Validation of in-line surface characterization by light scattering in Robot Assisted Polishing

The suitability of a commercial scattered light sensor for in-line characterization of fine surfaces in the roughness range Sa 1 – 30 nm generated by the Robot Assisted Polishing (RAP) was investigated and validated. A number of surfaces were generated and directly measured with the scattered light sensor on the machine in a shop floor environment. Scattered light roughness measurements of the whole surfaces were performed to investigate the measurement method suitability for 100% quality control. For comparison, the surfaces were measured with reference optical instruments in laboratory conditions. Comparison of the scattered light measurements results taken on the machine with the reference optical roughness measurements taken in laboratory demonstrate the capability of the scattered light sensor for robust in-line surface characterization. This allows for the RAP process control by proper process endpoint detection in a multi-step polishing sequence. The measurements of the whole polished surfaces demonstrate improved reliability of the measurements with fast measurement rate, well suitable for cost-efficient 100% quality assurance.

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