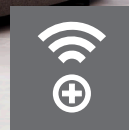
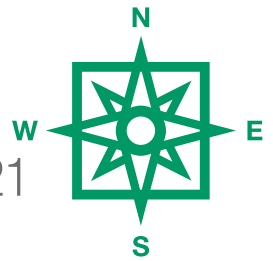


RADIO TRANSPARENT INSULATING GLASS

Thermal insulation glazing for optimized reception of broadband data



Lesser
electrosmog



Better mobile-radio
signal reception



Longer
battery life



Optimum
thermal
Insulation

The product enables optimum reception of mobile-radio data signals in buildings with thermal insulation glazing. It is designed to meet all requirements for low-energy thermal insulation without any problems. What's more, it even helps reduce electro smog and extend the battery life of mobile devices.

INTRODUCTION

Modern insulation glazing attenuates cellular frequencies to such an extent that in many indoor spaces, the reception of data and telephone calls is often possible only to a very limited extent. This is because the silver coatings meant for thermal insulation and solar protection act like a Faraday cage and they reflect not only solar and infrared radiation, but also radio waves. This, by the way, is true for all common cellular frequencies – from GSM to UMTS, LTE right up to 5G as well as WLAN and navigation services.

Terminal devices then usually increase their output power in order to maintain reception. Consequently, the users of these devices are exposed to stronger electrical fields, known as electro smog.

The increase in output power also reduces the battery life of the mobile device. Therefore, nowadays, mostly repeaters are used to enable reception of cellular frequencies in buildings with insulation glazing. These devices amplify the signals, but as they are active devices they need electric power to function, and can, of course, also break.

Thermal insulation and solar control coatings significantly reduce the radio transparency of insulating glazing significantly. With double insulating glass, only 1/1,000 of the output signal passes through the glass. With triple glazing the value is 1/1,000,000.

THE SOLUTION

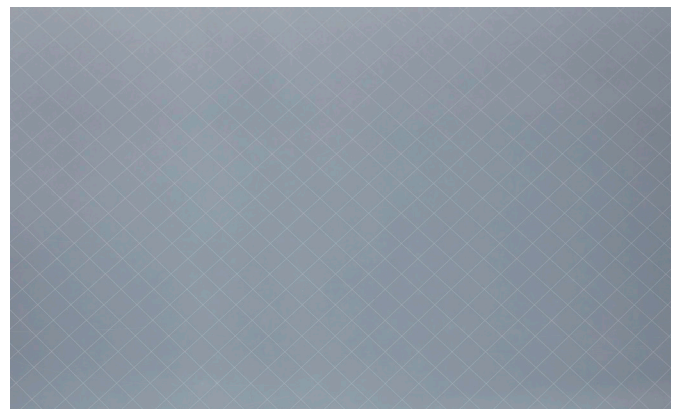
ISOLAR® offers a modified insulating glass that enables optimal transmission of mobile radio waves while largely preserving the insulating function of the glass. Unlike a repeater, this solution is passive; therefore, it does not require any electric power and works throughout the entire lifespan of the building.

In order to achieve this effect, the low-E layer of the glass is segmented into small units. This may be accomplished in a laser or lift-off process. The segments must be dimensioned in such a way that the frequency range of the thermal radiation continues to be reflected, whereas the common cellular frequencies can pass through. The reference points here are wavelengths such as those of infrared radiation, which lie between 780 nanometres and one millimetre, and of radio waves. The GSM standard has a wavelength of 33 centimetres; in the case of 5G, it is currently at least 8.1 centimetres.

In the segmentation process, the coating is divided into small squares. In tests the selected grid pattern improved the reception of mobile radio data signals

