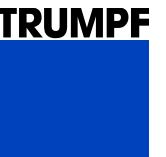


EPIC Online Technology Meeting on Laser Beam Welding

Laser Welding for eMobility applications

Matthias Beranek, IWE | Industry Management Automotive

TRUMPF Laser- und Systemtechnik GmbH



Laser Applications for eMobility

Broad spectrum: Applications with TRUMPF lasers



Power Electronics

Copper / Aluminum / Cu-Al

Battery Cell & Module

Battery Container

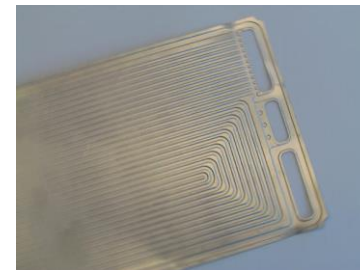
Aluminum / Steel

Hairpin eDrives & Drivetrain



Copper / High Strength Steels

Fuel Cell

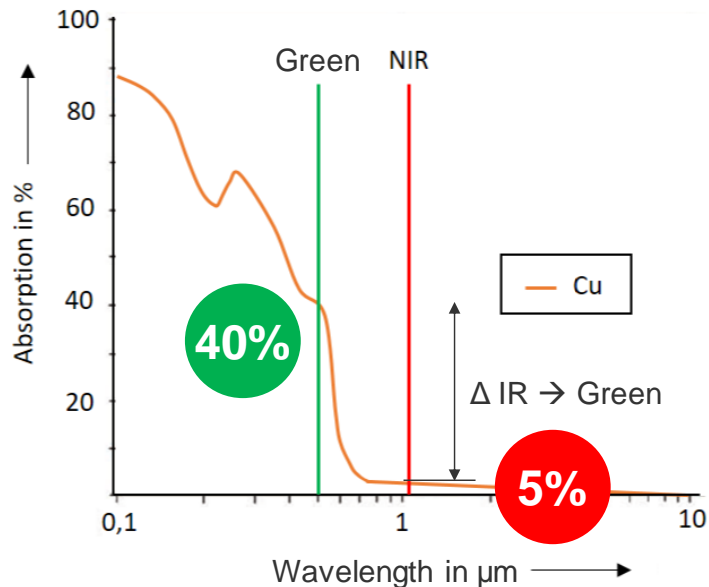


Stainless Steels

Copper Welding using High Power lasers with **Green** wavelength

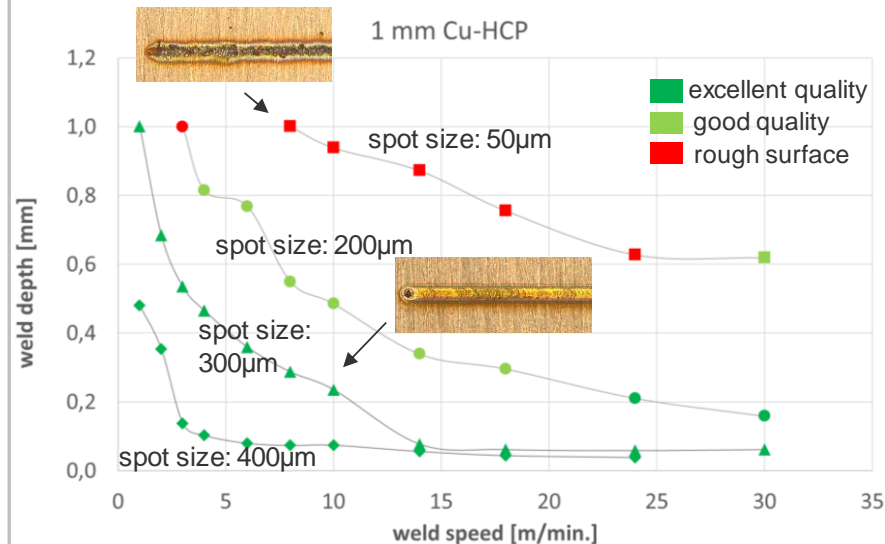
Extremely stable processing of thin sheet copper with up to 2kW

Absorption of visible wavelength exceeds IR at incoupling condition



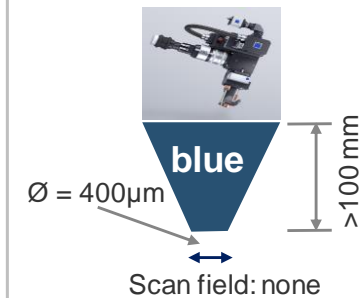
Absorption at room temperature, polished surface and vertical beam propagation

