

# **Optimization of EDM Process Parameters for Inconel 718 by Machine Learning Techniques**

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## **Abstract**

Electrical Discharge Machining (EDM) is used to machine electrically conductive materials with complex shapes through controlled electrical discharges. Inconel 718, a tough nickel-based superalloy, poses machining challenges due to its hardness and heat resistance, causing rapid tool wear and poor surface finish in traditional methods. This study optimizes EDM parameters for Inconel 718 using machine learning (ML) techniques. By leveraging ML algorithms, we aim to identify optimal parameters to improve material removal rates and machining efficiency. Experiments using Wire EDM (WEDM) with zinc-coated brass wire electrodes highlighted pulse-off time as crucial for quality. A machine learning model was developed to predict optimal WEDM settings, showcasing ML's effectiveness in enhancing machining performance for Inconel 718. This research offers a data-driven approach to optimize EDM parameters, boosting efficiency in machining Inconel 718.

## **Keywords**

Inconel 718, EDM, Machine Learning, Process Parameters, Nickel Alloy