technical data sheet

PERSPEX® CAST

PERSPEX® FROM LUCITE®

Thermal Expansion Coefficient of Perspex® from Lucite® Sheet

The coefficient of linear thermal expansion of thermoplastic materials is greater than that of most other materials and therefore, where significant variations in temperature are expected during service, an allowance must be made for thermal movement of the material.

Where Perspex® from Lucite® sheet is to be used for external signs, adequate allowance must be made for thermal expansion and contraction of the sign. In Europe, external signs can be subjected to extremes of temperature from -20°C in winter to +30°C in summer, a temperature variation of 50°C. From many years practical experience it has been found that, as a general rule, an expansion allowance of 0.5% or 5 mm per metre run length on both panel dimensions should be sufficient to accommodate any temperature or humidity variations.

It is equally important to bear in mind that, when fixing Perspex® sign panels into frames, the rebate depth of the frame must be sufficient not only to accept the expansion clearance but also an equivalent contraction allowance; otherwise panels could be blown out of their frames in gale force winds during the winter months.

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LUCITE®
The source of inspiration

The following is a worked example of how to calculate thermal expansion for a 3 metre panel over a 60 °C temperature change.

Panel size = 3000 mm

Temperature change = 60°C

Coefficient of Thermal Expansion = $7.7 \times 10^{-5}\ k^{-1}$

These are then simply multiplied together to find the thermal expansion of this panel over the stated temperature change:

i.e. Panel size x Temperature change x Coefficient of Thermal Expansion

$= 3000 \times 60 \times 7.7 \times 10^{-5}$

$= 13.86$ mm

This calculation must be done twice, once for the panel length and once for the panel width. The expansion over the thickness will be so small as to be negligible.

Similarly, as mentioned above, a panel will undergo thermal contraction during periods of cold weather. The calculation is exactly the same but the dimensions obtained are contraction rather than expansion and therefore need to be subtracted from the initial sheet dimension.