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IOP Conference Series: Materials Science and Engineering
Volume 926, Issue 1, 24 September 2020, Article number 012002
4th International Conference on Advanced Technologies in Design, Mechanical and Aeronautical Engineering, ATDMAE 2020; Kuala Lumpur; Malaysia; 10 July 2020 through ; Code 163714

## Micro Dry Wire EDM: Kerf Investigation using Response Surface Methodology (Conference Paper) (Open Access)

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## Abstract

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Dry electrical discharge machining (DEDM) is an environmentally friendly and green machining process where it uses gas as the dielectric fluid instead of liquid. It is an alternative to the conventional electrical discharge machining (EDM) process. However, kerf variation remains as a critical issue in micro dry wire EDM (μDWEDM) process. Therefore, the objective of this research is to investigate kerf in μDWEDM using response surface methodology (RSM). The experimental investigation was perform using an integrated multi process machine tool, DT 110 (Mikrotools Inc., Singapore). Stainless steel (SS304), tungsten wire, and compressed air were used as the workpiece, electrode, and dielectric fluid respectively. Central composite design (CCD), a type of RSM, was used to design the experiment using two controlled parameters which were capacitance and gap voltage. Analysis of variance (ANOVA) was used to analyse the results and to evaluate the adequacy of the developed model. The results were obtained by measuring the kerf using scanning electron microscope (SEM) (JEOL JSM-5600, Japan). An empirical model has been developed, and it was found that both parameters; capacitance and gap voltage have high influence on kerf. The optimum parameters for minimum kerf were found to be 0.1 nF capacitance and 91 V gap voltage. The developed model was found to be adequate since the percentage error was relatively small (~ 2%). © Published under licence by IOP Publishing Ltd.

## SciVal Topic Prominence

Topic: Electric Discharge Machining | Inconel (Trademark) | Tool Wear

Prominence percentile: 99.322

## Chemistry database information

### Substances

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## Funding details

| Funding sponsor | Funding number | Acronym |
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