

Machining of Micro Tools by Electrical Discharge Machining

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Abstract. Mass production of micro or miniature parts is increasingly based on replication technologies, such as hot embossing, micro-injection moulding, and bulk forming. These technologies rely on the application of high thermal and mechanical loads on the forming tool and especially on the integrated microstructures. To achieve sufficient tool life, functional tool materials with high strength and hardness like steel or cemented carbide are used. The mechanical properties of these materials are a strong limitation to the variety of structuring technologies which can be applied. Due to the non-contact thermal removal mechanism, electrical discharge machining (EDM) is a manufacturing technology which allows an almost process force free machining. It is used in many micro-technological applications. EDM offers a suitable alternative to conventional mould-and-die-making in terms of obtainable structure dimensions and accuracy. In combination with a wide range of geometric complexity and high accuracy, electrical discharge machining is able to process functional materials with precision of few micrometers. Since micro-electrical discharge machining can be used economically small series production, next to primary structuring of micro parts, it is predestined for the machining of micro tools. This paper presents a comparison of various micro-electrical discharge machining technologies and strategies for application in the field of micro tool manufacturing.

Keywords: Micro Manufacturing, Micro Electrical Discharge Machining, Die and Mould Making