



# THERMOBEL

Insulating  
glazing

**AGC**

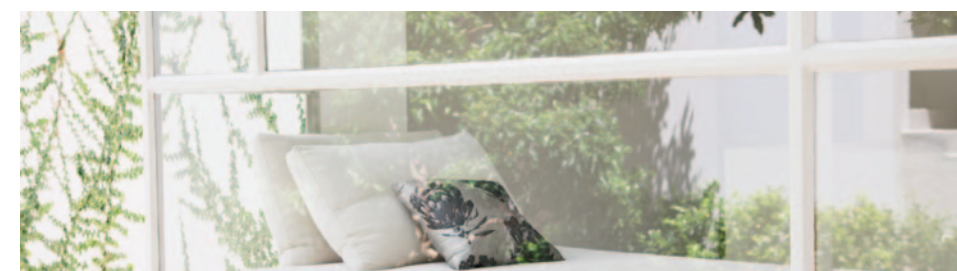
Your Dreams, Our Challenge



## AGC Glass Europe presents...



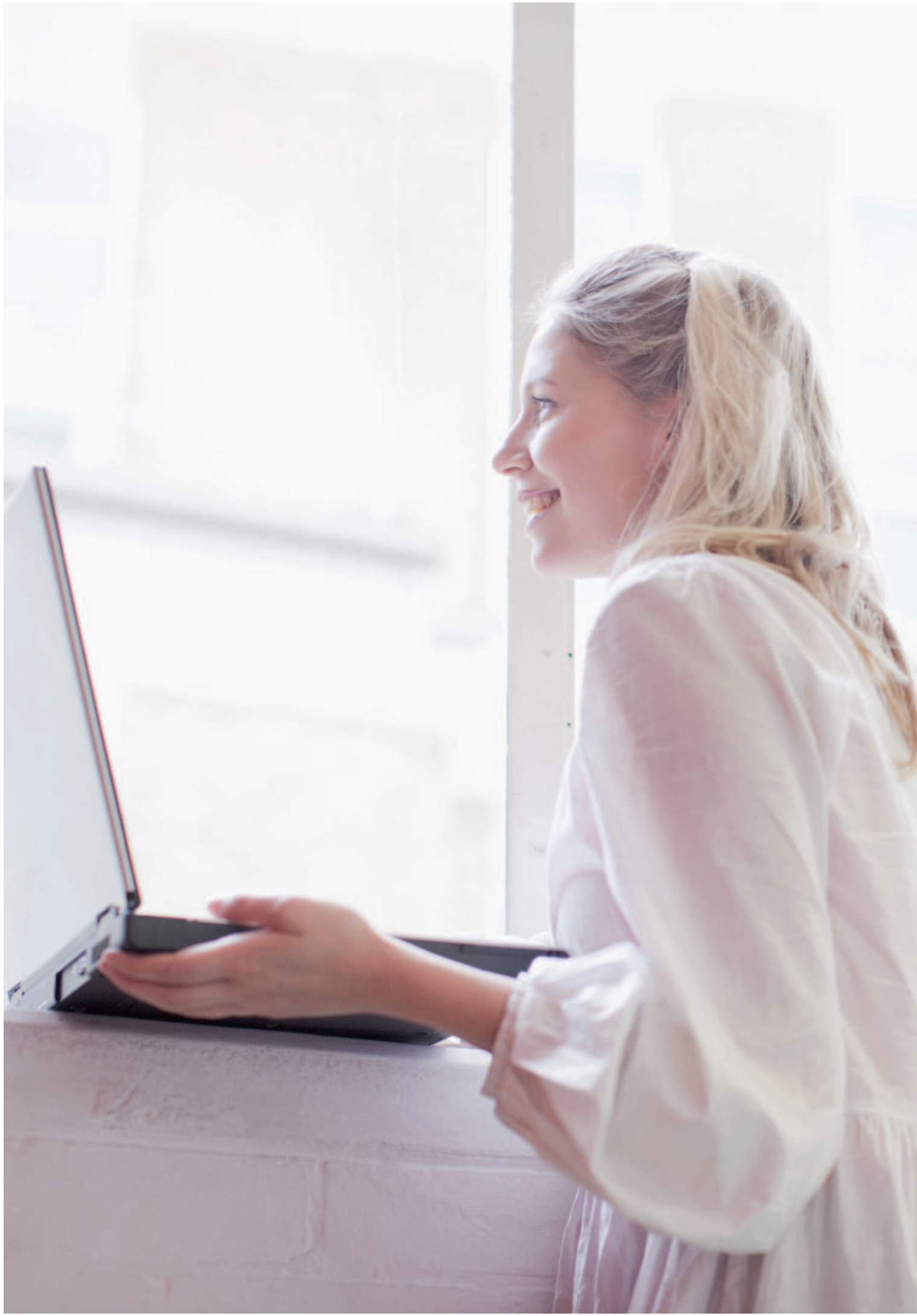
## ...insulating glazing for a more comfortable home



