Effect of aluminium and chromium powder mixed dielectric fluid on electrical discharge machining effectiveness

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A B S T R A C T

This article studied the impacts of using different powders on the productivity of electro discharge machining (EDM) of Nimonic 80A alloy. The powders used for experiments are chromium (Cr) and aluminium (Al), though these powders are in contrasts in their thermo-physical characteristics. With the mixing of these powders in dielectric fluid, effect on surface roughness (SR), material removal rate (MRR), and mechanism of the machining process have been studied in this research work. On going through the results of experiments, it was observed that even volumetric proportion of powders, size of molecules, its density, electric resistance, and heat conductivity of additives were vital parameters that altogether influenced the productivity of powder mixed-electro discharge machining (PMEDM) process. With addition of proper ratio of powders in dielectric fluid, it enhanced the material removal rate, and consequently, reduced the surface roughness. Under a similar molecule volumetric proportion tests, the minutes suspended molecule size of powder prompted the largest material removal rate and consequently, the surface roughness increased. Conclusion is that adding chromium powder improves to the highest material removal rate, but poor surface finish while adding aluminium powder has the reverse effects.

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Keywords:
Powder mixed-electro discharge machining (PMEDM);
Aluminium powder;
Chromium powder;
Dielectric fluid;
Productivity;
Material removal rate (MRR);
Surface roughness;
Nimonic 80A alloy

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Article history:
Received 12 April 2019
Revised 13 September 2019
Accepted 15 September 2019

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