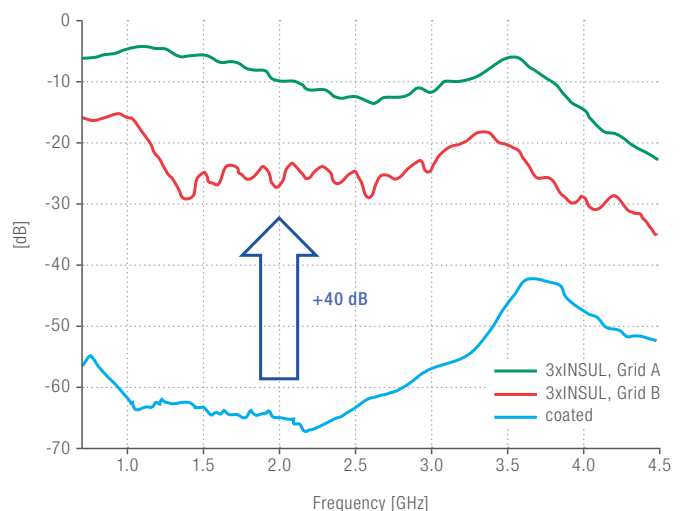
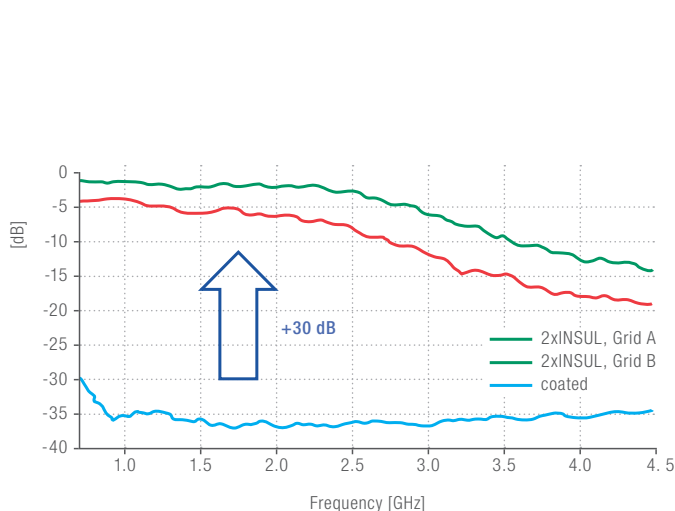
- by a factor of 1,000 in double glazing insulating glass and
- up to a factor of 100,000 in triple glazing insulating glass.

In both cases, reception improves for all common cellular frequencies.

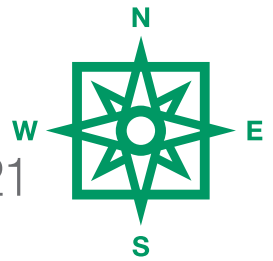


The grid pattern of the coating in the form of small squares improves the passage of mobile radio waves and thereby improves data reception inside buildings.

LABORATORY MEASUREMENT OF RADIO TRANSPARENCY



Measurement of radio transparency of insulating glass at Fraunhofer Institute. 0 dB indicates the reception of mobile-radio signals without glass. Coated glasses (blue) shield cellular frequencies so strongly that significantly fewer signals are received behind them. Depending on the type of structuring, the passage improves (green and red). In double glazing, it almost reaches the values of glazing without coating. Even in the case of triple glazing, the values increase very significantly.

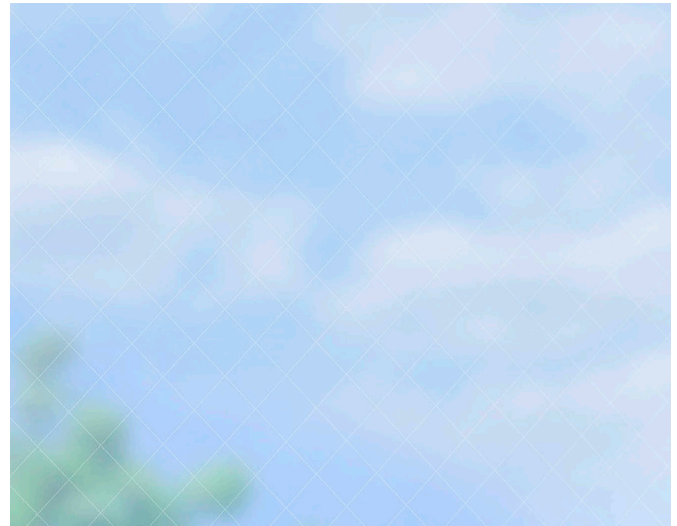


INFLUENCE ON THE PROPERTIES OF THE GLASS

Segmentation of the thermal insulation coating changes its insulating properties only to a minor extent. This change has been measured by the Fraunhofer Institute.

In the case of double glazing, which has a Ug-value of 1.15 W/m²K without any structuring, the value increases by 0.1 W/m²K due to the segmentation. In triple glazing having Ug-value of 0.7 W/m²K, the increase is also around 0.1 W/m²K. The segmentation therefore increases the heat transfer only to a very small extent. Therefore, all low-energy requirements for thermal insulation can be met without any problem. Likewise, the influence on light transmission is very less. The grid method also has no effect on the strength of the glass. The coating is durable and maintenance-free.

The grid pattern itself is only visible when one stands very close in front of the glass – both with heterogeneous and homogeneous backgrounds.



The fine grid pattern of the coating is only visible if one looks at it very closely. With increasing distance, this structure becomes invisible. The process also has only a very minor influence on light transmission.

RADIO TRANSPARENT GLASS – THE KEY BENEFITS

- Optimized reception of broadband data – even from the current 5G network in Europe
- Can meet all thermal insulation and low-energy requirements
- Available as double-glazing and triple-glazing
- Reduction of indoor electrosmog
- Available as float glass or laminated safety glass
- Easy to retrofit, maintenance-free and durable
- Longer battery life

LEGAL NOTICE

ISOLAR® Compass is a product of ISOLAR GLAS Beratung GmbH.

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