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# Impact of phenolic resin preparation on its properties and its penetration behavior in Kraft paper

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## **Abstract**

The core of decorative laminates is generally made of stacked Kraft paper sheets impregnated with a phenolic resin. As the impregnation process in industry is relatively fast, new methods need to be developed to characterize it for different paper-resin systems. Several phenolic resins were synthesized with the same Phenol: Formaldehyde ratio of 1:1.8 and characterized by Fourier Transform Infrared Spectrometry (FTIR) as well as Size-Exclusion Chromatography (SEC). In addition, their viscosities and surface tensions when diluted in methanol to 45% of solid content were measured. The capacity of each resin to penetrate a Kraft paper sheet was characterized using a new method which measures the conductivities induced by the liquid resin crossing the paper substrate. With this method, crossing times could be measured with a good accuracy. Surprisingly, the results showed that the penetration time of the resin samples is not correlated to the viscosity values, but rather to the surface tension characteristics and the chemical characteristics of paper. Furthermore, some resins had a higher swelling effect on the fibers that delayed the crossing of the liquid through the paper.

Keywords: Phenol; Formaldehyde; Resin; Penetration; Impregnation; Paper.

## **Introduction**

High Pressure Laminates (HPL) are boards of relatively high density, around 1.35 according to standards ISO EN 4386, which are used in different applications of furniture [1,2], electronics [3] and construction [4,5]. During the manufacturing of such decorative laminates, different impregnation process

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