

## ABSTRACT

Metal removal mechanism in Electrical Discharge Machining (EDM) is mainly a thermal phenomenon where thermal energy is produced in plasma channel, and is dissipated through work piece, tool and dielectric. The process is mostly used in situations where machining of very hard materials, intricate parts, complex shapes. The aim of this work is to pursue the influence of three design factors, current (I), pulse (V), pulse on (Ton), and pulse off (Toff) which are the most connected parameters to be controlled by the EDM process over D2 machining specifications such as material removal rate (MRR) and characteristics of surface integrity such as average surface roughness (Ra) quantify them. The experiments were carried out as per L9 orthogonal array. Each experiment was performed under different conditions such as Ampere rating, pulse on time and pulse off time. The optimal factor for Surface Roughness, Machining timing and Material removal rate were obtained when Pulse on time is 7  $\mu$ s, Pulse off time 12  $\mu$ s and Amps-6. Particularly output response was mainly depending on the pulse on time for the maximum output Response. The major Contribution of Surface Roughness and Machining Timing - 46% influenced with pulse on time and Material Removal rate mainly influenced with Pulse on time 28% of the D2 steel.

**Keywords:** EDM, surface roughness (Ra); material removal rate (MRR); current (I); voltage (V); pulse on (Ton); pulse off (Toff).