High beam quality enables high productivity & weld depth
TruDisk Green 1kW, BPP2

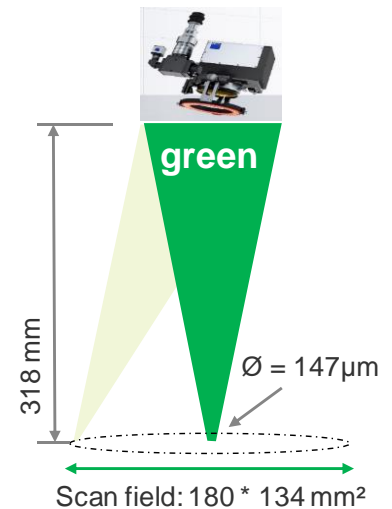


High beam quality enables fastest production systems

BPP 29mm*mrad
(TRUMPF blue)



BPP 2mm*mrad



Copper Welding using High Power lasers with **Green** wavelength

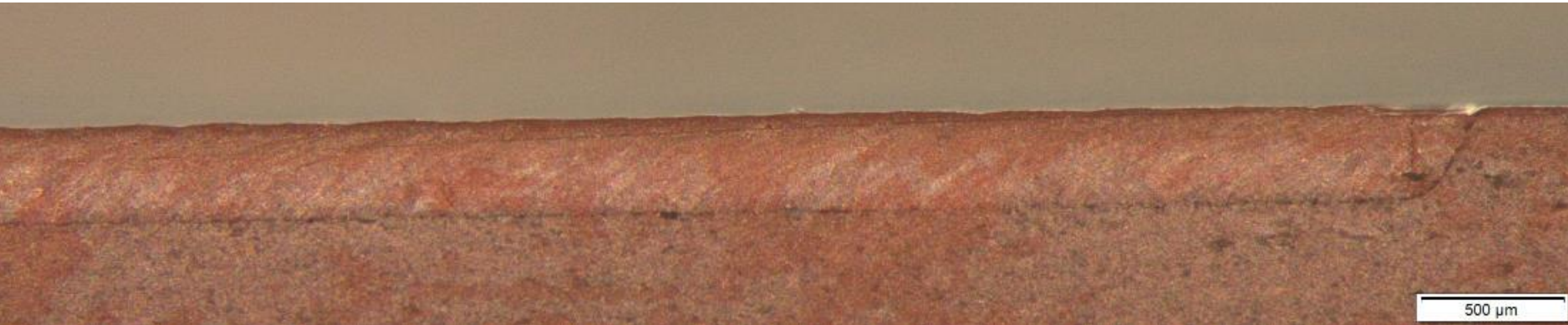
Extremely stable processing of thin sheet copper with up to 2kW

TruDisk 1020 (1kW)

Bead on plate welding, Longitudinal section

Velocity 5 m/min

Welding depth 0.35 mm



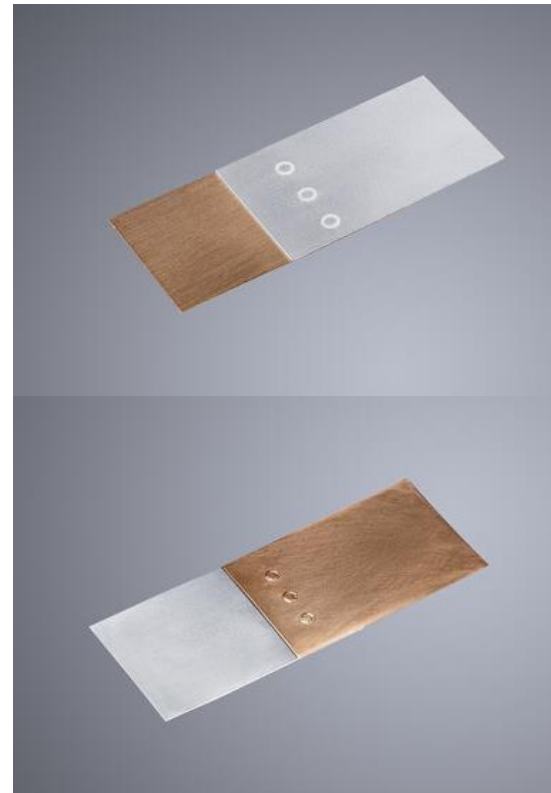
Copper Welding using High Power lasers with **Green** wavelength

