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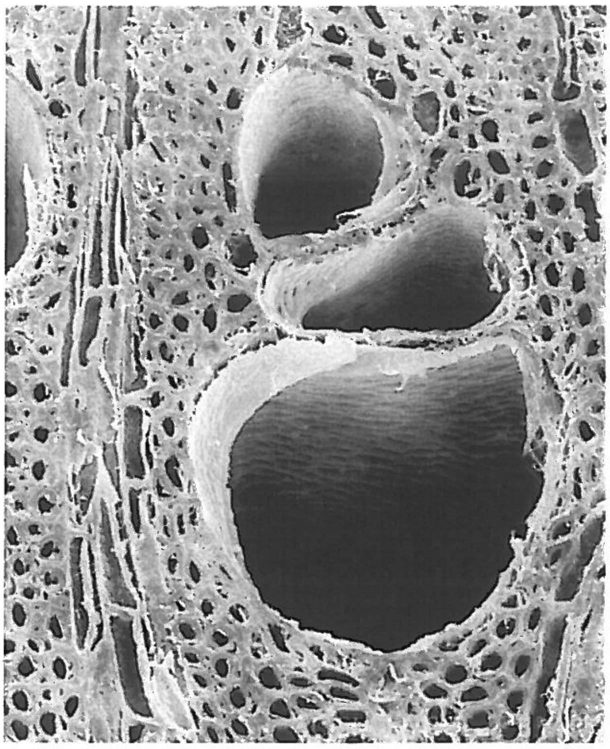

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Contents

High pressure decorative laminate suitable for application as postforming laminate using polyurethane resins

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Abstract

High pressure laminates (HPL), manufactured with paper and thermosetting resins, are a value-added product that has been increasingly used for home and commercial surfaces. Given the great interest in this type of product, the focus on the development of new products, with improved characteristics, is very important. Thus, it is intended to use different resins during the impregnation process, in order to confer postformability properties to the decorative papers to improve the performance of decorative postforming laminates. Postforming laminates are laminates that can be formed around curved edges by application

of heat and restraint, followed by cooling. Their maximum thickness is about 0.97 mm; these laminates can normally be formed or soft roll-formed to radii as small as 9.5 mm or less. Typical uses are cupboard door edges and counter bullnoses and cove bends

In order to add postformability to a laminate, many solutions have been described in patents. One patent suggest to change the furnish of the paper [1]. Another way is to modify the melamine resin that is used to impregnate the decorative layer including the use of caprolactams [2], glucosides [3], carbamates [4], mannatin [5], epoxies [6] and polyethylenoglycol [7]. Also severeal patents describe modifications to the phenolic resins to improve post-forming characteristcs [8, 9].This study intended to develop a postformable HPL using polyurethane resins .The strategy involves acquisition of different polyurethane resins from external suppliers (Table 1) to test in the first step its wettability behaviour, when used as impregnation resin.

Table 1 – Properties of the studied polyurethanes

Resin	Type of polyol	Ion type on the backbone
A	Polyether	Anionic
B	Polyester	Anionic
C	Polycarbonate	Anionic
D	Polyester	Cationic

When compared with melamine resins, only the cationic polyurethane resin exhibits identical wettability to the melamine resin. Thus, the cationic polyurethane resin was select as the impregnation resin.

To afford at the same time postforming capability, solvent and water resistance, heat resistance and moisture resistance, it was decided to use the polyurethane resin as impregnation resin in the first bath (in order to confer postforming properties) and the melamine resin in the second bath to confer the other properties.

The use of this impregnation method (cationic polyurehtane dispersion resin in the first bath and melamine resin in the second) result in a flexible paper (see figure 1) with the desired properties when subjected to test the resistance against water vapour, resistance to staining, and resistance to dry heat according to the European Standard EN 438-2

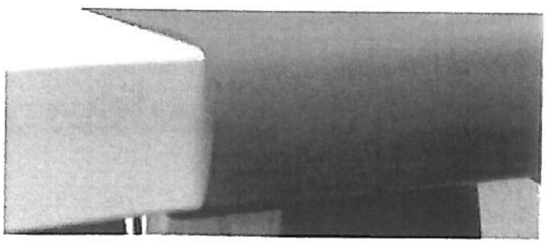

Figure 1: Flexibility of the paper with cationic polyurethane dispersion and melamine resins as impregnation resins

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