Postforming High Pressure Laminate

General

The term ‘postforming’ describes the process of bending Formica® high pressure laminate into simple cylindrical concave or convex curves. This procedure is applied to specially developed grades of laminate which retain all the properties of standard grade laminates.

On internal and external angles, curved surfaces – with their absence of visible seams – are often more aesthetically pleasing than sharp edges; they also eliminate joints in which dirt and water can accumulate.

Thickness is an important determinant of formability. Generally, thin laminates can be formed to tighter radii than thicker laminates. For a given thickness, flame-retardant postforming laminates are less formable than non-flame-retardant postforming laminates.

Unlike some manufacturers’ postforming laminates which have a shelf-life, the formability of Formica laminates does not deteriorate during long-term storage.

The Postforming Process

All postforming requires the laminate to be heated on the area which is to be formed. To obtain the best (stress-free) bends, heat the laminate to just below the temperature at which it blisters (approximately 175°C). This forming temperature should be attained fairly rapidly, whatever the method of heating.

In practice, a reasonably wide forming temperature zone is needed between the lowest temperature at which the laminate will form without cracking, and the highest temperature which can be safely used without the risk of blistering. The recommended forming temperature range for Formica HGP and VGP postforming laminates is 150°C - 165°C. The recommended range for flame-retardant postforming grade VFP is 160°C - 170°C. Always form white laminates at the upper end of the temperature range.

Several postforming processes are available. These range from inexpensive workshop-made jigs to sophisticated machines that process panels on two edges at speeds of up to 15 metres per minute.

Whatever process is used, control and monitor the heating of the laminate meticulously throughout the working period. Fluctuations in ambient temperature, heater voltage or machine speeds may upset critical heating conditions, leading to cracking due to insufficient heat or to blistering from too much heat.

Applying heat sensitive liquids or waxes to the area to be heated is an effective way of checking the forming temperature. These melt instantly at the prescribed temperature, giving an accurate visible indication that the laminate surface has reached the required temperature. Hand-held infra-red thermometers can also be used, but take care that the instrument is measuring only the temperature of the laminate surface without being influenced by surrounding sources of heat or cold.

Equipment

The usual method of postforming is first to glue the laminate to the flat area of the panel or worktop, which has been previously shaped on its edge to the required profile, then to form and bond the laminate simultaneously over the rounded edge.

Glueing processes differ, but there are only two basic methods of postforming the laminate: stationary forming and continuous forming. In the first, the workpiece remains static during the forming operation; in the second, it is carried on a moving belt through the heating and forming zones of the machine.

Stationary or Static Forming

Static forming machines are simple bending rigs. The panel is pneumatically clamped to a flat stout bed with the overhanging laminate edge projecting. A retractable radiant heater descends and dwells over the laminate until the required forming temperature is reached. The heater is then retracted and an angled section folds the heated laminate over the edge profile and holds it in position until it is cool. An advantage of these machines is that they can be used for forming down-bends with large drop fronts.

A different method of stationary postforming is used in the Brandt machines. The infra-red radiant heater is replaced by a narrow heated platen, which directly contacts the laminate surface and irons it around a prepared profile. Bonding and forming occur simultaneously. Being in reality a small mobile press, it can use almost any type of adhesive. These machines are fully automatic: once set to a particular profile they follow it repeatedly at the touch of a button.

Continuous Forming

Continuous forming machines vary in their size and output capacity, but all operate in a similar way. The panel, which has had the edges radiused and the laminate bonded to the flat area, is carried by a chain or belt-drive through an infra-red heating zone, and past stainless steel bars which turn the now-softened laminate over the profiled edge. Shaped rubber or metal rollers press the formed laminate edge in place until the adhesive is cured, and the surplus laminate is trimmed off.

Continuous machines fall into two groups using different adhesive systems.

Continuous Process Using PVAc Adhesive

These machines are favoured in the mass production kitchen furniture industry. They are automated; and they use adhesives which require no special extraction facilities and present no fire hazard.

The panels or worktops are first veneered in a flat bonding press, with the laminate overhanging the profiled edges. The postforming machines are self-contained units: they form, glue and trim in one pass.

Continuous Process Using Contact Adhesives

These machines are usually double sided and capable of considerable width adjustment. The panel or worktop is first veneered by spraying both the laminate and substrate (including the profiled edges) with neoprene adhesive, then bonding them under pressure by passing the assembly through rubber-covered nip rollers.

For postforming, the laminate is first heated by passing through an infra-red heating zone to reach forming temperature. The heat reactivates the adhesive so that, when the laminate is formed and pressed home by the rollers, it instantly bonds with the adhesive coating on the profiled edges of the substrate.

Coving

The internal (concave) bend of a worktop with an integral riser is usually achieved by milling away the substrate in the area of the bend, then postforming the laminate over a heated metal former. An MDF in-fill piece (heel-piece) is inserted and glued in position after the laminate has been formed.

Substrates for Postformed Components

The requirements for a good substrate in general fabrication apply also in postforming. In addition, a substrate with good edge machining properties (producing a smooth clean finish with minimum break-out) is required to provide both a smooth transition from the flat into the radius, and flawless adhesion over the curve with minimum show-through.

1. Chipboard

Good quality chipboard with a smooth and even surface finish is essential. It should be constructed to prevent tearing out of the chip particles during the edge profiling process and should provide a fine even surface with no voids. Brush to remove loose particles after machining the profile.

2. MDF

The excellent machining qualities of MDF make it an ideal substrate for smooth edge profiles.

3. Plywood

Machining of the profile is more difficult with plywood as the multiple glue-lines can produce unequal wear of cutter blades. Keep blades as sharp as possible; clean them regularly and coat with a release agent to prevent resin build-up.

A post-sanding operation followed by brushing is advisable after machining. The machining direction should follow the grain of the surface veneers.

4. Solid Nose-pieces

Where components require a large external radius, fashion the profile from built-up sections of MDF or chipboard and never from solid timber, which may shrink and produce ripples on the laminate surface.