### THERMOBEL

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## Thermobel, the benchmark for environmentally friendly insulating glazing

Glass is a key material used in all homes. When assembled in [insulating glazing](#), it is the perfect ally in your quest for [comfort](#).

Through the development of solid industrial and technical [expertise](#) in the manufacture of double and triple glazing, [Thermobel](#) has become a benchmark in insulating glazing. Each of the materials used in the composition of Thermobel insulating glazing is specially selected to comply with [rigorous internal specifications](#), which are generally more stringent than market standards. A true gauge of [quality](#) and [reliability](#)! Thermobel products harness the most advanced [technological progress](#) to deliver increasingly innovative, efficient, safe and [environmentally](#) friendly solutions.

Thermobel glazings are the first and only insulating glass products to have received "Cradle to Cradle Certified® Bronze" environmental certification.

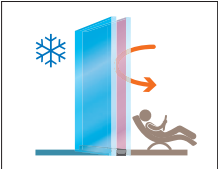
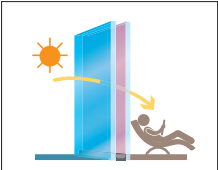

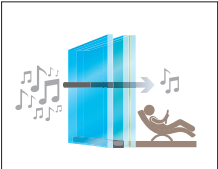
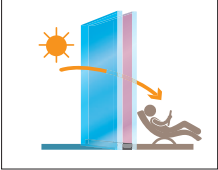
Explore our extensive range of products and you'll find the right solution for your needs, whether you're building a new home or renovating an old one.



# Helpful information

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To make sure you're totally satisfied, your glazing will be chosen with a great deal of care and in accordance with your specific needs. To help you, certain essential parameters must be taken into account.

If you want to...	Then look at...
<div>Keep heat inside</div> <div></div>	<ul style="list-style-type: none"><li>The thermal insulation of a glazing is its ability to keep heat inside the home by maximally reducing heat losses to the outdoors. It is measured by the <b>thermal transmission coefficient (<math>U_g</math>)</b>: the lower the <math>U_g</math> value, the more efficient the thermal insulation</li></ul>
<div>Let light in</div> <div></div>	<ul style="list-style-type: none"><li><b>Light transmission (LT)</b>, expressed in %, represents the quantity of natural light that passes through a glazing. The higher the value, the less artificial lighting you will need</li></ul>
<div>Protect yourself from falls, break-ins and noise</div> <div></div> <div></div>	<ul style="list-style-type: none"><li>Laminated glass comprises two sheets of glass between which are glued one or more sheets of flexible plastic film (PVB, polyvinyl butyral). The primary function of this type of glazing is to ensure the <b>safety of people</b> in case of a fall or an accident, and to provide <b>protection from burglary</b>. If the glazing is broken, the pieces of glass remain stuck to the plastic film, reducing the risk of injury and slowing down intruders</li><li>The PVB films between the sheets of glass also absorb sound, making it possible to offer a function that complements <b>acoustic insulation</b></li></ul>
<div>Harnesses solar energy</div> <div></div>	<ul style="list-style-type: none"><li><b>Solar factor (SF)</b>, expressed in %, corresponds to the solar energy that passes through the glazing. A low solar factor means the glass provides protection against solar radiation and prevents overheating. On the other hand, a glazing with a high rating provides the home with free solar energy and reduces the need for heating</li></ul>







# Thermal insulation glazing

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The most appropriate choice of thermal insulation depends on your type of home (new build or renovation, traditional home or passive home, etc.), the climate where you live and the direction in which your glazed facades face. Thermal insulation glazing comprises two or three sheets of glass, at least one of which has a thin metal oxide coating that delivers high insulating properties while remaining perfectly transparent.

