

VISIBLY BETTER

**AGC**

GLASS UNLIMITED

PLUS ANTI-FOG





# ARTIFOG

## 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 iplus Anti-Fog products developed by AGC Glass Europe\* prevent the formation of condensation on glazing.

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

# Anti-Fog

# visibly better!

## 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?

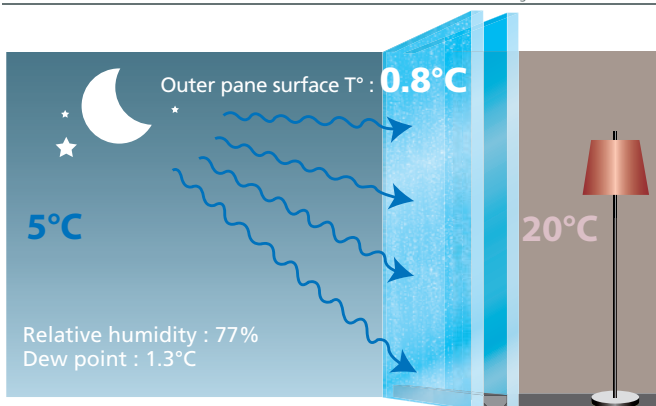
Condensation generally forms at night or at dawn when two specific conditions are met: a significant drop in external temperature combined with a high relative humidity. Under those conditions, the outer surface of a high-performance glazing can become colder than the external temperature. There are 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.

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

## How does condensation form?

Double glazing  $U_g = 1.1 \text{ W}/(\text{m}^2 \cdot \text{K})$



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 ( $1.3^\circ\text{C}$ ).

## 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

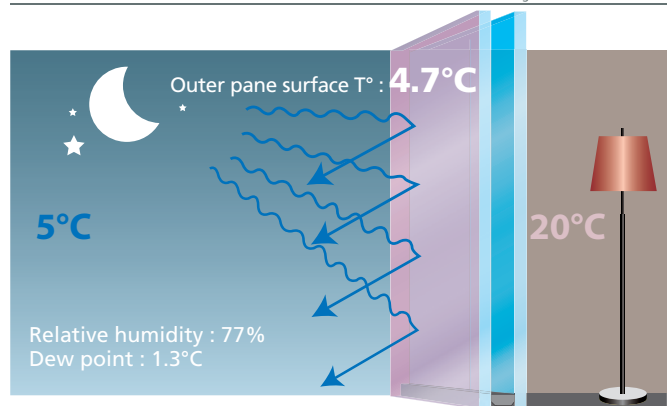
AGC offers a special hard coating\*\* which, when applied to the outer surface of the glass\*\*\*, provides protection from atmospheric radiation. It keeps the glass at a temperature just above the dew point, thus reducing condensation.

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%.

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

## How does iplus Anti-Fog glazing work?

Double glazing  $U_g = 1.1 \text{ W}/(\text{m}^2 \cdot \text{K})$



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 ( $4.7^\circ\text{C}$ ) remains above the dew point ( $1.3^\circ\text{C}$ ), preventing the onset of condensation.

## AGC: innovation and custom solutions

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

- **iplus AF:** glass with pyrolytic anti-condensation coating (in position 1).
- **iplus AF Top:** double-coated glass combining anti-condensation properties (iplus AF anti-condensation coating in position 1) with thermal insulation (iplus Top 1.1 coating in position 2).

- **iplus AF Energy<sup>N</sup>:** double-coated glass combining three functions: anti-condensation, thermal insulation and solar control (thanks to the iplus AF anti-condensation coating in position 1 and the iplus Energy<sup>N</sup> 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

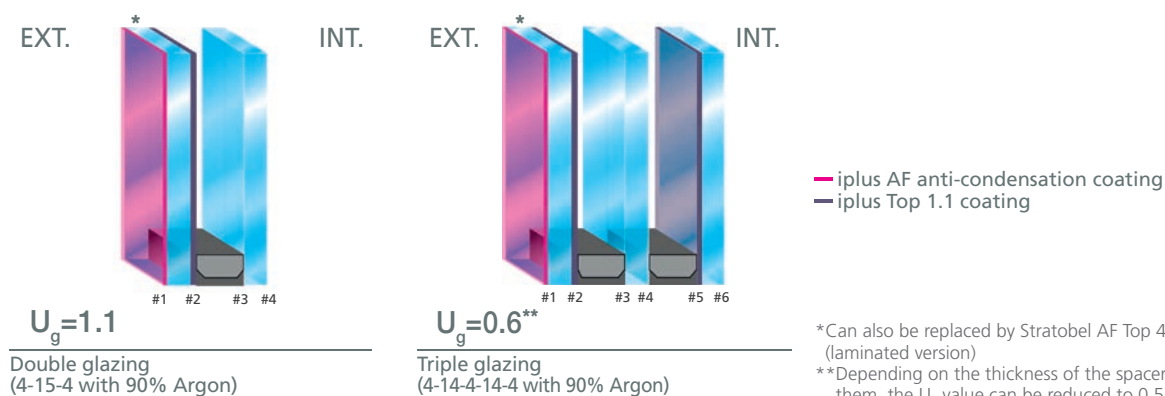
The anti-condensation coating is scratch-resistant, maintains its appearance over time, ensures a perfect transparency of the glass and can be readily processed in many different ways.

## Performance

	EN 410			EN 673
	LT(%)	LR(%)	SF(%)	$U_g$ (W/(m <sup>2</sup> .K))
<b>DOUBLE GLAZING</b>				
4 mm iplus AF #1 - 15 mm Argon 90% - 4 mm iplus Top 1.1 #3	75	16	59	1.1
4 mm iplus AF Top (iplus AF #1 / iplus Top 1.1 #2) - 15 mm Argon 90% - 4 mm Planibel Clear	76	16	56	1.1
4 mm iplus AF Energy <sup>N</sup> (iplus AF #1 / iplus Energy <sup>N</sup> #2) - 15 mm Argon 90% - 4 mm Planibel Clear	68	16	39	1.0
<b>TRIPLE GLAZING</b>				
4 mm iplus AF Top (iplus AF #1 / iplus Top 1.1 #2) - 14 mm Argon 90% - 4 mm Planibel Clear - 14 mm Argon 90% - 4 mm iplus Top 1.1 #5	68	19	49	0.6
4 mm iplus AF Energy <sup>N</sup> (iplus AF #1 / iplus Energy <sup>N</sup> #2) - 14 mm Argon 90% - 4 mm Planibel Clear - 14 mm Argon 90% - 4 mm iplus Top 1.1 #5	61	18	35	0.6

## Assembly options

### iplus AF Top



\*Can also be replaced by Stratobel AF Top 44.1 or 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/(m<sup>2</sup>.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](http://www.yourglass.com).



# ANTI-FOGS

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, iplus 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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