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# Accuracy of duplex stainless steel feature generated by electrical discharge machining (EDM)

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## Abstract

The present paper studies different types of errors generated on the feature (cylindrical holes) which was fabricated by the wire EDM of 2205 duplex stainless steel. Different experimental parameters such as, pulse on time, pulse off time and wire tension on the feature as well as the contribution of these parameters on cylindricity error, circularity error and diameter error were explored. Moreover, interactions among the input parameters were also considered. It was found that the total contributions of interactions between different parameters are reasonably high for all the cases which make the modelling process very complex for cylindricity, circularity and diameter errors in term of the range of parameter considered in this investigation. Wire tension has highest contribution on cylindricity error which is lowest at high value wire tension. Pulse on time has minor contribution on the cylindricity error and it increases with the increase of pulse on time. Pulse of time does not have any influence on the cylindricity error. The circularity error was lowest at medium pulse off time and medium wire tension; and those two parameters have almost similar and highest contributions. The pulse on time has around 14 % contribution on circularity error and the medium value of it minimizes the circularity error. The input parameters such as pulse on time, pulse off time and wire tension have around 13%, 16% and 7% contributions respectively on diameter error which is minimized at medium pulse on time, and low pulse off time and low wire tension.

Keywords: Duplex stainless steel; errors; wire EDM.

## 1. Introduction

Stainless steel is a renowned engineering material for number of structural applications. Duplex stainless steel is a special variety of stainless steel which resulted due to continuous development towards obtaining superior properties such as, localised corrosion resistance (J Nomani, Alokesh Pramanik, T Hilditch, & G Littlefair, 2013), high toughness and good hot workability. Since its introduction in structural applications, the demand

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