SOLAR CONTROL TECHNOLOGY

Nanotechnology for energy efficiency: Nano Coat Glass.

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Sustainable Efficiency

NANO COAT GLASS

With its continuing search for products offering energy efficiency, Noka is promoting the use of an innovative solution in the sector of solar shielding: **Nano Coat Glass**.

Nano Coat Glass is a special nano¬technological fluid based on metal oxides (antimony, indium, tin, tungsten and cesium oxides), which is applied to transparent surfaces, with the use of different techniques, and includes an ultraviolet-ray screening agent and an infrared-ray screening agent.

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NANOTECH

The use of the nanotechnologies is based on comprehensive knowledge of the properties of matter on a nanoscale: a nanometer (one-billionth of one meter) corresponds to the length of a small molecule. At this scale, matter presents other, new, and sometimes surprising, properties, with scientific research continuing to propose innovation and new technical solutions about nanotechnologies.

Noka Nanotech, a NOKA Group company, offers technological innovation and solutions for energy efficiency and environmental sustainability through the use of new nanoscale materials.

A GLASS-SHIELDING TECHNOLOGY

Nano Coat Glass is a special nanomaterial-based transparent coating that is applied to glass surfaces in order to provide shielding from infrared and ultraviolet rays.

SHIELDING FROM INFRARED RAYS
The application of Nano Coat Glass blocks from 70% to more than 90% of the infrared rays, and it improves the resilience of windows exposed to the sun by drastically reducing the quantity of heat that normally penetrates glass, thereby keeping the interior temperature more comfortable and reducing the annoying “greenhouse” effect that can be felt during very sunny days.

Aside from a notable improvement in environmental comfort, the application of Nano Coat Glass makes it possible to significant reduce the energy cost of heating, ventilation and air-conditioning systems.

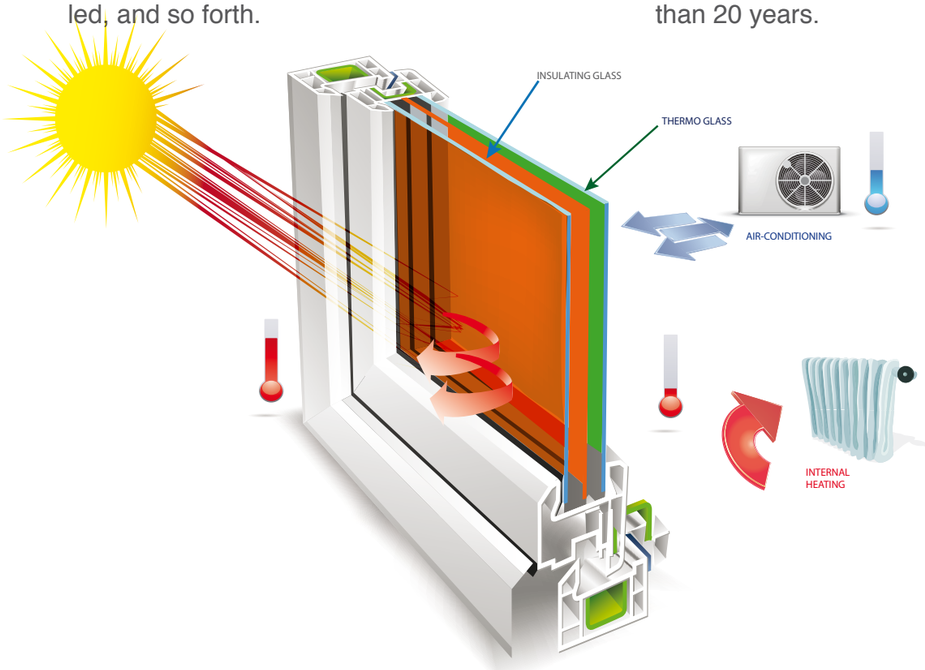
The cost savings can be up to 30%, thereby allowing for rapid returns on investment, depending on the exposure of the windows, their size in relation to the premises where they are installed, and so forth.

During the winter months, the surfaces treated with Nano Coat Glass reduce the losses of heat that is generated internally and escapes through windows.

SHIELDING FROM ULTRAVIOLET RAYS
Nano Coat Glass blocks 99% of the ultraviolet rays and thus supplies a definitive solution against the destructive effects of ultraviolet rays:

- protects art work, expensive floors, antiques and furniture;
- protects products, textiles and colours in store window displays.

