

ABSORBRELLA TERRACE ENERGY SAVING REPORT

Object

The purpose of the following report will be to compare different energy sources from an energy perspective. solutions for sun protection on terraces.

Specifically, the thermal insulation behavior of a conventional type solution (PVC tarpaulins) will be compared with the two solutions with ABSORBRELLA from ISINAC, with the objective of quantifying the savings provided by these solutions in addition to the improvement in the user comfort.

Comparative solutions

Solutions for parasols used as sun protection on terraces that are compared in this report will be:

- Conventional solution with 0.85mm thick PVC canvas
- ABSORBRELLA type R 25mm thick
- ABSORBELLA type S 40mm thick

Calculation procedure

In order to compare the thermal behavior of the different solutions compared, will use the expression:

$$Q = U \times A \times \Delta T_{load}$$

Being:

U= thermal transmission coefficient of the surface (W/m²K)

A= surface area in m²

ΔT_{carga} = coefficient that depends on:

- Indoor temperature
- Outside temperature
- Color and absorption coefficient of the enclosure
- Incident solar radiation
- Convection and radiation coefficient

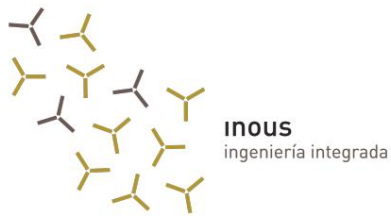
This last coefficient is tabulated.

This formula measures the amount of energy transferred to an enclosure through a surface and values both convective and radiant energy.

The following report will use a series of identical conditions for all enclosures as a calculation basis so that the comparison is valid.

Umbrella surface: 50 m²

Location: Madrid



Southeast Orientation

Exterior color: medium

Outside temperature: 33.6 °C

Considering these conditions $\dot{Q}_{load} = 10.8 \text{ °C}$

Results

The heat transfer results of the following solutions are shown below:

- PVC canvas 0.85 mm conductivity 0.12 W/mK and thermal resistance 0.066 m²K/W (it takes the canvas as a homogeneous material).
- Absorbrella canvas type R 25mm thermal resistance 0.237556 m²K/W
- Absorbrella type S tarpaulin 40mm thermal resistance 0.430045 m²K/W

material	thermal resistance (m ² K/W)	U(W/m ² K)	Area (m ²)	DT (tabulated) Madrid	Thermal load W	reduced W tion
PVC tarpaulin 8.5mm	0.0666	14,118	50	10.8	7623.53	
ABSORBRELLA tarpaulin R (25mm)	0.237556	1,560	50	10.8	842.46	89%
ABSORBRELLA canvas R (40mm)	0.430045	0.968	50	10.8	522.96	93%

Conclusions

The reduction in energy flow of Absorbrella tarps compared to a tarpaulin solution conventional is very significant, 89% in the case of 25 mm Absorbrella R canvas and 93% in the case of the 40mm Absorbrella R tarpaulin.

The results indicate a notable difference in the thermal comfort of users depending on

The solution adopted, in addition to a significant reduction in the energy required for increase this comfort if you use a specific air conditioning system for terraces.