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**An investigation of the effects of cutting parameters and graphite reinforcement on quality characteristics
during the drilling of Al/10B₄C composites**

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Abstract

This study investigated the effects of cutting parameters on the quality characteristics of thrust force (F_t), surface roughness (Ra), dimensional accuracy (Da) and burr height (Bh) during the drilling of Al/10B₄C and Al/10B₄C/5Gr composites. Machinability experiments were carried out with uncoated carbide twist drills at three different cutting speeds (18, 25 and 35 m/min) and three different feed rates (0.08, 0.112 and 0.16 mm/rev) under dry cutting conditions. The percent contribution of the cutting/drilling parameters/variables to the quality characteristics was determined using analysis of variance (ANOVA), and predictive linear equations were developed for the estimation of all the quality characteristics. As a result of the experimental study, it was determined that during the drilling of the composites, the 5% graphite reinforcement of Al/10B₄C/5Gr decreased the thrust force and the burr height, improved the surface quality and brought the composite closer to its ideal diameter value.

Keywords: MMCs, Drilling, Thrust force, Surface roughness, Dimensional accuracy, Burr height

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