Nano Coat Glass can be applied to internal or external surfaces of windows, depending on the specific characteristics of the building, cost optimization, and installation time. Nano Coat Glass does not change the transparency of the glass, and therefore, it does not entail the need for additional interior artificial lighting.
The application of Nano Coat Glass is guaranteed for 10 years (applications to internal surfaces), although it may be effective for up to more than 20 years.



100%
GLASS TRANSPARENCY

90%
REDUCTION OF IR RAYS

30%
ENERGY SAVINGS

ADVANTAGES

The transparent surfaces of a building and their properties (in terms of their protection and shielding from solar radiation and external temperatures) are elements that significantly affect the energy needs for heating, ventilation and air conditioning.

The upgrade of existing buildings requires compliance with the European Directive No. 31/2010/CE that promotes the realization of nearly Zero Energy Buildings (nZEB) or nearly net Zero Energy Buildings (nnZEB).

Among the different technologies for controlling solar effects, Nano Coat Glass represents a developed and tested system that offers several advantages over alternative products:

more than 20 years — Product life

10 years — Product guarantee

top performance — In terms of reduction of infrared and ultraviolet radiation, but with an excellent level of visible light transmission

EFFECTS

Solar radiation has three components:

- ultraviolet radiation (approximately 3%)
- visible light (approximately 44%)
- infrared radiation (approximately 53%)

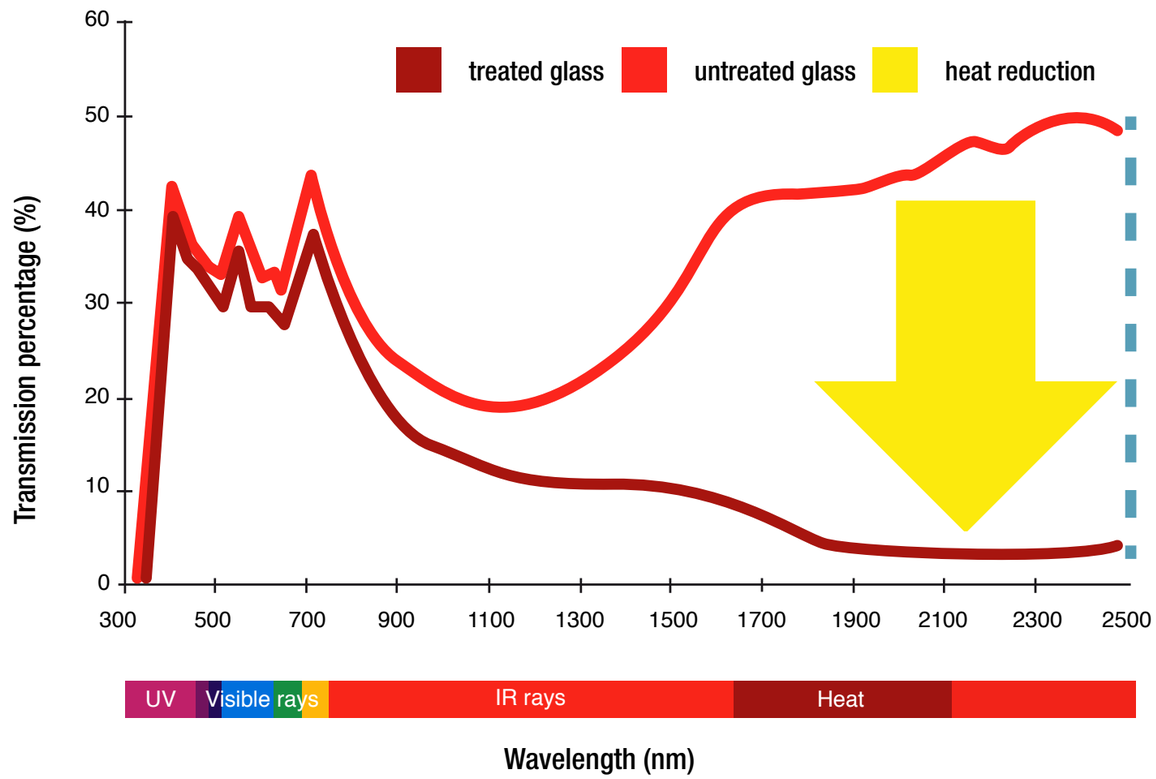
A transparent plate of glass reflects about 6% of solar radiation, while it absorbs about 5% and transmits the remaining 89% (to interior space).

With the application of Nano Coat Glass to the glass surface (which can be done internally or externally), the following effects are obtained, with respect to reflection and absorption:

- The ultraviolet rays are reduced by approximately 99%. The coating allows for cutting around 99.6% of ultraviolet rays, thereby protecting parquet and internal furnishings;
- Some 75%-80% of the visible light is transmitted;
- The infrared rays are reduced by 90%. The coating blocks up to 90% of infrared radiation emitted, thereby reducing the interior temperature.

