

Fully Printed Strain Gauges: A Comparison of Aerosoljet-Printing and Micropipette-Dispensing

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Abstract : Strain sensors based on a change in resistance are well established for the measurement of forces, stresses, or material fatigue. Within the scope of this paper, fully additive manufactured strain sensors were produced using an ink of silver nanoparticles. Their behavior was evaluated by periodic tensile tests. Printed strain sensors exhibit two advantages: Their measuring grid is adaptable to the use case and they do not need a carrier-foil, as the measuring structure can be printed directly onto a thin sprayed varnish layer on the aluminum specimen. In order to compare quality characteristics, the sensors have been manufactured using two different technologies, namely aerosoljet-printing and micropipette-dispensing. Both processes produce structures which exhibit continuous features (in contrast to what can be achieved with droplets during inkjet printing). Briefly summarized the results show that aerosoljet-printing is the preferable technology for specimen with non-planar surfaces whereas both technologies are suitable for flat specimen.

Keywords : aerosoljet-printing, micropipette-dispensing, printed electronics, printed sensors, strain gauge

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