

ThermINCoat U-Value Enhancement and Heat Dispersion Benefits

1 Starting Window Configuration

The original glazing system is a high-performance double-glazed unit composed of:

- 4mm clear toughened glass
- 20mm air or argon gap
- 4mm clear toughened low-E glass

This configuration achieves a U-value of 1.2 W/m²·K.

2 U-Value Improvement with ThermINCoat

ThermINCoat, with a U-value of 2.72 W/m²·K, is applied to the glazing system. The combined U-value of the system is calculated using thermal resistances in series:

$$1/U_{\text{total}} = 1/U_{\text{existing}} + 1/U_{\text{ThermINCoat}}$$

$$1/U_{\text{total}} = 1/1.2 + 1/2.72 = 0.833 + 0.368 = 1.201$$

$$U_{\text{total}} = 1/1.201 \approx 0.83 \text{ W/m}^2\cdot\text{K}$$

Therefore, applying ThermINCoat reduces the U-value from 1.2 to approximately 0.83 W/m²·K — a 30.8% improvement in thermal insulation performance.

3 Additional Performance Benefit – Heat Dispersion Across the Membrane

While the U-value measures steady-state heat transfer, it does not account for dynamic thermal behaviours such as heat dispersion and surface balancing. ThermINCoat provides several additional benefits:

1. Uniform Surface Temperature:

- ThermINCoat distributes heat evenly across the surface.
- This eliminates cold spots and hotspots, improving interior thermal stability.

2. Thermal Balancing Effect:

- Spreads radiant and convective heat laterally.
- Reduces temperature gradients and energy surges.

3. Seasonal Benefits:

- Summer: Reduces thermal stacking and enhances passive cooling.
- Winter: Improves heat retention, especially at glazing edges.

4. System Efficiency Synergy:

- Enhances HVAC system performance by maintaining consistent glass temperatures.
- Reduces workload on heating and cooling systems.

4 Summary Note on U-Value vs Real-World Experience

The U-value provides a baseline measurement for thermal transmission but does not account for dynamic factors like thermal inertia or dispersion. ThermINCoat enhances real-world energy performance through uniform thermal regulation, which improves both energy efficiency and comfort.