	0.01	0.01	0.01
141	Global warming potential	0.01	0.01	0.01	0.01
142	Acidification potential	0.01	0.01	0.01	0.01
143	Global warming potential	0.01	0.01	0.01	0.01
144	Acidification potential	0.01	0.01	0.01	0.01
145	Global warming potential	0.01	0.01	0.01	0.01
146	Acidification potential	0.01	0.01	0.01	0.01
147	Global warming potential	0.01	0.01	0.01	0.01
148	Acidification potential	0.01	0.01	0.01	0.01
149	Global warming potential	0.01	0.01	0.01	0.01
150	Acidification potential	0.01	0.01	0.01	0.01
151	Global warming potential	0.01	0.01	0.01	0.01
152	Acidification potential	0.01	0.01	0.01	0.01
153	Global warming potential	0.01	0.01	0.01	0.01
154	Acidification potential	0.01	0.01	0.01	0.01
155	Global warming potential	0.01	0.01	0.01	0.01
156	Acidification potential	0.01	0.01	0.01	0.01
157	Global warming potential	0.01	0.01	0.01	0.01
158	Acidification potential	0.01	0.01	0.01	0.01
159	Global warming potential	0.01	0.01	0.01	0.01
160	Acidification potential	0.01	0.01	0.01	0.01
161	Global warming potential	0.01	0.01	0.01	0.01
162	Acidification potential	0.01	0.01	0.01	0.01
163	Global warming potential	0.01	0.01	0.01	0.01
164	Acidification potential	0.01	0.01	0.01	0.01
165	Global warming potential	0.01	0.01	0.01	0.01
166	Acidification potential	0.01	0.01	0.01	0.01
167	Global warming potential	0.01	0.01	0.01	0.01
168	Acidification potential	0.01	0.01	0.01	0.01
169	Global warming potential	0.01	0.01	0.01	0.01
170	Acidification potential	0.01	0.01	0.01	0.01
171	Global warming potential	0.01	0.01	0.01	0.01
172	Acidification potential	0.01	0.01	0.01	0.01
173	Global warming potential	0.01	0.01	0.01	0.01
174	Acidification potential	0.01	0.01	0.01	0.01
175	Global warming potential	0.01	0.01	0.01	0.01
176	Acidification potential	0.01	0.01	0.01	0.01
177	Global warming potential	0.01	0.01	0.01	0.01
178	Acidification potential	0.01	0.01	0.01	0.01
179	Global warming potential	0.01	0.01	0.01	0.01
180	Acidification potential	0.01	0.01	0.01	0.01
181	Global warming potential	0.01	0.01	0.01	0.01
182	Acidification potential	0.01	0.01	0.01	0.01
183	Global warming potential	0.01	0.01	0.01	0.01
184	Acidification potential	0.01	0.01	0.01	0.01
185	Global warming potential	0.01	0.01	0.01	0.01
186	Acidification potential	0.01	0.01	0.01	0.01
187	Global warming potential	0.01	0.01	0.01	0.01
188	Acidification potential	0.01	0.01	0.01	0.01
189	Global warming potential	0.01	0.01	0.01	0.01
190	Acidification potential	0.01	0.01	0.01	0.01
191	Global warming potential	0.01	0.01	0.01	0.01
192	Acidification potential	0.01	0.01	0.01	0.01
193	Global warming potential	0.01	0.01	0.01	0.01
194	Acidification potential	0.01	0.01	0.01	0.01
195	Global warming potential	0.01	0.01	0.01	0.01
196	Acidification potential	0.01	0.01	0.01	0.01
197	Global warming potential	0.01	0.01	0.01	0.01
198	Acidification potential	0.01	0.01	0.01	0.01
199	Global warming potential	0.01	0.01	0.01	0.01
200	Acidification potential	0.01	0.01	0.01	0.01
201	Global warming potential	0.01	0.01	0.01	0.01
202	Acidification potential	0.01	0.01	0.01	0.01
203	Global warming potential	0.01	0.01	0.01	0.01
204	Acidification potential	0.01	0.01	0.01	0.01
205	Global warming potential	0.01	0.01	0.01	0.01
206	Acidification potential	0.01	0.01	0.01	0.01
207	Global warming potential	0.01	0.01	0.01	0.01
208	Acidification potential	0.01	0.01	0.01	0.01
209	Global warming potential	0.01	0.01	0.01	0.01
210	Acidification potential	0.01	0.01	0.01	0.01
211	Global warming potential	0.01	0.01	0.01	0.01
212	Acidification potential	0.01	0.01	0.01	0.01
213	Global warming potential	0.01	0.01	0.01	0.01
214	Acidification potential	0.01	0.01	0.01	0.01
215	Global warming potential	0.01	0.01	0.01	0.01
216	Acidification potential	0.01	0.01	0.01	0.01
217	Global warming potential	0.01	0.01	0.01	0.01
218	Acidification potential	0.01	0.01	0.01	0.01
219	Global warming potential	0.01	0.01	0.01	0.01
220					

Eco data

5. Additional information

NEP 010-010 is the Product Category Index for this EPEAT rating.

