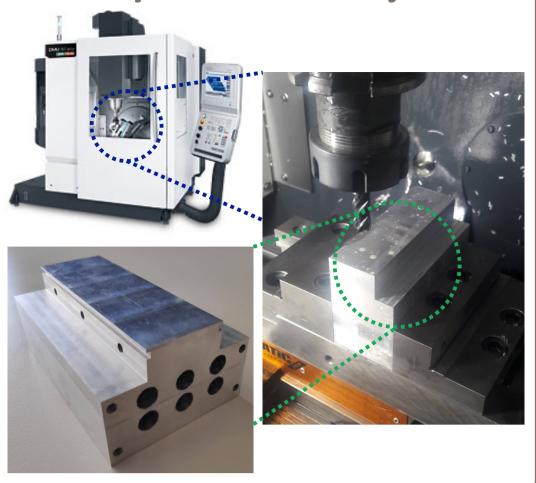
Steam Boiler -



Laser Engraving Successive laser pulses 3D profile 0.24 [nm] laser beam 0.20 2000 cut 0 Depth of 6 [mm workpiece 0.10 0.05 14 pulses 4000 0 0.05 0.10 0.15 0.20 [mm] 0.30 0 Workpiece material: SAE304. Average Output Power: P=3.5W. Repetition rate: F=20kHz Scanning speed: V=500mm/s, Laser spot diameter: D=30µm Laser engraving simulation 12·10<sup>-4</sup>s 24·10<sup>-4</sup>s ection plane 150µm 36·10<sup>-4</sup>s Material: SAE 304 stainless steel Process parameters: F=30kHz, V=600mm/s, P=12W Laser Machine: R=15µm, t<sub>p</sub>=100ns Engraving geometry: 120x120µm, rectangular pocket Depth of cut scale: 0 2 4 6 8 µm 12 Jube surface engraving

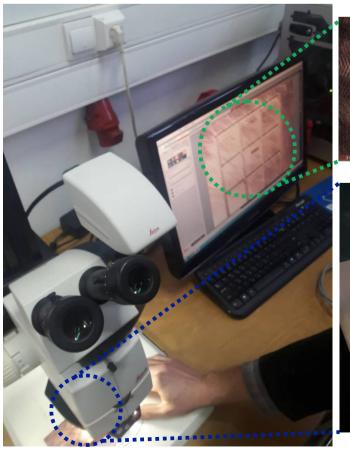
## Workpiece Milling

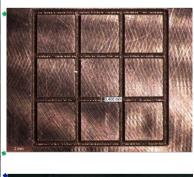


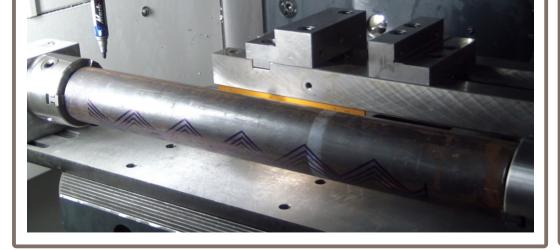
Smart Heat Exchanging Surfaces at Innovative and Highly Efficient Steam-Boiler (Smart Boiler)

> E. Nikolidakis, M. Pappa, C. Efstathiou, A. Katsamaki, A. Antoniadis











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