Simultaneous processing by combination of EHLA and turning

EHLA as an alternative to electroplating

With extreme high-speed laser material deposition (EHLA), Fraunhofer ILT has developed a pioneering alternative to hard chrome plating. This process has several advantages: It uses fewer resources, a greater range of materials, and no environmentally harmful chemicals, all added to the very high adhesive strength of the applied coatings. EHLA has been used in industry since 2015, for example for coating hydraulic components. However, EHLA coatings need mechanical post-processing, which constitutes an additional expense and has an impact on how productive and cost-effective the entire process chain is. Mechanical post-processing is particularly time-consuming and costly, especially for high-hardness coating materials for wear protection applications. Simultaneous machining and coating is an innovate solution to address these issues.

Coating and machining in one process step

Simultaneous Machining and Coating (SMaC) is a variant of Fraunhofer ILT's patent-pending manufacturing technology that combines the EHLA process with turning in a single process step, thus enabling users to produce coatings rapidly and with excellent surface quality.
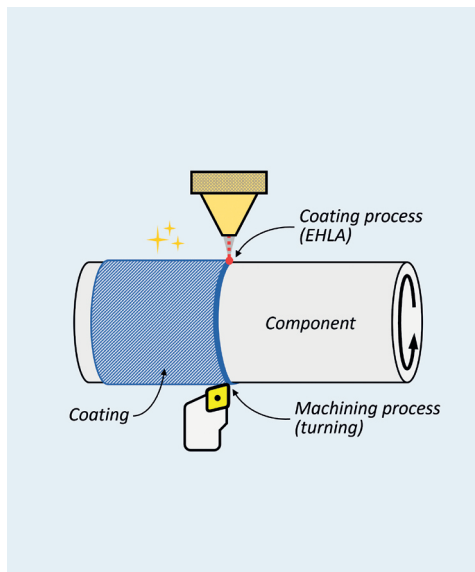
Economic and technological advantages through simultaneous processing

In addition to considerably shorter production times and lower investment costs, the new process also has technological advantages. By introducing compressive stresses on the tool side, thermally induced tensile stresses in the coating can be specifically compensated for and coating defects prevented. Immediately after laser material deposition, the hardness of the coating material is reduced thanks to residual process heat. This way, the material can be better machined during simultaneous mechanical post-processing, which reduces tool wear, particularly when high-hardness coatings for corrosion and wear protection are produced.

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Coating process (EHLA)

Component

Coating

Machining process (turning)

1 SMaC: Simultaneous processing using EHLA and turning.
2 How the SMaC process works.