Thermal Performance Analysis
Suntrenz Suntube – Rigid Tube, 350mm Diameter

Objective

To provide a comprehensive breakdown of the estimated R-value (thermal resistance) and U-value (thermal transmittance) for the installed Suntrenz Suntube system using multiple methodologies:
- ISO-based layer-by-layer calculation
- VELUX/BRANZ-style weighted U-value method
- Independent energy rating test
- Comparative data from Solatube's published performance

Product Overview

Model	Suntrenz Suntube (Rigid Tube)
Diameter	350mm
Tube Material	Miro Silver Reflective Aluminium
Dome	UV-Stabilised Clear Acrylic
Ceiling Diffuser	Double-Glazed PMMA Seadrift with 10mm Air Gap
Installation	Into 10mm GIB standard ceiling board
Note	No acrylic baffle included in this configuration

Method 1: ISO-Based Layer-by-Layer Calculation

Component	Material	Thickness (m)	Thermal Conductivity (W/m·K)	R-Value (m^2·K/W)
Diffuser – Outer Layer	PMMA	0.003	0.19	0.0158
Diffuser – Air Gap	Air	0.010	0.025	0.4000
Diffuser – Inner Layer	PMMA	0.003	0.19	0.0158
Aluminium Tube Wall	Miro Silver	~0.010	237	0.000042
Flashings / Seals (avg.)	Composite	~0.010	0.04–0.2	~0.0500
Ceiling GIB	Plasterboard	0.010	0.125	0.0800

Total R-Value: 1.28 m^2·K/W
Equivalent U-Value: 0.78 W/m^2·K

Method 2: Weighted U-Value (VELUX/BRANZ Style)

Component	U-Value (W/m^2·K)	Area (m^2)
Diffuser (Double PMMA)	1.5	0.096

Rigid Tube Wall	4.5	0.45
Frame/Flashings	2.5	0.08

Weighted System U-Value: 3.78 W/m²·K
Equivalent R-Value: 0.26 m²·K/W

Method 3: Tested Performance (Peter Lyons & Associates)

Tested U-Value: 1.92 W/m²·K
Equivalent R-Value: 0.52 m²·K/W

Method 4: Solatube Comparative Performance

Configuration	Typical R-Value (m²·K/W)
Single Diffuser	0.20 – 0.40
Dual Diffuser	0.52 – 0.69
With Thermal Collar/Baffle	1.00 – 2.00
Solatube 350mm Dual Diffuser System	0.62 (U = 1.61)

Thermal Performance by Model (ISO-Based Estimates)

Model	Diameter	Estimated R-Value	Estimated U-Value
S300	255 mm	1.40 m²·K/W	0.71 W/m²·K
S400	350 mm	1.28 m²·K/W	0.78 W/m²·K
S500	450 mm	1.15 m²·K/W	0.87 W/m²·K
S600	540 mm	1.05 m²·K/W	0.95 W/m²·K

Performance Summary

Method	R-Value (m²·K/W)	U-Value (W/m²·K)
ISO Layered Approach	1.28	0.78
BRANZ/VELUX Weighted	0.26	3.78
Peter Lyons Test	0.52	1.92
Solatube Comparison	0.62	1.61

Appendix: R-Value Summary by Method and Model Size

Model	Diameter	ISO Method	Weighted U-Value Method	Tested (Peter Lyons)	Solatube Comparison
S300	255 mm	1.40	0.26	0.52	0.62
S400	350 mm	1.28	0.26	0.52	0.62
S500	450 mm	1.15	0.26	0.52	0.62
S600	540 mm	1.05	0.26	0.52	0.62

Disclaimer

Performance values are based on calculations, industry methodologies, and laboratory testing under controlled conditions. Variability may occur due to installation quality, environmental conditions, and building design. While care has been taken to ensure accuracy, Suntrenz Skylights accepts no liability for deviations in real-world performance.

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