Extremely stable processing of thin sheet copper with up to 2kW

Copper Foil Welding



Cu/Al, Al/Cu Weldjoints



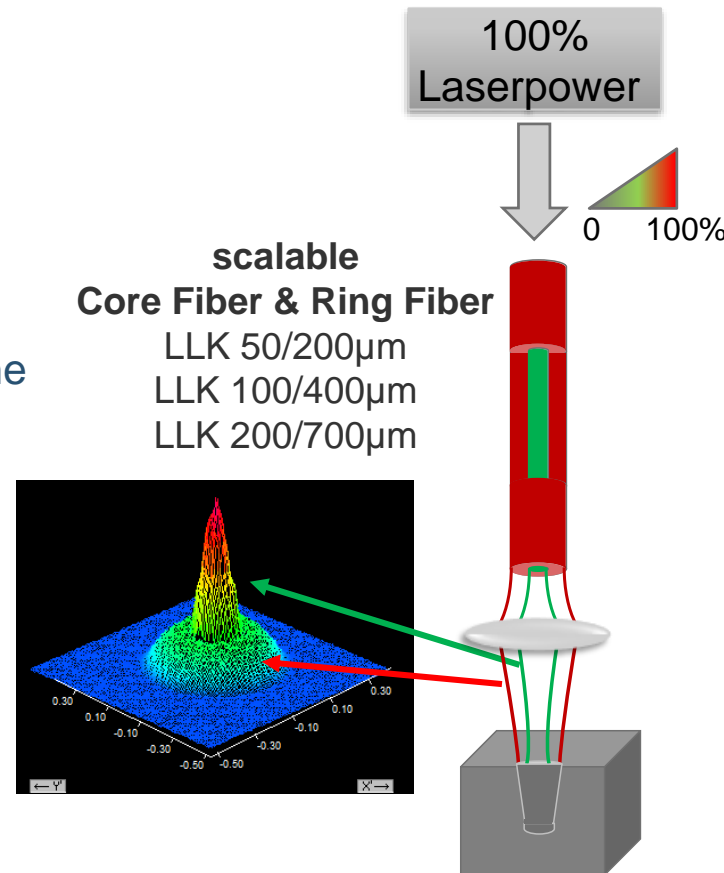
Multi Spot Laserwelding

Flexible power distribution using BrightLine Weld up to 16kW

- Patented waveguide layout of **TRUMPF2in1-fiber**
- Flexible distribution of laser power into inner and outer fibercore
- Superposition of two beams into the process zone
- New degree of freedom

Stabilized Welding Process

Significant Spatter Reduction



STEEL

High Speed Welding (no humping)

High Efficiency

COPPER

Low- and Highspeed Welding

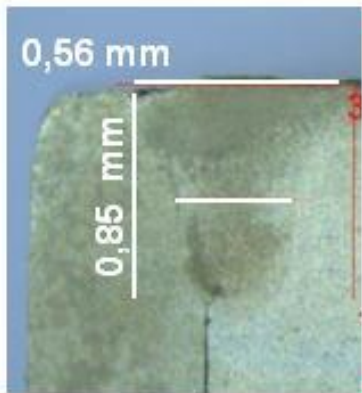
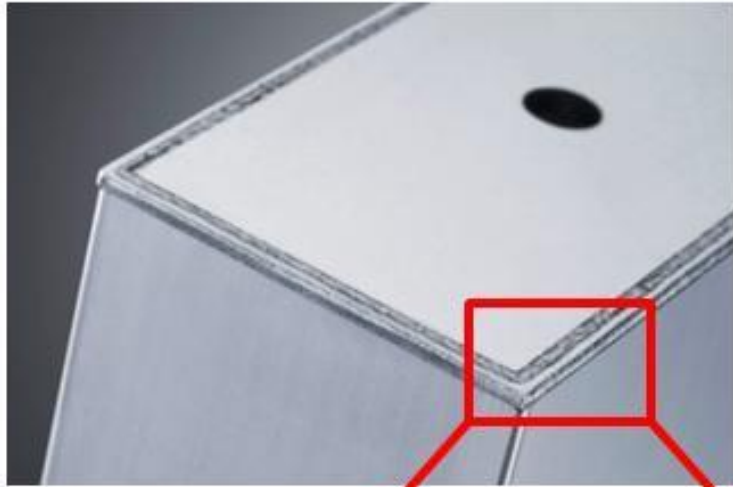
Smooth Seams

