Effects of processing factors and polymer retention on the performance of phenolictreated wood

ABSTRACT

Effects of initial moisture content, soaking time and addition of urea on the performance of sesenduk (Endospermum diadenum) wood impregnated with low molecular weight phenol formaldehyde (LmwPF) were investigated. Wood samples with nominal dimensions of 150 mm × 50 mm × 10 mm and initial moisture contents of 15, 25 and 40% were impregnated with either 15% (w/v) LmwPF or mixed separately with urea (10, 20 and 30% based on solid PF) using a vacuum-pressure process. After impregnation, the treated samples were partially cured in an oven at 65 °C for 6 hours and subsequently compressed to a ratio of 50% in a hot press at 150 ± 2 °C for 60 min. Results showed that the initial moisture content and soaking time significantly affected polymer retention and weight per cent gain of the treated wood. Statistical analyses showed that density and reduction in water absorption of the treated wood were positively correlated with weight per cent gain, but thickness swelling was inversely correlated with it. The emission of formaldehyde was highly dependent on weight per cent gain and could be successfully reduced when urea was incorporated into the phenolic resin. The degree of reduction increased with urea concentration. Compreg products produced with or without urea had superior mechanical properties and reduction in water absorption compared with untreated wood.

Keyword: Impreg; Compreg; Formaldehyde emission; Swelling coefficient; Endospermum diadenum