VISIBLY BETTER
AGC
GLASS UNLIMITED
PLANIBEL LOW-E ANTI-FOG

ANTI-FOG

enjoy the outdoors from the comfort of indoors

Glazing choices are determined by financial, environmental and comfort-related factors. High-quality glazing enhances your day-to-day life, allowing you to fully enjoy the view outside from the comfort of indoors.

visibly better!

Effective thermal insulation can cause condensation to build up on the outer pane, potentially impairing your view. The new Planibel Low-e Anti-Fog range developed by AGC Glass Europe* prevents the formation of condensation on glazing.

*In this document, AGC always refers to AGC Glass Europe.

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The impact of good thermal insulation

Home insulation is more than a passing fad: it is an issue of major social importance. Coated glass, in both double and triple glazing, provides excellent levels of thermal insulation while letting in light and harnessing solar energy gains. Its ability to keep heat inside a building enhances your comfort while benefiting the environment. However, improved insulation can also cause condensation to form on the outer surface of the glass.

How does condensation form?

Condensation generally forms at night or at dawn when two specific conditions are met: a significant drop in external temperature combined with a high relative humidity. Under those conditions, the outer surface of a high-performance glazing can become colder than the external temperature. There are two reasons for this: the excellent insulating properties of the glass reduce outward heat loss, and the external environment (i.e. the sky) cools the outer surface of the glass. If the temperature of the outer surface of the glass drops below the dew point*, then the moisture in the air forms tiny droplets of condensation on the glass.

The problem is exacerbated when the glazing is directly exposed to a very clear, cloudless sky. The risk of condensation can also be greater on sloped glazing.

External condensation: an unwelcome phenomenon

Condensation obscures glass, making it difficult to see through. It can also cause glass to look dirty by highlighting traces of pollution, rain or detergents. External condensation is proof that a glazing unit is insulating effectively. The more we insulate our homes, the greater the problem of condensation.

Preventing external condensation

AGC offers a special coating** which, when applied to the outer surface of the glass***, provides protection from atmospheric radiation. It keeps the glass at a temperature just above the dew point, thus reducing condensation.

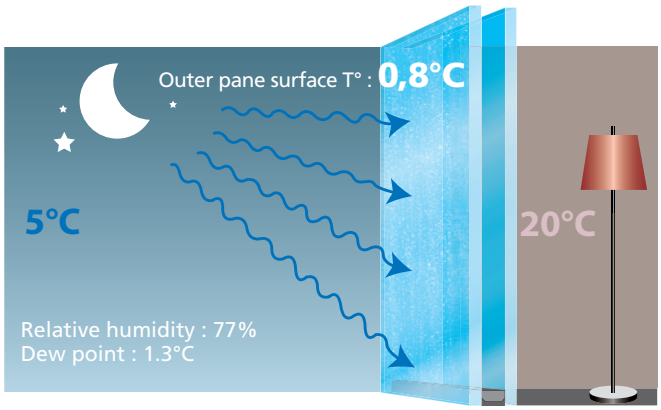
Fraunhofer-Institut für Bauphysik IBP, an independent laboratory, carried out a study to measure the effectiveness of a glazing with an anti-condensation coating compared to a glazing without the coating. The study found that condensation forms on the conventional glazing once the relative humidity reached 77%. On the other hand, the glazing with the anti-condensation coating delayed the onset of condensation until the relative humidity reached 97%.

* The dew point is the temperature below which the water vapour in a volume of air will condense into drops of water.

** Low-emissivity coating obtained by sputtering metal oxides onto clear float glass.
*** This product is applied only to residential external glazings.

How does condensation form?

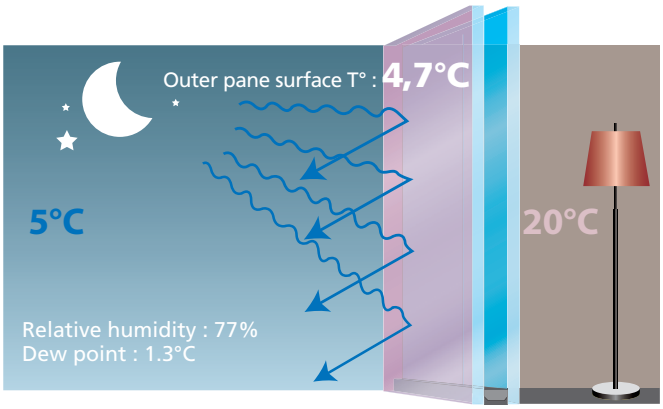
Double glazing U_g = 1.1 W/(m².K)



A highly insulating glazing combined with a very cold sky will cause the outer surface of the glazing to become relatively cold. Condensation forms when the temperature of the outer surface drops below the dew point (1.3 °C).

How does Planibel Low-e Anti-Fog glazing work?

