

Calculating the Carbon Footprint of Laser Cutting Machines from Cradle to Grave and Examination the Effect of the Use of the Machine on the Carbon Footprint

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Abstract : Against the climate crisis, an increasing number of countries are working on green energy, carbon emission measurement, calculation and reduction. The work of industrial organizations with the highest carbon emissions on these issues is increasing. Aim of this paper is calculating carbon emissions of laser cutting machine with cradle-to-grave approach and discuss the potential affects of usage conditions, such as laser power, gas type, gas pressure, on carbon footprint. In particular, this study includes consumption of electricity used in production, laser cutting machine raw materials, and disposal of the machine. In the process of raw material supplying, machine processing and shipping, all calculations were studied using the Tier1 approach. Laser cutting machines require a specified cutting parameter set for each different material in different thicknesses, this parameters are a combination of laser power, gas type, cutting speed, gas pressure and focus point, The another purpose of this study is examine the potential affect of different cutting parameters for the same material in same thickness on carbon footprint.

Keywords : life cycle assessment, carbon emission, laser cutting machine, cutting parameters

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