Each product... | ...has its benefits

### DOUBLE GLAZING

- Thermobel Top**
- Provides protection against the cold, with a  $U_g$  of 1.1 W/(m<sup>2</sup>K)
  - Delivers a high level of natural light throughput thanks to its very high light transmission of 82%
  - Allows you to enjoy free solar energy and helps you to reduce your heating requirements thanks to its high solar factor of 65%

- Thermobel Advanced**
- For enhanced thermal insulation of 1.0 W/(m<sup>2</sup>K), while maintaining a high solar factor of 57%

- Thermobel Advanced 0.9**
- Extremely insulating glazing, with  $U_g$  values of 0.9 W/(m<sup>2</sup>K)
  - Thin, light and very effective: the ideal solution for any renovation project

### TRIPLE VITRAGE

- Thermobel TG Top**
- Provides good thermal insulation of 0.6 W/(m<sup>2</sup>K)
  - Delivers a high level of natural light throughput thanks to its high light transmission of 75%
  - Solar factor of 53% allows you to enjoy free solar energy at standard level

- Thermobel TG Advanced**
- Makes it possible to attain the highest insulation standards

- Thermobel TG LS**
- Specially developed for structures requiring an extremely low level of energy consumption (new builds, low-energy, passive and zero-energy homes)
  - The high light transmission rating of 75% lets in plenty of natural light
  - A high solar factor (61%) allows you to enjoy free solar energy and helps you to reduce your heating requirements

- Thermobel TG Energy 72/38**
- Glazing recommended for homes with glazed surfaces highly exposed to the sun, where there is a distinct risk of overheating





## Thermal insulation and solar control glazing

— THERMOBEL —

It is possible to combine thermal insulation and solar control. The solar protection function – providing protection against excessive heat from the sun – is obtained by applying a special transparent coating to the glass. It reflects solar radiation, while letting in plenty of light.

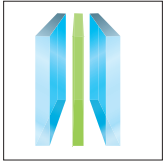
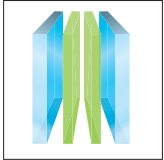
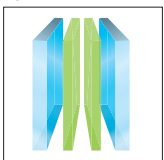
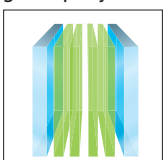
Each product...	...has its benefits
<b>Thermobel Energy 72/38</b>	<ul style="list-style-type: none"> <li>– Ideal for facades with a high exposure to the sun, such as wide bay windows and conservatories</li> <li>– Maintains a high level of thermal insulation of 1.0 W(m<sup>2</sup>K)</li> <li>– Its neutral colour ensures a nice appearance</li> </ul>
<b>Thermobel Stopray</b>	<ul style="list-style-type: none"> <li>– Ideal for rooftop glazing</li> <li>– Provides excellent protection against solar radiation (only 27% of the heat passes through the glazing) and glare</li> <li>– Makes it possible to maintain a pleasant temperature while using less air conditioning, thus lowering energy costs</li> <li>– Reflective external appearance and neutral internal appearance</li> </ul>



# Laminated security and safety glazing

— THERMOBEL STRATOBEL —

For large bay windows and rooftop glazing, Thermobel insulating glazing incorporates a laminated glass in order to prevent the risk of injury or fall. This glass also offers effective protection against break-ins and vandalism. The Thermobel Stratobel range meets all protection and security/safety requirements, depending on the structure of the assembly.

