



Electrochemical Micromilling (ECF)

ECMTEC GmbH

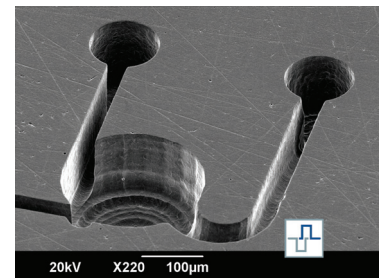
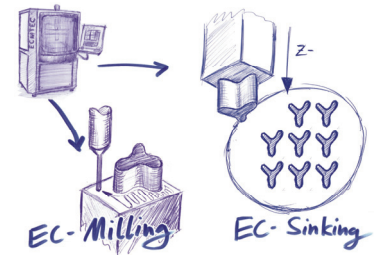


BACKGROUND and BASICS

The manufacturing of micro structures directly into metal or steel parts is still a problem. Conventional micro processing technologies like micro milling, laser micro machining or micro EDM create mechanical and or thermal stress to the material. Another problem is the tool wear that very often causes in non-constant machining processes and results.

With the mentioned conventional machining technologies 3D-micro structures into metal parts are still a problem too. The electrochemical micromilling (ECF) is a new micro machining technology to create 3D- and 2D- micro structures directly into metal or steel down to sub-microns.

New metal and steel applications like micro fluidic systems, micro nozzles, micro molds, micro sensors and lots of other high resistant micro devices are now possible with ECF.

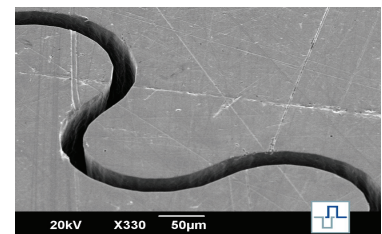
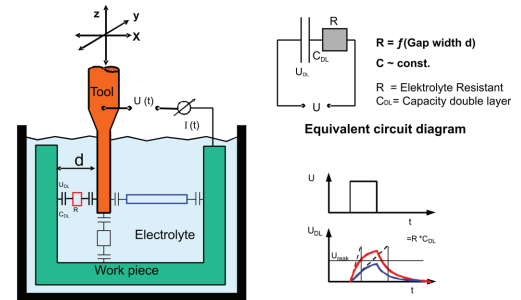


CONCEPT and SOLUTION

The electrochemical micromilling (ECF) is a controlled and highly precise performing electrochemical micro machining process. During the ECF the metal or steel is accurately dissolved around the electrode (tool) without any wear to the tool and without any thermal or mechanical stress to the machined material. Basically the ECF is an extremely precise and controlled electrochemical anodic dissolution process.

ECMTEC has developed a standard metal working CNC-machine (ECF-Machine "micro") that fits perfectly into common CAD-CAM working paths. The new ECMTEC machine concept allows rapid prototyping like on a standard CNC-milling machine. But it also enables to perform serial manufacturing by using the sinking mode. Therefore 3D- and 2D-structures can be machined into metal and steel easy and effectively.

Electrochemical micromilling with ultra short voltage pulses (ECF)



STATUS and OUTLOOK

- main development work has been finished.
- only some more process development work is required for specific applications or related to specific metallic materials and alloys.
- the standard ECF-machines "micro" is already available on the market.
- depending on specific applications special ECF-machines can be developed.



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