



High Temperature Applications (page 1)

Cellular PVCu foamed sheet has the ability to operate across a broad range of temperature and moisture conditions.

The product is designed to function through a very broad spectrum of application and post extrusion processes.

KEY NOTE:

PVCU becomes increasingly softer at higher temperatures.

Caution must be exercised at temperatures above 500C, as the performance of the product cannot be guaranteed.

Impact

Care should be exercised when using PVCU sheet products in warm environments. Due to the variation in Moisture and application it is not possible to be definitive as to the extremes of its operating capability. However the suggested operational limit is roughly +500C.

The level of impact resistance diminished significantly at increased temperatures so it is vital that each application is tested for suitability prior to formal instillation.

Energy absorption

The level of energy absorption of Foamalite sheet will vary depending upon both Thickness and colour (the darker the colour the greater and faster the energy absorption rate).

Coefficient of Thermal Expansion

Like all materials, Foamalite sheets are subject to a change in dimensions with changing ambient temperatures. This characteristic can be quantified by determining the linear coefficient of expansion (α), which considers the linear increase of a material per increase in temperature.

A change in linear length (ΔL) can be calculated using the following equation:

$$\Delta L = L \times \Delta t \times \alpha \text{ where } \Delta t = t_{\max} - t_{\min}$$

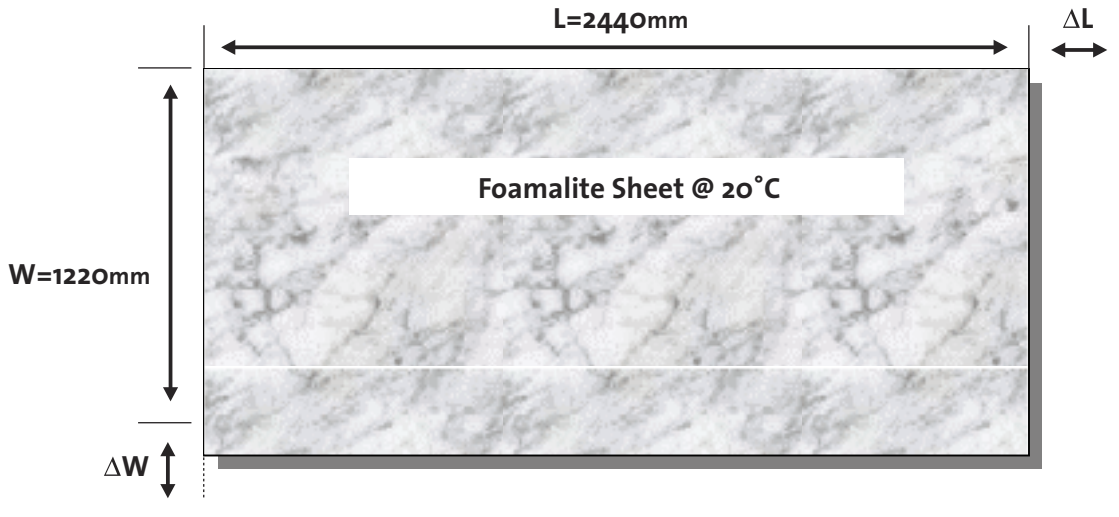
Symbols:

ΔL	=	Linear change in length (m)
L	=	Original length (m)
Δt	=	Change in temperature (K)
α	=	Linear Coefficient of thermal expansion (m/m/K)
t_{\max}	=	Maximum temperature of sheet (K)
t_{\min}	=	Minimum temperature of sheet (K)

A possible linear change in length should be considered during installation to prevent the introduction of stresses in the mounted sheet. Excessive stresses can lead to deformation (warping) and even cracking. Even in a European climate, a considerable change in ambient temperatures can be observed (-20 °C to 50 °C) and the maximum ambient temperature can be further increased if direct sunlight effects are relevant.

Ultra Violet Light & PVC Foam Sheet Materials

The practical implications of thermal expansion can be highlighted in the following example showing the increase in sheet length with increasing temperature:



Sheet Temperature (°C)	Dimensionnel Change (mm)	
	ΔL	ΔW
0	- 2.44	- 1.22
10	- 1.22	- 0.61
20	0	0
30	+ 1.22	+ 0.61
40	+ 2.44	+ 1.22
50	+ 3.66	+ 1.83

The value taken for Δ is an approximate value and is not truly constant with temperature for thermoplastics. The fixing technique must allow for the effects of thermal expansion /constriction by estimating the change in dimensions over the anticipated service temperature. It should be noted that Foamalit products might vary in performance in certain applications so tests should be carried out prior to use to establish the most suitable product.

Instillation

Prior to instillation of either flat panels or processed units it is recommended that the time or product is stabilised to the surrounding temperature and environment for roughly 24 hours prior to fixing in any form. The product will expand according to the change in temperature of the operating environment and allowance should be taken to accommodate this effect.

Other Information

For other information please refer directly to our technical manual or our technical depart who will be happy to offer advice and direction as appropriate.