Types of protection	Specifications
<div>Protection against injuries</div> <div></div>	<div>— Prevention of cuts and injuries caused by accidental impact (classes 1B1-2B2)</div> <div>— 2 sheets – at least 1 PVB film</div>
<div>Protection against falls</div> <div></div>	<div>— Prevention of falls through the glass even if it is broken accidentally (class 1B1)</div> <div>— 2 sheets of glass – at least 2 PVB films</div>
<div>Protection against vandalism</div> <div></div>	<div>— Prevention of acts of vandalism (classes P1A-P2A)</div> <div>— 2 sheets of glass – at least 2 PVB films</div>
<div>Protection against petty crime</div> <div></div>	<div>— Prevention of attempted break-ins (classes P3A-P4A)</div> <div>— 2 sheets of glass – at least 4 PVB films</div>

Did you know?

- PVB plastic is generally clear, but it can also be coloured or opalescent to provide an original touch or shield you from prying eyes
- A laminated security/safety glass can be assembled with other types of glass to add complementary functions: solar control, thermal insulation, design
- Laminated glass is ideal for interior and exterior applications, in single glazing and insulating glazing. Perfect for balustrades, bay windows, interior walls, glass floors, etc.
- Laminated glass enhances acoustic insulation and provides protection against ultraviolet radiation, preventing discoloration of furniture, coverings and objects

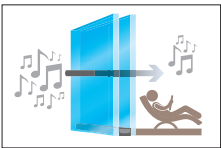

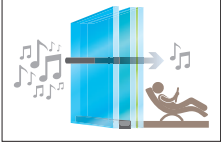
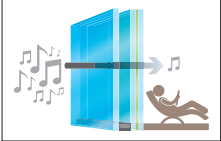


# Acoustic glazing

## THERMOBEL STRATOPHONE

Noise affects us all every day: road, train and air traffic, factories, noisy conversations, concerts, etc. We offer multiple solutions for insulating your home as effectively as possible against noise pollution depending on its current exposure to noise and on the level of acoustic insulation you require.


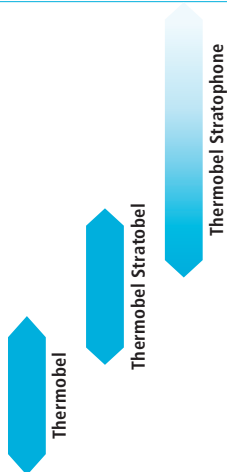






Each product...	...has its level of acoustic insulation
<div>Thermobel</div> 	– Traditional insulating glazing, for basic acoustic performance
<div>Thermobel asymétrique</div> 	– Insulating glazing comprising 2 sheets of glass of different thicknesses, for improved acoustic performance
<div>Thermobel Stratobel</div> 	– Insulating glazing incorporating 1 or 2 laminated glass products in the composition, for advanced acoustic performance
<div>Thermobel Stratophone</div> 	– Insulating glazing incorporating 1 or 2 laminated acoustic glass products in the composition, for optimal acoustic performance



### Did you know?

- Sound intensity is measured in decibels (dB), which indicate whether a noise is soft or loud
- You can already achieve acoustic insulation of 10 dB (i.e. reduce the initial noise level by 10 dB thanks to the glazing) by switching from standard Thermobel glazing to Thermobel Stratophone acoustic glazing. This is equivalent to halving the level of noise!
- Acoustic glass is ideal for interior and exterior applications, in single, double and triple glazing
- Acoustic glass can be assembled with other types of glass to add complementary functions: solar control, thermal insulation, design
- Like conventional laminated glass, acoustic laminated glass has safety and security properties

Scale of intensity (dB)	Type of sound	How it's perceived	AGC solutions
130	Airplane taking off	Pain threshold 	
120	Car horn Jackhammer		
110	Rock concert Thunder	Risk of hearing loss 	
100	Metro train arriving Chainsaw	Painful 	
90	Dog barking Petrol lawnmower		
80	Heavy traffic	Tiring 	
70	Noisy street Telephone ringing		
60	Normal conversation	Bearable 	
50	Rain beating against a window		
40	Dishwasher Quiet office	Pleasant	
30	A quiet day in the mountains Hushed conversation		
20	Whispering	Calm	
10	Slight rustling of leaves in a tree		
0	Total quiet		



# Adjust transparency

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Glass also offers a great many ways to protect you from prying eyes and to play with light while remaining transparent. Ideal for glass doors, interior walls and windows exposed to people looking in from outside.

