

The Influence of Speed on Kerf width using PA to Optimize the Quality of 1mm Copper Sheets

Dr. Abdulrahman Abu Zeid

Assistant Professor, Department of Mineral Products and Ornaments, Faculty of Applied Arts, Helwan University, Egypt.

Abstract:

Copper is widely used in industry where it has a number of varied applications. Nowadays, various methods are used in productive industries to provide the fastest, cheapest, and most effective solutions in facilitating cutting operations with minimal surface deformation. The study aims to examine the effect of speed on the kerf width to optimize the quality of 1 mm Cu surfaces using Plasma Arc Cutting Machining (PACM). The study used the experimental approach in performing cutting machining a number of 13 specimens with different cutting speeds from lowest to highest and using the same ampere for all experiments. The main objective is to study the effect of speed on the cutting quality. The design of the cutting path included the straight line and the angle resulting from the convergence of the vertical line with the curve of the circle, the obtuse angle, right and acute angle, the curved line and the angle resulting from the convergence of the horizontal line with the curve of the circle. A number of 18 points were assigned and measured and kerf width readings were recorded for all points on the path. The results of the measurement readings for the samples were compared, discussed and represented graphically to determine the speeds that can be used to obtain good cutting quality. Among the most important results of the study, the cutting speed increased at the beginning of the cutting path and resulted in a lower kerf width. This had a clear effect and increased the cutting quality. At the angle resulting from the convergence of the vertical line and the curve of the circle, the cut resulted in a greater kerf width. When the cutting speed decreased, the kerf width increased and the cutting quality decreased. The points on the circumference of the circle on the cutting path also recorded lower width values, lower than the mean values at higher speeds.

Keywords

Cutting Speed ,kerf width ,Plasma Arc Cutting Machining , Kerf (Cutting) Quality ,Copper

Paper History:

Paper received 15th July 2019, Accepted 10th September 2020, Published 1st of October 2020