Laser welding applications

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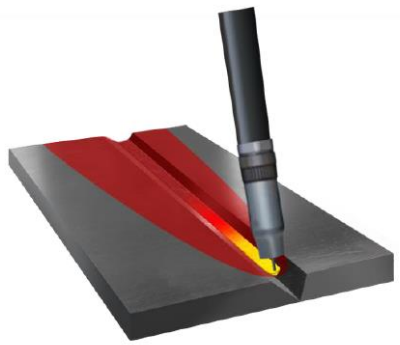
Overview

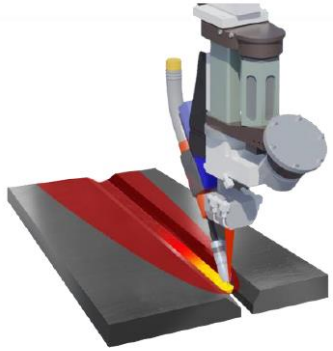
- Welding technologies
- Why laser welding?
- Heavy industry applications (thick metal welding)
- EV applications

Welding technologies



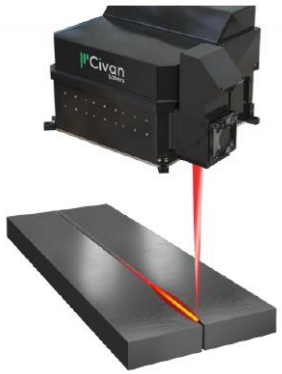
Gen I

GMAW/ SAW



Gen II

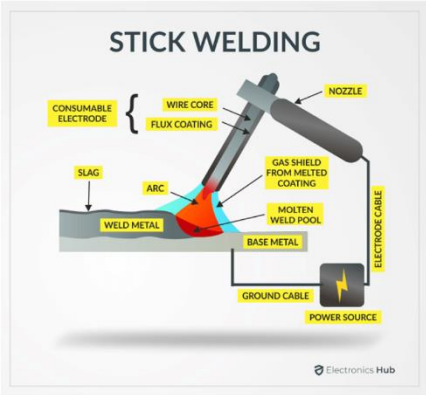
GMAW – Laser Hybrid

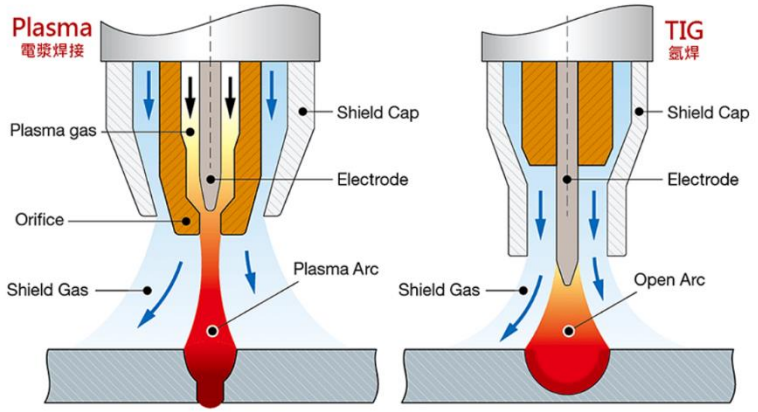


Gen III

Dynamic Beam Laser

Gen-1 welding technologies





CHIHSHENGYI
CHIH SHENG YI TECHNOLOGY CO.,LTD.