Each product...	...has its benefits
<b>MATELUX</b> Glass in which one side is acid-etched	<ul style="list-style-type: none"><li>– Translucent, neutral and satin finish appearance, while letting light through (light transmission of up to 90%)</li><li>– Highly resistant to stains, easy to maintain</li><li>– Ideal in double and triple glazing used in windows, doors and walls</li></ul>
<b>IMAGIN – OLTRELUCE</b> Ranges of decorative glass where a design is printed directly in the glass	<ul style="list-style-type: none"><li>– Translucence determined by the design and structure</li><li>– Imagin offers numerous traditional designs (geometric, stylised, figurative, etc.), while Oltreluce offers three exclusive designs (Circles, Waves, Space) by Italian designer Michele De Lucchi, which gently filter variations in light</li><li>– Original and varied applications in insulating glazing for doors, windows and walls. Also available in single glazing (furniture, shower walls, etc.)</li></ul>
<b>ARTLITE</b> Toughened decorative glass that is partially enamelled using a silk-screen or digital process	<ul style="list-style-type: none"><li>– Offers a nearly infinite choice of creations thanks to à la carte designs and colours</li><li>– Can also have a solar control function by playing with different levels of opacity</li><li>– Miscellaneous applications: walls, doors, external blinds, etc.</li></ul>
<b>THERMOBEL STORE</b> Insulating glazing with built-in blinds between the two sheets of glass	<ul style="list-style-type: none"><li>– Perfect control over light and heat, while maintaining visual and auditory intimacy</li><li>– Choice between different types of blinds and controls (automatic or manual)</li><li>– Long-term dust protection for the blind; little maintenance required</li><li>– Can also have an additional thermal insulation, solar control or design function (by incorporating decorative glass)</li></ul>







## Other requirements?

— THERMOBEL —

Each product...

...has its benefits

- |                       |  |
|-----------------------|--|
| Thermobel Croisillons | — Insulating glazing with built-in Georgian bars between the two sheets of glass   |
|                       | — Broad range of looks in terms of textures, widths and colours  |
|                       | — Easy to care for   |
|                       | — Efficient thermal insulation maintained  |
| Thermobel Anti-Fog    | — Thermobel Anti-Fog is a glazing with a special coating making it possible to delay or even prevent the onset of external condensation* |
|                       | — In addition to providing you with a clear view of the outside world, Anti-Fog products will make you more comfortable in your home     |

\* Efficient thermal insulation ensures comfort and energy savings, but can also lead to the onset of condensation on the external sheet of glass. This phenomenon materialises when the temperature drops rapidly and when the humidity in the ambient air is high. The condensation opacifies the glass, making it hard to see through.



# Some parting advice



## Remember

- Insulation requires ventilation** – Condensation can appear on the inner side of the glazing in a home if the level of humidity indoors is high. Make sure to properly ventilate your home in order to maintain optimal comfort
- Appearance of the glazing** – We advise you not to position different types of insulating glazing in the same facade. There may be slight differences in colour depending on the light or the angle from which they are viewed
- Maintenance** – Glass is an aesthetically pleasing, durable, strong and safe material that is also easy to maintain. In most cases, clean water is sufficient to clean it correctly. From time to time, a few drops of neutral detergent can be added to the water. After cleaning the glass, rinse with clean water and dry the surface thoroughly. Avoid abrasive products and do not use tools that are likely to scratch the glass
- Regulations and subsidies** – Energy regulations and subsidies are specific to each country. Feel free to contact the relevant authorities





# Certifications

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Thermobel products not only bear the CE mark signifying that they comply with European standards, but also have major certifications relating to the environment and energy performance.



Certificates	Guarantees
<b>Cradle to Cradle</b>	— Thermobel products comprise glass that is Cradle to Cradle Certified® Bronze. Cradle to Cradle Certified® is a certification mark licensed by the Cradle to Cradle Products Innovation Institute. This rigorous programme assesses the sustainable nature of a product as a whole, i.e. throughout its entire life-cycle
<b>PassivHaus</b>	— Multiple compositions of Thermobel TG glazing meet the PassivHaus criteria and thus are involved in obtaining certification during the construction of a passive home







AGC Glass Europe has representatives worldwide

See [www.agc-yourglass.com](http://www.agc-yourglass.com) for further addresses.