A DGR from the SCS CDWAPR-0101 can be used to verify the environmental benefits derived from energy savings resulting from using a SCS CDWAPR-0101 in a single phase, after deducting the environmental impacts associated with producing the DGR.

N°	Environmental impact	Indicator value for Reference Service Life	Indicator value for Reference Service Life	Units
1	Consumption of green electricity	-	-	-
2	Total primary energy	404	63 739	MJ
3	Renewable energy	203	2 501	MJ
4	Non-renewable energy	201	59 238	MJ
5	Depletion of natural resources (NDP)	0.190	54.0	kg neptunium (238U)
6	Total water consumption	244	9 447	l
7	Solid waste	-	-	kg
8	Recovered waste (bottle)	1.132	0	kg
9	Waste deposited at hazardous waste	3.851	6.17	kg
10	Non-hazardous waste	1.101	0	kg
11	Biodegradable waste	0.05	7.09	kg
12	Recycled waste	0.000	0.000	kg
13	Climate change	314	1 339	kg neptunium (238U)
14	Atmospheric acidification	0.203	8.78	kg neptunium (238U)
15	Acid equivalent	1.992	74.18	kg neptunium (238U)
16	Water pollution	3.76	303	g
17	Stratospheric ozone depletion	1.39E-010	0	kg neptunium (238U)

On average, 70% of the weight of a glass pane produced by SAINT-GOBAIN GLASS comes from internally recycled cullet (compared to 20% 10 years ago).

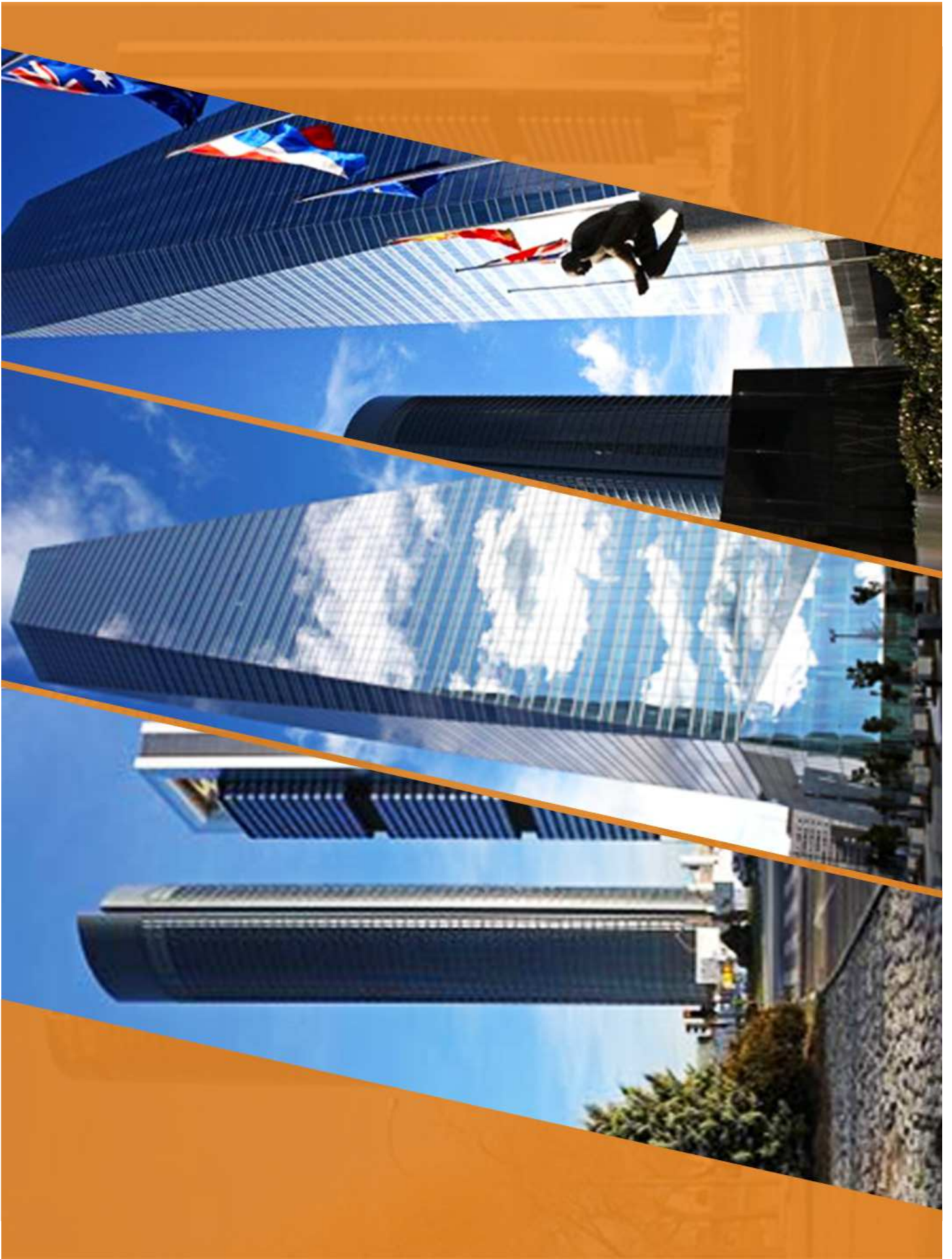
Chatter from DGEAs can be recycled in a glass furnace after treatment to separate the glass from mastics and spacers. Nevertheless, however, nearly 99% of glass at the end of life goes to landfill due to a lack of dismantling, sorting and collecting networks. The useful ratio of glass at the end of life is thus only 5%.