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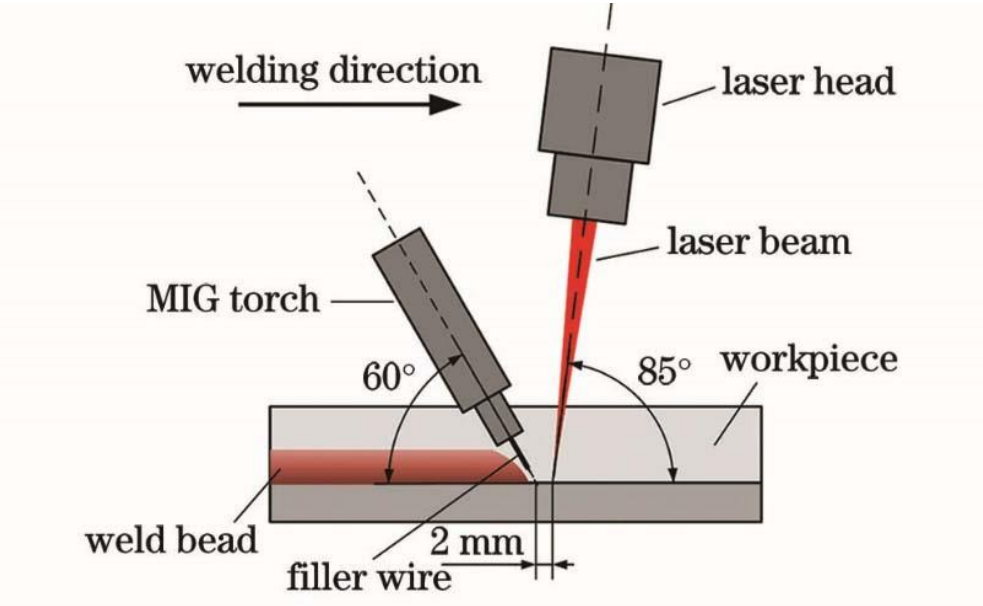
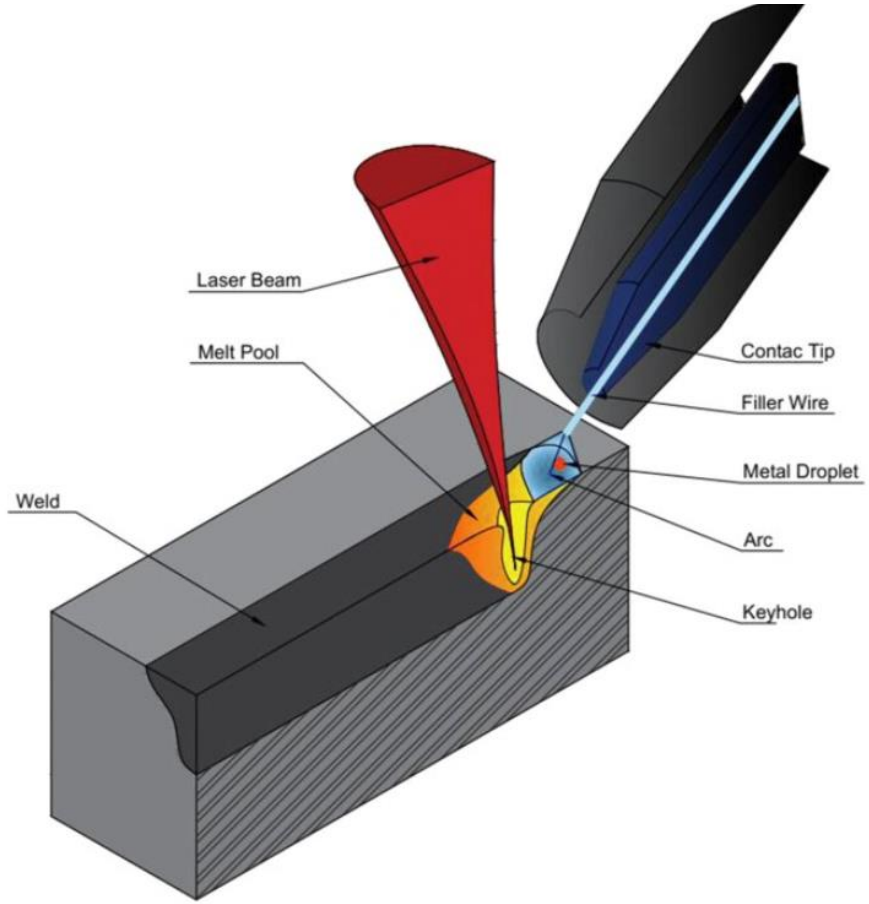
Gen2- welding technologies





