

Document purpose:

This document describes the product properties, performance, applications and maintenance guidelines of Nano-EcoLine GlassShield. The full installation procedure is provided in a separate installation sheet. Nano-EcoLine Climate GlassShield is an advanced nanothermal glass upgrade and sustainability solution for existing glazing. The product reduces heat gain, UV exposure and energy loss through glass and is applied on the interior side, without replacing windows or frames. Thanks to its nano membrane structure, it supports both heat reflection in summer and heat retention in winter.

1. Key benefits

- Blocks 99% of UV radiation.
- Reduces 95% of infrared radiation.
- Maintains high visible light transmission; only 10 to 12% loss of visible light.
- Reduces energy costs (air-conditioning and heating costs) by up to 40%, depending on the situation and glazing.
- Helps prevent fading of furniture, fabrics and other interior materials.
- Interior-side retrofit solution with little or no disruption to business processes.
- Lower cost than glass replacement and hardly any additional weight on existing structures.
- 10-year warranty on the film.
- Suitable for both summer and winter comfort: limits solar heat gain and supports heat retention.
- Only approx. 60 microns thick and therefore much more flexible than many conventional films.
- The nanothermal membrane structure keeps thermal stress to an absolute minimum through its unique heat distribution and processing.
- Any installation air bubbles will disappear over time (after application according to instructions and under the influence of heat).
- Significantly improves the performance of various glass types and upgraded glazing.

2. Product overview and applications

Nano-EcoLine GlassShield was developed to improve indoor comfort in all seasons, extend the life cycle of existing glass and avoid high renovation costs caused by glass replacement. The solution can be used in homes, utility buildings, offices, schools, healthcare facilities, hotels, residential complexes and listed or heritage buildings where appearance and weight are important. By combining solar control, improved insulation and limited visual impact, the system is suitable for both renovation and upgrade projects.

3. Certification and safety

- Certified for use in enclosed spaces.
- Tested for more than 240 harmful elements without detectable traces.
- Conforms to or fits within Health Canada, EPA, low VOC emission, PFOS/PFAS requirements, RoHS and REACH.
- Fire tests according to ASTM E84 Class A and CAN-ULC S102.
- European/UK classification.
- Environmentally friendly retrofit application without construction waste.
- Free from detectable mercury, lead or heavy metals.
- Supported by certification and test basis for multiple markets, including Canada, the United States, Europe and the United Kingdom.

4. Signal permeability & radiation filtering

Optimal protection without signal loss. The film is specifically developed for performance in the UV range (below 380 nm) and the infrared range (above 680 nm). Important communication signals remain fully intact:

- No impact on networks: GlassShield does not block radio frequencies. This means that Wi-Fi, Bluetooth and mobile networks such as 4G and 5G continue to work perfectly indoors and outdoors.

5. Technical specifications

Component	Specification
Product type	Advanced nanothermal energy-saving glass upgrade
Installation side	Interior side
Suitable glazing	Single glazing, double glazing and triple glazing
UV reduction	99%
IR reduction	95%
Light transmission	88%
Visible light loss	12%
Shading Coefficient (SC)	0.45
SHGC / g-value	0.3915
Solar heat gain reduction	Approx. 60.85%
TSER	47%
U-Factor	0.48 BTU/(h.ft ² .°F) = 2.72 W/m ² .K
Indicative insulation value	Up to R4, comparable to triple glazing
VOC content	6.08 g/L
Mechanical effect	Reduces risk of fragmentation in case of glass breakage
Temperature resistance	Down to -50 °C
Warranty	10 years
Indicative service life	10-20 years
Indicative ROI	Average 4 to 5 years, depending on the situation
Roll dimensions	1.52 m x 60 m (approx. 91.2 m ² per roll)
Thickness	Approx. 60 microns
Comparison with conventional LOW-E film	Indicatively 4-5 W/m ² .K versus 2.72 W/m ² .K for this system
Laboratory test thermal stress	Tested at temperatures from -50 °C to +40 °C
Practical climate	Applied in regions below -40 °C and above 50 °C
International use	More than 15 years of practical experience in 24 countries

6. Thermal performance

An independent ASTM C1363-2005 Hot Box test confirms that Nano-EcoLine GlassShield significantly improves the thermal performance of glass. The measured U-Factor is 0.48 BTU/(h.ft².°F), equal to 2.72 W/m².K. Compared with many conventional LOW-E films, which are indicatively around 4-5 W/m².K, Nano-EcoLine GlassShield reaches a comparative U-Factor of 2.72 W/m².K.

The membrane structure distributes heat much more evenly across the glass surface compared with conventional plastic films. This keeps local hot/cold spots and thermal stress to a minimum, significantly reducing the risk of breakage and delamination, especially with laminated glazing.

Glazing type	Start Ug (W/m ² .K)	New Ug (W/m ² .K)	% improvement
4 mm single glazing	5.80	1.85	68.1%
Double glazing (pre-2008)	2.90	1.40	51.7%
Triple glazing (air)	2.20	1.22	44.5%
Double glazing low-E	1.20	0.83	30.8%
Double glazing Planitherm One	1.10	0.78	28.9%
Double glazing SKN 176	1.10	0.78	28.9%
Triple glazing with Planitherm One	1.00	0.73	27.0%

The described results are outcomes from various measurements in test setups and in practice and represent average measured values.

7. Explanation of solar energy values

The SHGC or g-value indicates how much solar heat enters a room through the glass and membrane. The lower this value, the lower the heating-up effect and cooling load. For project-specific calculations, the following example formula may be used: new g-value = existing g-value x (1 - 0.3915). With an existing g-value of 0.43 this results indicatively in 0.261.

8. Installation and maintenance

- Professional installation is recommended.
- A separate installation sheet is available for the complete application procedure.
- After the film has fully dried, it can be cleaned with a non-aggressive glass cleaner.
- Do not use abrasive cleaning products.
- Use a soft cloth or microfibre cloth.

9. Positioning and added value

- Retrofit solution without demolition, construction waste or glass replacement.
- Broadly applicable, from single glazing to high-performance triple glazing.
- Suitable for listed buildings and heritage properties thanks to the low impact on appearance and weight.
- Supports comfort improvement, energy reduction (up to 40%) and CO2 reduction.
- Unique nano membrane layer for retaining heat on the interior side.
- Relevant solution for high-quality real estate and safety-critical environments where fire performance, comfort and minimal impact on existing glazing are important.
- The underlying technology has been internationally applied in projects including airport environments and aligns with settings that require high safety and reliability.
- Based on an internationally proven product concept with more than 15 years of practical experience and application in 24 countries.

Note: Note: Performance such as energy savings, ROI and final values depends on glass composition, project conditions, orientation, climate exposure and installation quality.