Poster Presentation

Topic Area: Composites

A new methodology to predict the optimum pressing time for wood-based panels produced with low formaldehyde emission resins
Poster # 12

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Hot-pressing is the most important and costly operation in the manufacture of wood-based panels. Therefore, a rigorous control of all processing variables is necessary to ensure product quality and reduce pressing time. This is particularly relevant because of the changes in resin formulations that have occurred along the last decade, due to the stringent regulations on formaldehyde emissions from wood-based panels. In many industries, the scheduling of the press cycle is still performed based on past operating conditions, developed for traditional formulations and are not adapted to the new low formaldehyde emissions resins. For these new resins, the interaction between resin cure kinetics, bond strength development, mat rheological behaviour and heat and mass transfer during pressing is still not fully understood.

The aim of this work is to understand the influence of the pressing operating conditions on the performance of particleboards bonded with a Carb II class fortified UF resin. Several trials were carried out on a computer controlled lab scale hot-press, varying the venting start time, the total pressing time and the moisture content on the mat face layer. Analysis of variance (ANOVA) was performed in order to evaluate the significance level of the effects of these factors on particleboard physico-mechanical properties and formaldehyde emission.

A new methodology has been developed by combining results of mat internal temperature evolution and bond strength development curves obtained using ABES apparatus to estimate the internal bond strength. This methodology allowed predicting the minimum pressing time needed to obtain a panel that meets the standard specifications.