

4.4 Thermal Performance

4.4.1 Introduction

The thermal performance of panels is expressed using the Ps, R and lambda (λ) values. The concepts of these values are explained here.

4.4.1.1 Ps-VALUE OR U-VALUE

The Ps-value (identical to the so-called U-value or transmittance typically used in building applications) is a measure of the thermal “conduction” of a panel in ideal circumstances, i.e. without considering the resistance of the heat flowing from the air or liquid into the panel. It is expressed in the unit $[W/(m^2 \cdot K)]$.

Panels with a higher Ps-value are panels with a greater thermal conduction, and are therefore worse insulators. The lower the Ps value, the better the insulating properties. **If the insulating properties are important (e.g. for panels used as wall cladding or heated swimming pools), a lower Ps-value is better.**



Important note

A low Ps value is not best for any application. In practical applications with great temperature differentials (e.g. liquid tanks and ventilation systems) the mechanical stresses in the panels may be higher because of the self-straining load. The effect of thermal differentials on liquid storage tanks is illustrated in section 6.6.3.

4.4.1.2 R-Value

The R-value is a measure of the thermal resistance of a panel in ideal circumstances. It is simply the inverse of the Ps value or U-value, and is expressed in the unit $[(m^2 \cdot K)/W]$. Panels with a higher R-value are panels with a greater thermal resistance, which means they are better insulators. **Therefore, if the insulating properties are important (e.g. for panels used as wall cladding or heated swimming pools), higher is better.**

4.4.1.3 Lambda Value

The lambda value (λ) is also a measure of the thermal “conduction” of a panel in ideal circumstances, but per unit thickness. Because panels have fixed thicknesses, this value is less interesting to use in heat-flow calculations.