



Vacuum Forming PVC Foam Sheet (page 1)

FORMING

Foamalite sheets can be thermoformed to the shape of a mould by using simple vacuum or pressure forming techniques. PVC has a broad thermoforming processing window and is well suited to this shaping process. Due to the excellent thermal insulation characteristics of PVC foam sheet, heating both sides of even moderately thick sheet using ceramic heaters is advisable. This simple process involves clamping the sheet, heating to the required thermoforming temperature and forming to the required shape of the mould by applying vacuum, air or both.

PVC is the exception to the rule that all thermoplastics suitable for the vacuum forming process must have a broad plastic range. This is because the elastic properties of PVC are not as tenacious as those of other plastics and can be overcome by the forces of atmospheric pressure, although vacuum levels must be good, (IE - .83bar or 24ins Hg).

Temperature range:

Solid PVC becomes elastic between 115 and 130oC and reaches it's plastic state at around 160oc. Caution must be taken not to overheat the sheet as it's degradation point is only 180oc. PVC foam sheet should perform to the same criteria but allowances must be made for the cellular content and its heat transfer capabilities.

Pre-drying:

It is not required that PVC sheet is pre-dried prior to vacuum forming.

Heating:

Due to the cellular structure of the product it is not advisable to use single heater vacuum forming machines. Top and bottom heaters are required to ensure a balanced flow of heat through the sheet surfaces. Irregular heating may cause the sheet to tear prior to forming. Significant "sag" may be evident as the sheet heats up so Pot opening depth and tool clearance must be considered.

Cooling:

Due to the cellular structure of the material water vapour cooling is advisable so as to ensure rapid surface cooling and integral heat dispersal. Slower cooling times/temperatures may cause the cellular structure to collapse in areas of increased stress.

Coloured sheet:

It should be remembered that coloured sheet materials absorb heat more rapidly than white. Shorter heating cycles or lower temperatures are then required for coloured sheet to ensure correct processing.



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Plug assist:

To enhance surface definition it is often the practice to use a "plug assist to force the sheet into specific areas of the mould. This practice is not recommended for use with PVC foam sheet as the added and localised pressure will crush the cellular structure causing deformation of the product.

Stress:

As PVC foam sheet is extruded there will be inherent stress within each sheet. This will be noticeable during the heating process as the stress is released. Caution should be taken not to over heat the panel as the process of releasing of these stresses can cause the sheet to tear.

Shape definition:

It should be remembered that to retain the surface and structural integrity of the sheet that broad radius must be used in tooling design. This depends upon the sheet thickness used.

Density:

Due to the variety of product densities available some caution should be adopted when calculating heating and cooling cycle times. Lower density products often contain more stabilisers and may be more difficult to form. Where lower density product is used we would suggest that longer heating times are used to soak the heat into the sheet.

Surface finish:

Due to the nature of the process vacuum forming may result in changes to the surface finish of the sheet. These can be a Glossing effect due to the heat element and/or a roughing effect due to the added stress on the surface making the cellular structure more evident. To reduce the potential effects consider longer heating cycles at lower temperatures and tool design to reduce surface stretching.

Data provided in this technical support sheet consists of approximate values based upon ongoing testing procedures and commercial experience. All Foamalite products described and included within this publication are subject to continuous quality control; in practice however, it is possible that figures here differ because of variations in the manufacturing processes and other external influences. It is recommended that distributors, processors and their customers establish the suitability of all Foamalite products for their application prior to use. Specifications are subject to change without notification.