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# Influences of Clay and Manufacturing on Fire Resistance of Organoclay/Thermoset Nanocomposites

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**ABSTRACT:** The organoclay GFRP nanocomposites are prepared using the vacuum assisted resin transfer moulding method. Two grades of organophilic clay with three content levels, three types of thermosetting resins (polyester, vinyl ester and epoxy), and three nanoclay dispersion techniques are investigated. To understand the effects of these factors on the fire performance, Taguchi design of experiments (DoE) method is employed and preferred combinations of factors are determined using a one-step and a proposed two-step GLM ANOVA. The one-step ANOVA is applied directly on the experimental results, while the two-step ANOVA is conducted on the signal-to-noise ratios obtained from the Taguchi analysis. The combination of mechanical and ultrasonic dispersing procedure has been found to have considerable influence on the of nanoclay distribution. While both approaches provide insights into the influences of each fabrication factor, the two-step gives a better prediction of the favourable response combination for the nanocomposites when validated with experiments.

**KEYWORDS:** Nanostructures, Polymer matrix composites (PMCs), Thermal properties, Statistical properties/methods, Taguchi method

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