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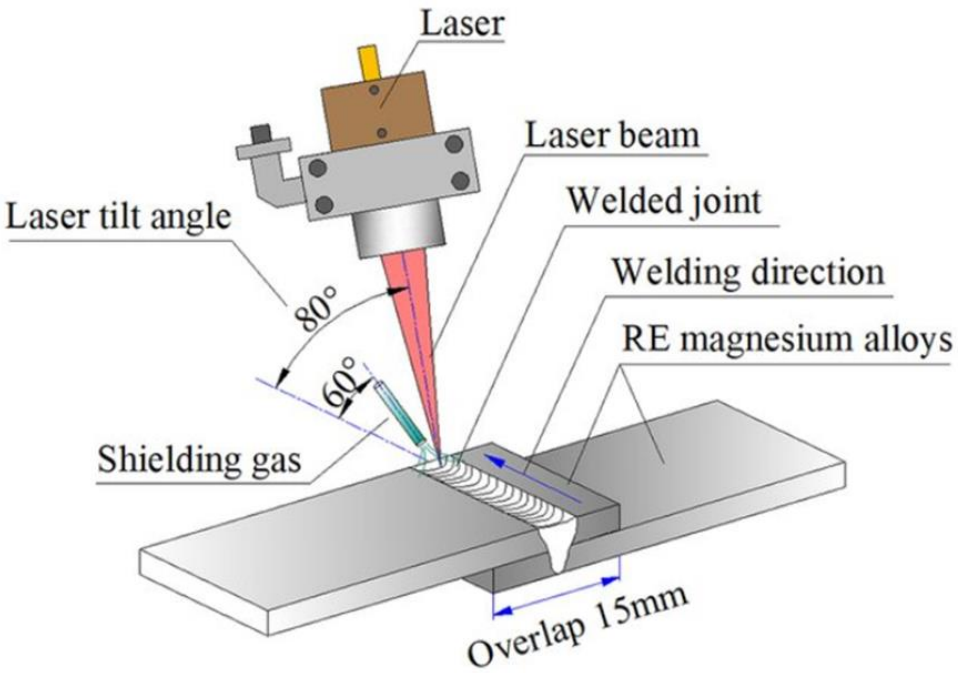
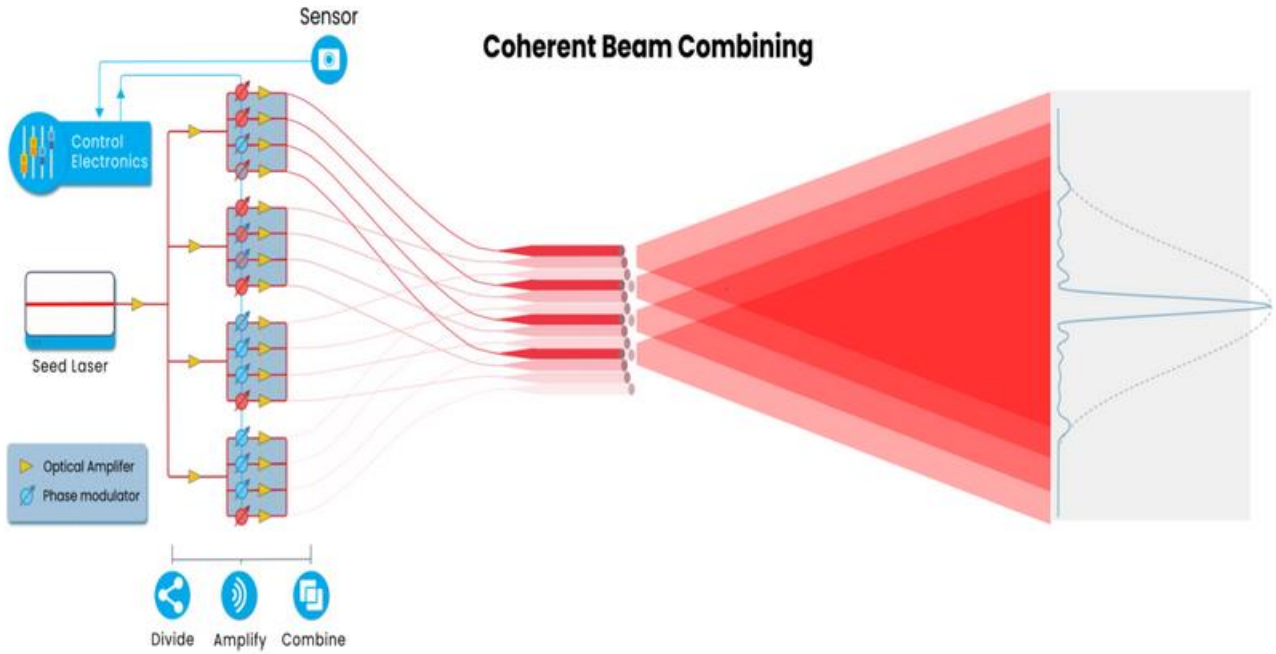
DOI: 10.1007/s00170-020-05343-5