ALUMINUM

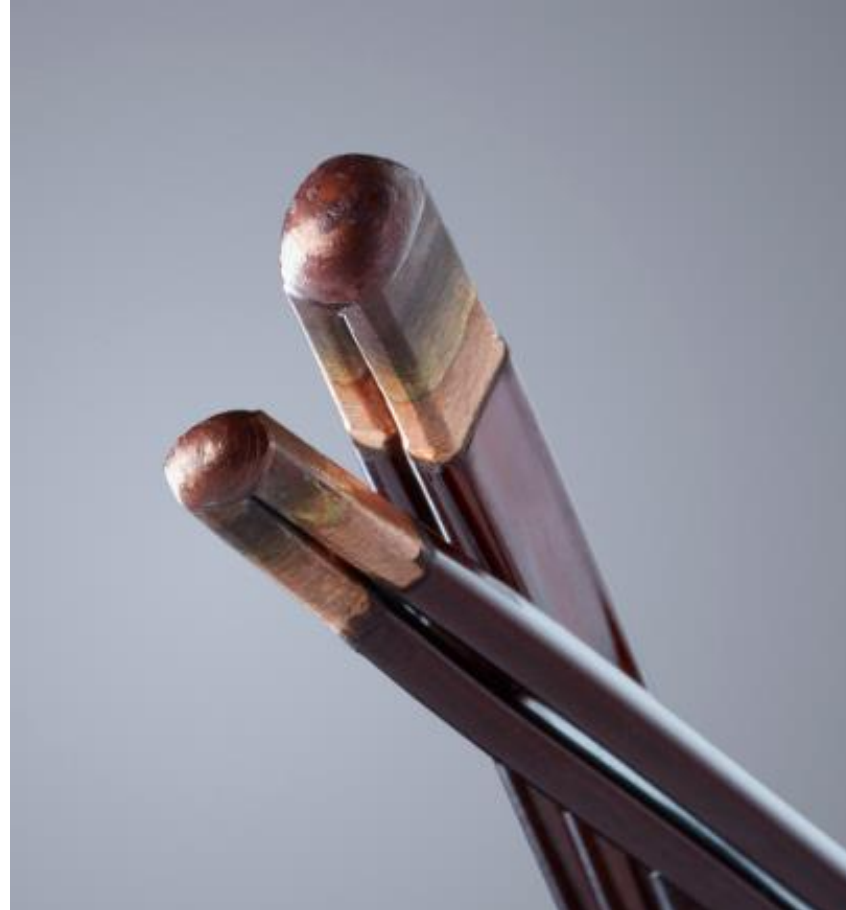
Crack free welding of 6000 alloy

Application examples of BrightLine Weld

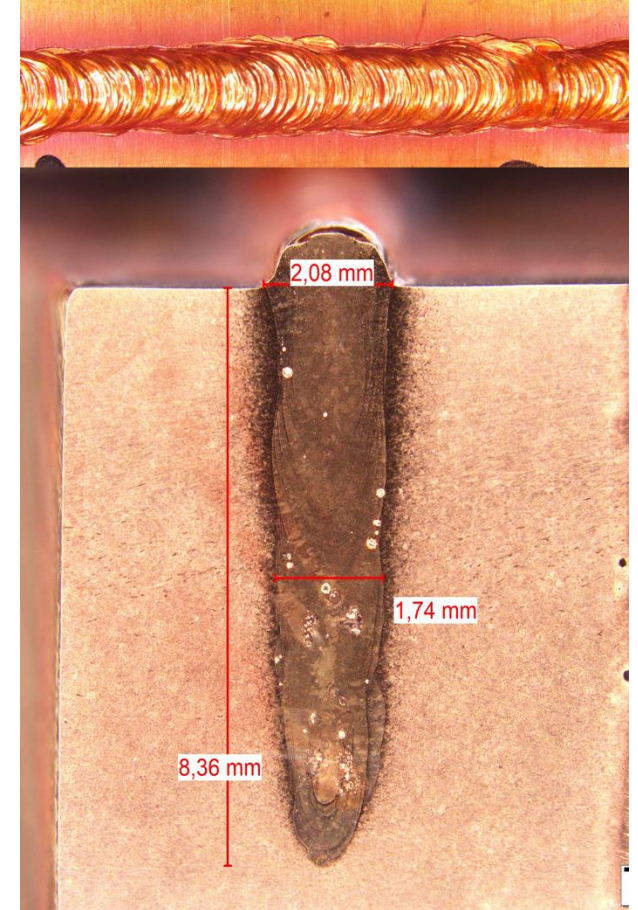
Deep Penetration copper-, aluminum- and steel-welding



Battery Cell Housing



Hairpins for eDrives



PD > 8 mm for busbars



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