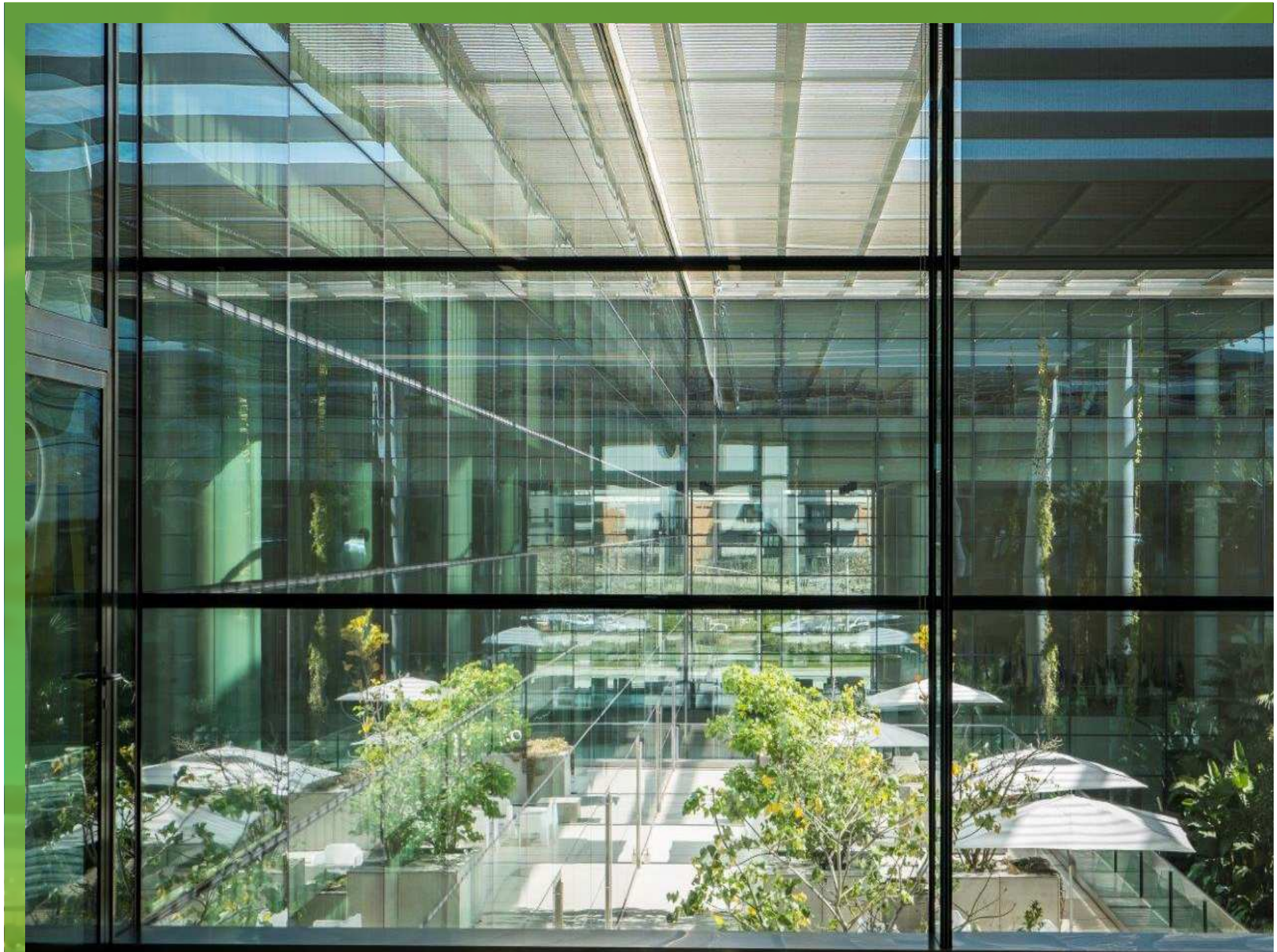
Eco-management and env. policy

A photograph of a modern building at night, featuring a glass facade and a prominent overhang. The building is illuminated from within, and the sky is dark. The image is used as a background for the left side of the slide.

05

Projectos Referência





SGG COOL-LITE XTREME®







Metropolis Luanda

- 6.200 m²
- Product: SGG CLIMALIT
- Client: Efangol/Bysteel

CENTRO CULTURAL DE BELÉM

Belém Centro Cultural de Belém
Projeto de Arquitetura: Gregotti Associati e KKKO S.A.
Arquiteto: Bruno Zevi, Oscar Niemeyer, KKKO S.A.
COORDENAÇÃO: com GRADUADO de Belém
Colaboração: Arquitetura: Fernando Costa / FCA-BO
Arquitetura: Pincusbury



PROJECT REFERENCES



LIDL Sacavém

Produto: SGG CLIMALIT PLUS COOL-LITE SKN 154 II

Cliente: Seveme

■ SEDE BBVA Madrid

- Execution: 2015
- Architec: Herzog & de Meuron con Ortiz y León.
- Client: PERMASTELISA
- Product:
 - SGG COOL-LITE SKN 065 Diamant
- 25.000 m²