Gen3- laser welding with beam shaping





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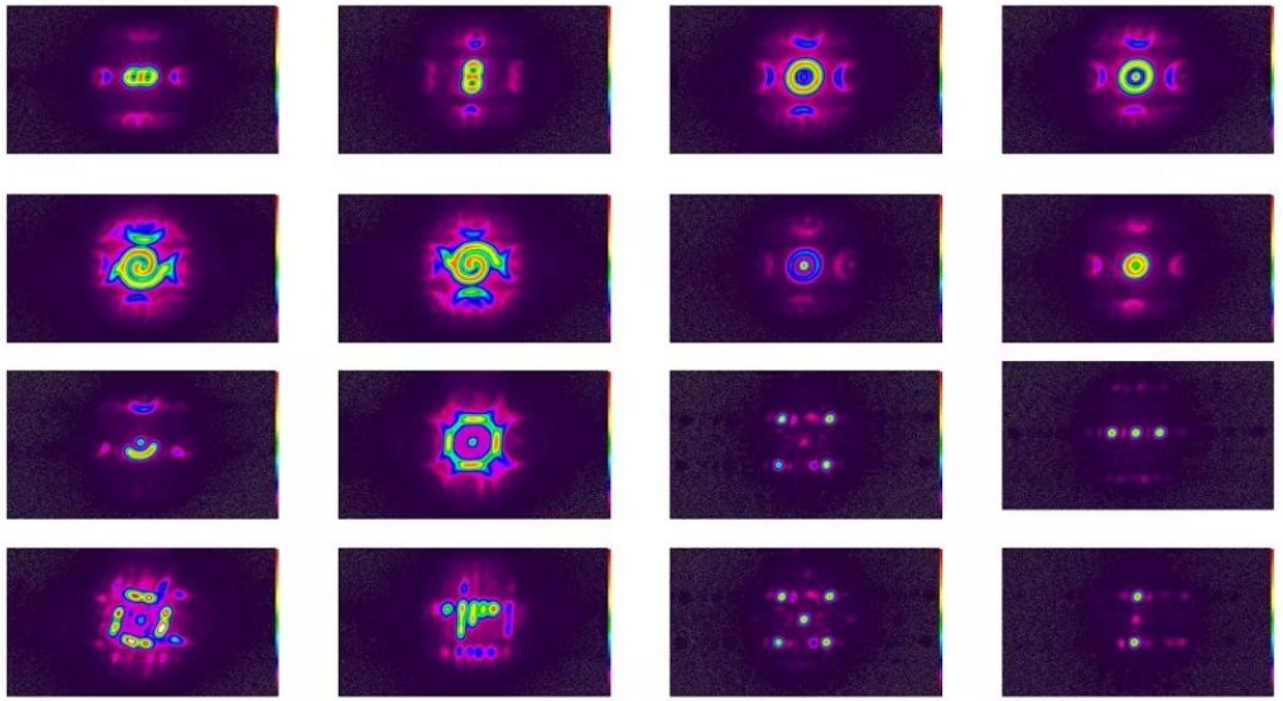
Gen3- laser welding with beam shaping



Civan's dynamic beam laser can be customized with profiles to match a specific application.

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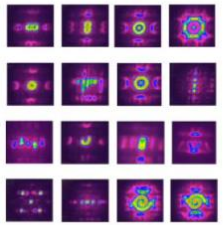
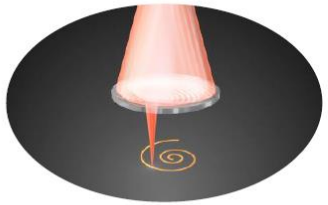
Gen3- laser welding with beam shaping