The chart bellows plots an example of transmission with respect to treated and untreated glass.

REFLECTION / TRANSMISSION PERCENTAGE



ENVIRONMENTAL TEMPERATURE REDUCTION

Though it may seem like science fiction, a simple glass-coating application that allows for energy savings of up to 30% is a reality today.

The application of Nano Coat Glass allows for obtaining lower interior temperatures, reducing energy costs related to heating, ventilation and air conditioning of interior space, and during the cold months, it significantly reduces the amount of heat lost through the treated surfaces.

More specifically, Nano Coat Glass makes it possible:

- To reduce the internal temperature by 4°C or more, with all other conditions held constant;
- To reduce energy consumption due to better control of the internal temperature;
- To reduce internal lighting, thanks to the continuing transparency of the glass surfaces treated.

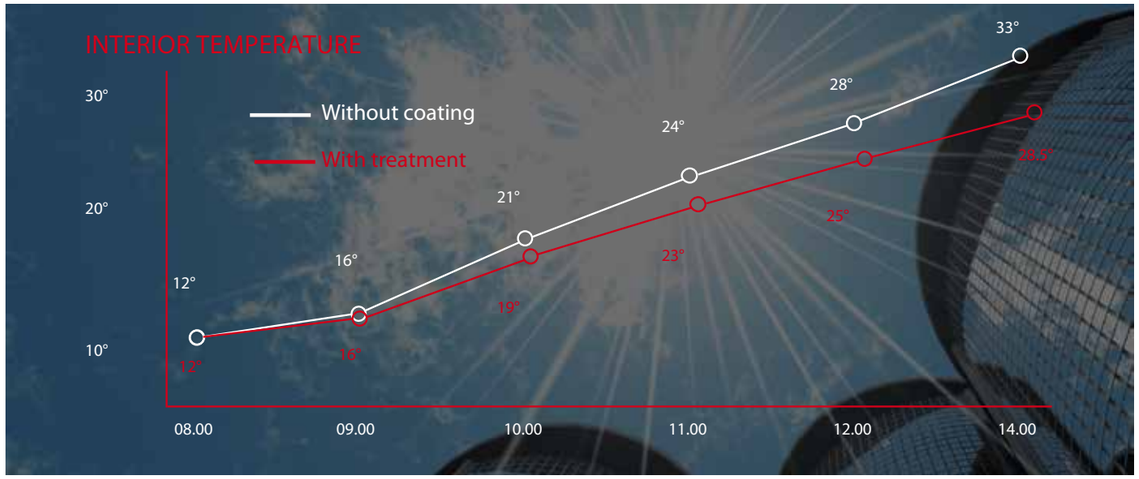
A NATURAL ENVIRONMENT

Up to now, the systems for solar control consisted of the application of heat reflective film that filtered infrared rays, but significantly reduced natural light.
As a result, interior space had to be constantly illuminated with artificial light, even during the day, with a sizeable energy cost.

Nano Coat Glass blends nanomaterials with the efficiency of the best films on the market. With a thickness of a mere 8-10 microns, total bonding to the glass, and a 4H scratch resistance, Nano Coat Glass keeps glass transparent.

Given its total transmission of solar light in comparison with other shielding technologies, Nano Coat Glass makes it possible to delay turning on artificial lighting during the day, thereby ensuring savings on energy consumption as well as better visual comfort.

In addition, Nano Coat Glass inhibits the entry of ultraviolet rays that are the cause of discoloration and deterioration of furnishings and product displays. The application of Nano Coat Glass also results in less glare within interior space, thereby improving visual comfort due to fewer reflections on television and computer screens, and other reflective surfaces.



ENERGY COSTS

Nano Coat Glass allows for savings of up to 30% on the energy used for the heating, ventilation and air conditioning of interior space.

- Reduction of the environmental impact of non-renewable energy, given the use of less energy for heating, ventilation and air conditioning.
- Rapid recovery of the investment for the application of Nano Coat Glass, as a result of energy savings.
- Savings on electricity due to the maximum transparency of the surfaces.
- Reduction of energy used for heating interior space during the winter months, due to less heat loss through windows.

In view of these aspects, the investment made for the application of **Nano Coat Glass** can be rapidly recovered within 12-24 months.

Unlike other coatings or products dedicated to solar control, Nano Coat Glass is applied with a roller to window surfaces, with lasting effects of more than 15 years.

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