AGC Processing Teplice a.s.  
člen AGC Group  
Závod Teplice  
Za Drahou 462, 416 74 Teplice  
+420 417 502 769  
[www.agc-processing.cz](http://www.agc-processing.cz)  
[processingteplce@agc.com](mailto:processingteplce@agc.com)

AGC Processing Teplice a.s.  
člen AGC Group  
Závod Kryry  
Tovární ul., 439 81 Kryry  
+420 415 235 542  
[www.agc-processing.cz](http://www.agc-processing.cz)  
[processingkryry@agc.com](mailto:processingkryry@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Brno  
Podstranská 14a, 627 00 Brno  
+420 548 423 311  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[fenestra.brno@agc.com](mailto:fenestra.brno@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Hradec Králové  
Kotrčova 615, 503 01 Hradec Králové  
+420 495 212 430  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[hradeckralove@agc.com](mailto:hradeckralove@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Moravské Budějovice  
Dopravní 127, 676 02 Moravské Budějovice  
+420 568 422 422  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[moravskubudejovice@agc.com](mailto:moravskubudejovice@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Nesovice  
Letošov 140, 683 33 Nesovice  
+420 517 32 5411  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[fenestra.nesovice@agc.com](mailto:fenestra.nesovice@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Salaš  
Salaš 86, 763 51 Zlín  
+420 577 100 611  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[fenestra@agc.com](mailto:fenestra@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Stod  
Průmyslová 782, 333 01 Stod  
+420 377 350 714  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[stod@agc.com](mailto:stod@agc.com)

AGC Fenestra a.s.  
člen AGC Group  
Závod Žďár nad Sázavou  
Strojírenská 1, 591 01 Žďár nad Sázavou  
+420 566 625 001  
[www.agc-fenestra.cz](http://www.agc-fenestra.cz)  
[zdar@agc.com](mailto:zdar@agc.com)

AGC Trenčín, s. r. o.  
Závod Trenčín  
Súvoz 12, 911 01 Trenčín  
+421 32 743 6574  
[www.agc-trencin.sk](http://www.agc-trencin.sk)  
[trencin@agc.com](mailto:trencin@agc.com)

AGC Trenčín, s. r. o.  
Závod Banská Bystrica  
Kremnička 9/A, 974 05 Banská Bystrica  
+421 484 162 418  
[www.agc-trencin.sk](http://www.agc-trencin.sk)  
[stanislav.kovac@agc.com](mailto:stanislav.kovac@agc.com)

AGC Trenčín, s. r. o.  
Závod Košice  
Osloboditeľov 68, 040 01 Košice  
+421 556 782 343  
[www.agc-trencin.sk](http://www.agc-trencin.sk)  
[milan.novitzky@agc.com](mailto:milan.novitzky@agc.com)

AGC Glass Poland Sp. z o.o.  
Závod Opatów  
Ćmielowska 16, 27-500 Opatów  
+48 15 868 4444  
[www.agc-poland.pl](http://www.agc-poland.pl)  
[opatow@agc.com](mailto:opatow@agc.com)

AGC Glass Poland Sp. z o.o.  
Závod Warszawa  
Małowiejska 30, 04-962 - Warszawa  
+48 226 126 350  
[www.agc-poland.pl](http://www.agc-poland.pl)  
[warszawa@agc.com](mailto:warszawa@agc.com)

AGC Glass Poland Sp. z o.o.  
Závod Gdańsk  
Podmiejska 5, 83-000 Pruszcz Gdańsk  
+48 58 773 01 21  
[www.agc-poland.pl](http://www.agc-poland.pl)  
[gdansk@agc.com](mailto:gdansk@agc.com)

AGC Glass Poland Sp. z o.o.  
Závod Silesia  
ul. M. Jachimowicza 11, 58-306 Wałbrzych  
+48 746 663 313  
[www.agc-poland.pl](http://www.agc-poland.pl)  
[silesia@agc.com](mailto:silesia@agc.com)