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Effect of peak current on material removal rate for electrical discharge machining of non-conductive Al_2O_3 ceramic (Conference Paper)

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Abstract

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Electrical discharge machining (EDM) is a non-conventional machining process where materials are removed by the thermal energy exerted from series of electrical sparks. This process is applied for machining of non-conductive alumina (Al_2O_3). The workpiece is covered with the adhesive copper foil to initiate the initial spark between the workpiece and the tool electrode. A pyrolytic carbon (PyC) layer is generated on workpiece surface by dissociating kerosene dielectric after the machining of initial copper assisting electrode (AE) layer. In this study, experiments were performed by varying the peak current and keeping other parameters constant in order to investigate the effect of peak current on material removal rate (MRR) in EDM of Al_2O_3. The results showed that the lowest and the highest values of peak current were 1.1 A and 1.3 A, respectively. Material cannot be removed due to insufficient PyC layer generation for any values of peak current less than 1.1 A or more than 1.3 A. From the results, it is also observed that the MRR is increased when higher peak current values are used. MRR was found to be 0.052 mm^3/min at peak current 1.1 A and it was found to be 0.132 mm^3/min at peak current 1.3 A. © (2014) Trans Tech Publications, Switzerland.

Author keywords

Assisting electrode | Conductive layer | Electrical discharge machining | Material removal rate | Non-conductive ceramic | Peak current

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