Centro das Artes de Águeda

- 600 m²
- Produto SGG CLIMALIT / SGG SERALIT
- Cliente Seveme

HOVIONE Loures

- 1400 m²
- Produto SGG CLIMALIT FIRE
- Cliente Ribeiro e Rocha





EDP MAAT Lisboa

725 m2

Produto SGG CLIMALIT PLUS COOL-LITE SKN 044 II

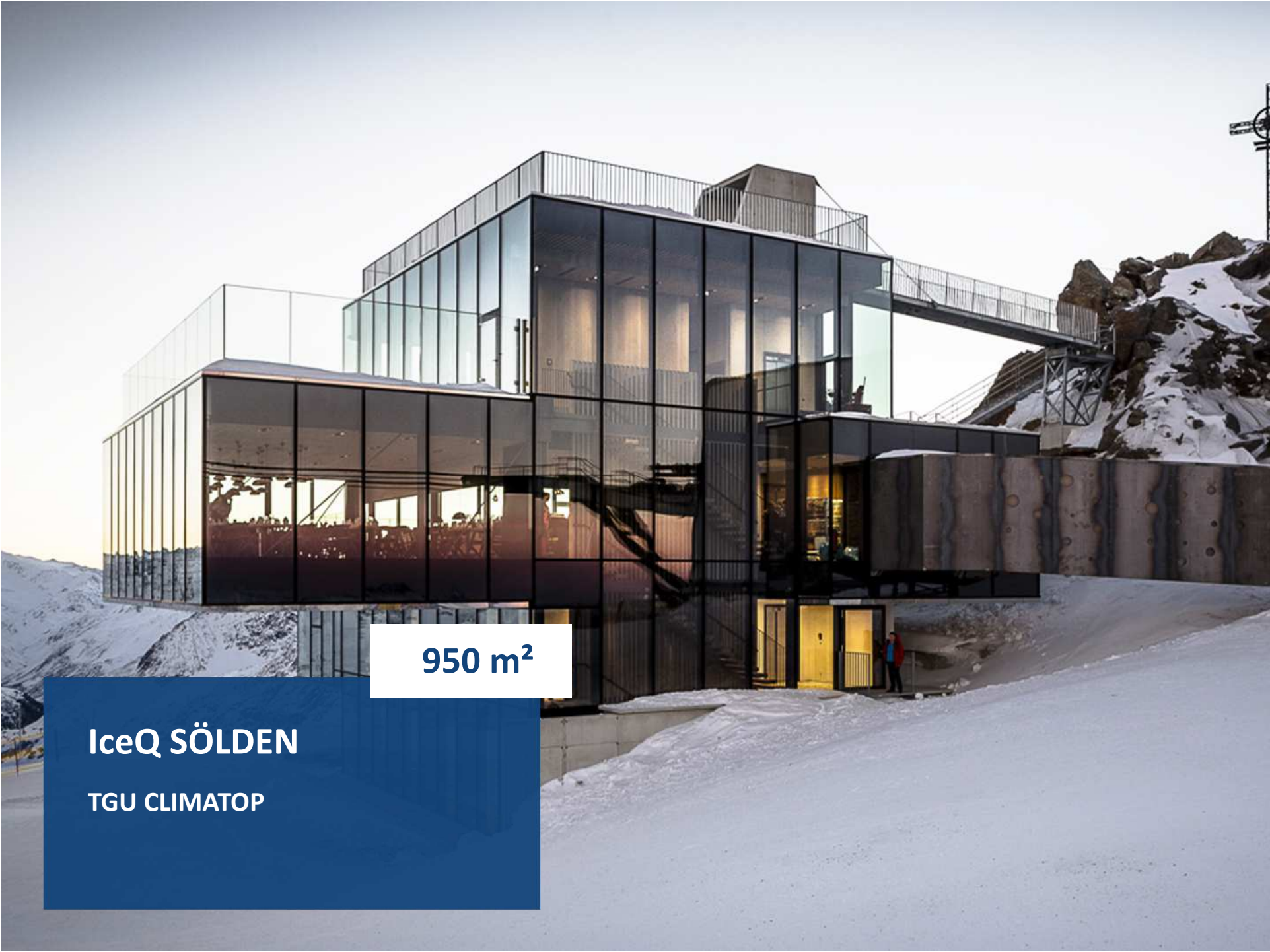
Cliente Vidromax

A photograph of the New Acropolis Museum in Athens, Greece. The museum is a modern building with a large glass facade that reflects the surrounding landscape and the Parthenon on the Acropolis in the background. The Parthenon is a large, ancient Greek temple dedicated to the goddess Athena, situated on the Acropolis of Athens. The sky is blue with some light clouds. The museum's glass facade is composed of large panels held together by dark metal frames. The Parthenon is visible through the glass, appearing as a reflection. The overall scene is a blend of ancient and modern architecture.

