Study on Effects of Powder-Mixed Dielectric Fluids on Electrical Discharge Machining Processes

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Abstract Powder-mixed electrical discharge machining is a technique for improving material removal rate and electrode wear ratio. Its utilization in the manufacturing industry is very low because many fundamental issues like machining mechanism, cost effectiveness of powders and powder concentration in the working fluid are not well understood. This study investigated the potential of diatomite powder suspension in distilled water for electrical discharge machining and compared its performance with that of aluminium and copper which are established in industry. Mild steel workpieces were machined using graphite. Completely randomized design was used to plan and analyze the experiments on effects of powders and concentrations on material removal rate and electrode wear ratio. Analysis of variance was performed at 5% level of significance. At optimum machining condition of 6 g/l, MRR increased by 32%, 44% and 7% while EWR decreased by 14%, 23% and 12% for diatomite, aluminium and copper, respectively