

INVESTIGATION OF DRY AND NEAR-DRY ELECTRICAL DISCHARGE MILLING PROCESSES FOR PROCESS PERFORMANCE : REVIEW

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Abstract

The study investigating the dry and near-dry electrical discharge machining (EDM) milling to achieve a high material removal rate (MRR) and fine surface finish for roughing and finishing operations, respectively, Dry EDM uses gas and near-dry EDM applies a liquid-gas mixture as the dielectric medium. Experimental studies leading to the selection of oxygen gas and copper electrode for high MRR dry EDM and the nitrogen-water mixture and graphite electrode for fine surface finish near-dry EDM are presented. Near-dry EDM exhibits the advantage of good machining stability and surface finish under low discharge energy input. Dry EDM uses gas to replace the liquid dielectric fluid in conventional EDM. Near-dry EDM applies liquid-gas mixture as the dielectric fluid. The EDM milling configuration is used to supply the dielectric fluid through a rotary tubular tool electrode. The process is capable to achieve both high material removal rate (MRR) and fine surface finish. Experimental results demonstrating the feasibility of the dry EDM process are available from a few research groups. However, literature in this field is insufficient and further research is required to make this process commercially feasible. This paper present a review on the dry and near-dry electrical discharge machining and future trends of its application.

Keywords: Dry EDM, Near-dry EDM, surface finish, material removal rate, surface finish.