

Dimensional Accuracy of CNTs/PMMA Parts and Holes Produced by Laser Cutting

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Abstract : Laser cutting is a very common production method for cutting 2D polymeric parts. Developing of polymer composites with nano-fibers makes important their other properties like laser workability. The aim of this research is investigation of the influence different laser cutting conditions on the dimensional accuracy of parts and holes from poly methyl methacrylate (PMMA)/carbon nanotubes (CNTs) material. Experiments were carried out by considering of CNTs (in four level 0,0.5, 1 and 1.5% wt.%), laser power (60, 80, and 100 watt) and cutting speed 20, 30, and 40 mm/s as input variable factors. The results reveal that CNTs adding improves the laser workability of PMMA and the increasing of power has a significant effect on the part and hole size. The findings also show cutting speed is effective parameter on the size accuracy. Eventually, the statistical analysis of results was done, and calculated mathematical equations by the regression are presented for determining relation between input and output factor.

Keywords : dimensional accuracy, PMMA, CNTs, laser cutting

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