NEW ACROPOLIS MUSEUM

IGU, VARIO, STADIP, screen printing

11.000 m²

A modern, multi-story building with a glass and metal facade, situated on a snowy mountain slope. The building features a prominent glass staircase and a glass-enclosed elevator shaft. A walkway with a metal railing extends from the building towards a rocky, snow-covered peak in the background. The sky is a pale, overcast blue.

950 m²

IceQ SÖLDEN

TGU CLIMATOP



3.550 m²

HÖFE AM BRÜHL

IGU CLIMAPLUS ULTRA N with
golden screen printing



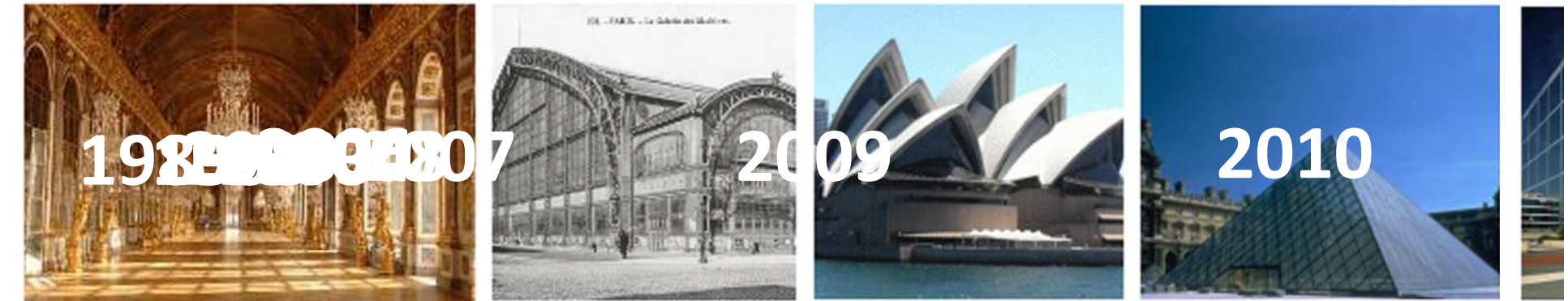
15.000 m²

432 PARK AVENUE NY

**IGU CLIMAPLUS SOLAR CONTROL
oversize 3x3m**



SGG CLIMALIT PLUS com SGG COOL-LITE SKN 154 II



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