
Searching for solutions to micro hole perforation in chromium and chromium-nickel steel

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The study considers the problem of high positional density micro hole forming in chromium-nickel steel by nanosecond laser emission. The article describes the sequence of technological approaches and operations. We modelled the effect of laser emission on the surface of chromium-nickel steel. We created heat field distribution diagrams for various numbers of pulses. The data obtained during computer modelling and full-scale experiments are in 97% agreement. We determined the optimum sequence for hole formation so as to decrease thermal loading on the workpiece. This helped to avoid thermal warping of the part. The study suggests a range of technological approaches to increase the edge surface quality of the micro holes obtained. It became possible to decrease the amount of liquid phase products spilling onto the surface of the part being treated. We validate the feasibility of employing additional technological approaches during laser microperforation.

Keywords: fibre laser, laser microfabrication, ultra-perforation, micro holes, chromium-nickel steel.

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