Double glazing U_g = 1.1 W/(m².K)



The metal oxide coating applied to the outer surface of the glass 'reflects the cold' back into the environment. As a result, the temperature of the outer surface of the glass (4.7 °C) remains above the dew point (1.3 °C), preventing the onset of condensation.

AGC: innovation and custom solutions

AGC currently offers different products that meet the most demanding requirements:

- **Planibel AF:** glass with anti-condensation coating (in position 1).
- **Planibel AF Top^{N+} and AF iplus E *(NEW)*:** double-coated glass combining anti-condensation properties (anti-condensation coating in position 1) with thermal insulation (Top^{N+} or iplus E in position 2).
- **Planibel AF Energy^{N} *(NEW)*:** double-coated glass combining three functions: anti-condensation, thermal insulation and solar control (thanks to the anti-condensation coating in position 1 and the Energy^{N} coating in position 2).

All of these products are also available in laminated versions, providing enhanced safety and security as well as acoustic comfort.

Significant benefits

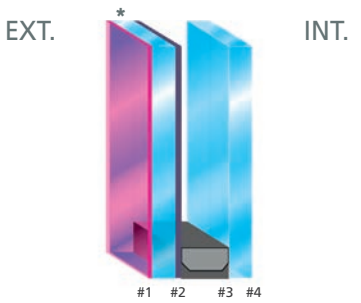
The anti-condensation coating is scratch-resistant, maintains its appearance over time, ensures a perfect transparency of the glass and can be readily processed in many different ways.

Performance

	EN 410			EN 673
	LT(%)	LR(%)	SF(%)	U_g(W/(m².K))
DOUBLE GLAZING				
4 mm Planibel AF #1 - 15 mm Argon 90% - 4 mm Planibel Top^{N+} #3	74	17	57	1.1
4 mm Planibel AF Top^{N+} (AF #1 / Top^{N+} #2) - 15 mm Argon 90% - 4 mm Planibel Clear	74	17	53	1.1
4 mm AF iplus E (AF #1 / iplus E #2) - 15 mm Argon 90% - 4 mm Planibel Clear	75	16	55	1.1
4 mm Planibel AF Energy^{N} (AF #1 / Energy^{N} #2) - 15 mm Argon 90% - 4 mm Planibel Clear	68	16	39	1.0
TRIPLE GLAZING				
4 mm Planibel AF Top^{N+} (AF #1 / Top^{N+} #2) - 14 mm Argon 90% - 4 mm Planibel Clear - 14 mm Argon 90% - 4 mm Planibel Top^{N+} #5	64	21	45	0.6
4 mm AF iplus E (AF #1 / iplus E #2) - 14 mm Argon 90% - 4 mm Planibel Clear - 14 mm Argon 90% - 4 mm iplus E #5	67	19	48	0.6
4 mm Planibel AF Energy^{N} (AF #1 / Energy^{N} #2) - 14 mm Argon 90% - 4 mm Planibel Clear - 14 mm Argon 90% - 4 mm Planibel Top^{N+} #5	60	19	35	0.6

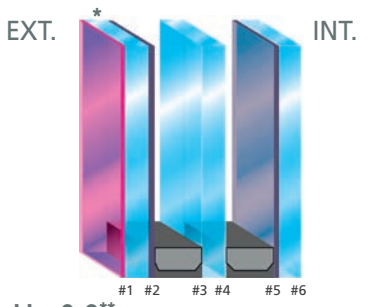
Assembly options

PLANIBEL AF TOP^{N+}



U_g=1.1

Double glazing
(4-15-4 with 90% Argon)



U_g=0.6**

Triple glazing
(4-14-4-14-4 with 90% Argon)

— Anti-condensation coating
— Top^{N+} coating

*Can also be replaced by Stratobel AF Top^{N+} 44.2 safety glazing (laminated version)
**Depending on the thickness of the spacers and the gas used inside them, the U_g value can be reduced to 0.5 W/(m².K)

Important note:

External appearance: anti-condensation glazings have a metal oxide coating in position 1 (exterior-facing side) which means that they are slightly more reflective and tinted than normal glazing.
Cleaning: anti-condensation glazings have a coating in position 1 (exterior-facing side). A number of precautions must be taken when cleaning this coating.
These are detailed in the "Cleaning and Maintenance Guide for Facade Glazing", available on www.yourglass.com/Products/Planibel LOW-E.

planitherm

for a freer outlook on the world

True to its reputation for innovation*, AGC has succeeded in combining a pyrolytic anti-condensation coating and a magnetron thermal insulation and/or solar control coating in a single pane of glass – the first time this has been done.

*Through its innovative strength in advanced glass technology, its global sales network, its industrial presence spread from Spain to Russia, and its membership to the world's leading producer in flat glass: AGC Glass Europe is "Glass Unlimited".

visibly better!

As well as ensuring an uninterrupted view outdoors, Planibel Low-e Anti-Fog will make your living space more comfortable, reduce your energy bills and protect the environment. A better outlook in every sense!

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