TECHNISCHE UNIVERSITÄT CHEMNITZ

Fakultät Maschinenbau
Institut für Werkzeugmaschinen und Produktionsprozesse
Professur Fertigungsmesstechnik

TOPIC FOR PA/ SA/ BA/ MA

CHARACTERIZATION OF PLASMA-POLISHED SURFACES

Plasma electrolytic polishing (PEP) is an electrochemical process for the post-treatment of metallic surfaces, in which roughness peaks are selectively removed through the formation of a plasma sheath on the workpiece surface. This process offers significant potential for improving surface quality, particularly for additively manufactured components, as these often exhibit pronounced surface roughness and direction-dependent structures due to the layer-by-layer manufacturing process. For industrial application, a thorough understanding of how process parameters influence surface properties is therefore essential.

The aim of this thesis is to experimentally investigate the influence of polishing duration on the surface quality of additively manufactured components. Based on optical measurements of the test specimens, the applicability of common roughness parameters to real surfaces is to be examined, and additional parameters (two- and three-dimensional) are to be derived.

https://beckmann-institut.de/portfolio/plasmaelektrolytisches-polieren/

TASKS:

- Research and compilation of the current state of the art in research and technology regarding the geometric description of additively manufactured and PEP-treated surfaces
- Development of an experimental design
- Design of a method for marking the surface to identify the same measurement area before and after polishing
- Optical measurement of selected test specimens
- Selection and derivation of suitable parameters and development of an evaluation concept for PEP-surfaces
- Compilation of findings and formulation of an outlook

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