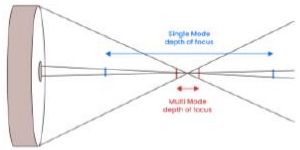
Beam Shaping



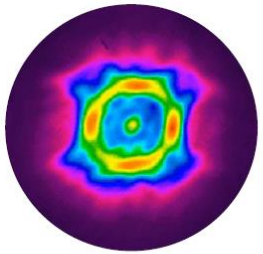
Shape Frequency



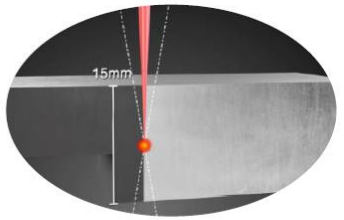
High Beam Quality



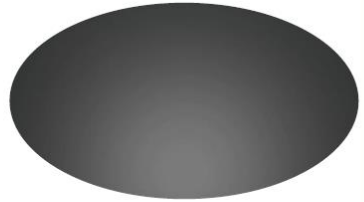
Shape Sequence



Focus Steering



Focus Autocorrect



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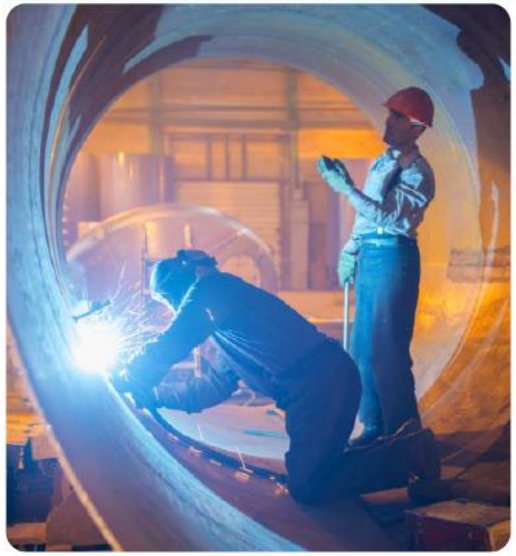
Thick metal welding

Ship building

Wind turbine

Oil & gas pipes



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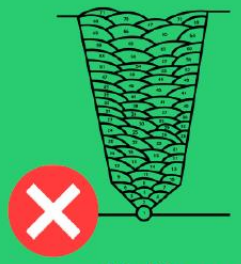
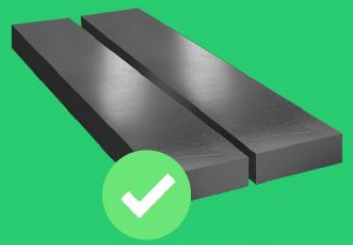
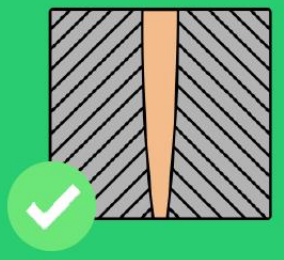
Thick metal welding

Traditional Methods	 High heat input	 Bevel	 Multi- pass	 Filler material
Dynamic Beam Laser	 Low heat input	 No Bevel	 Single pass	 Autogenous welding

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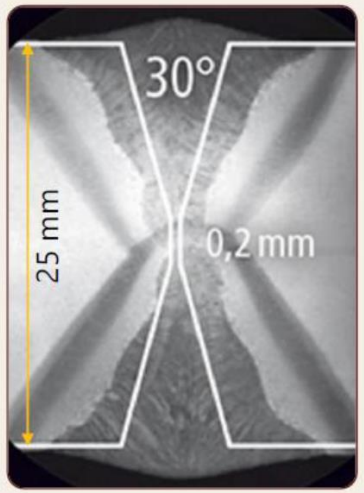
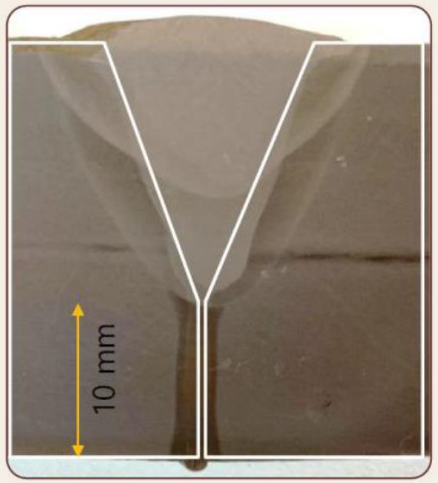
Thick metal welding

Traditional
No laser



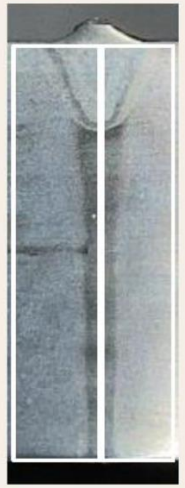
- 6 passes
- Double side
- Edge preparation

Emerging
Partial laser



- 3 passes
- Single side
- Edge preparation

Desired
Fully laser



- 1 pass
- Single side
- Square groove

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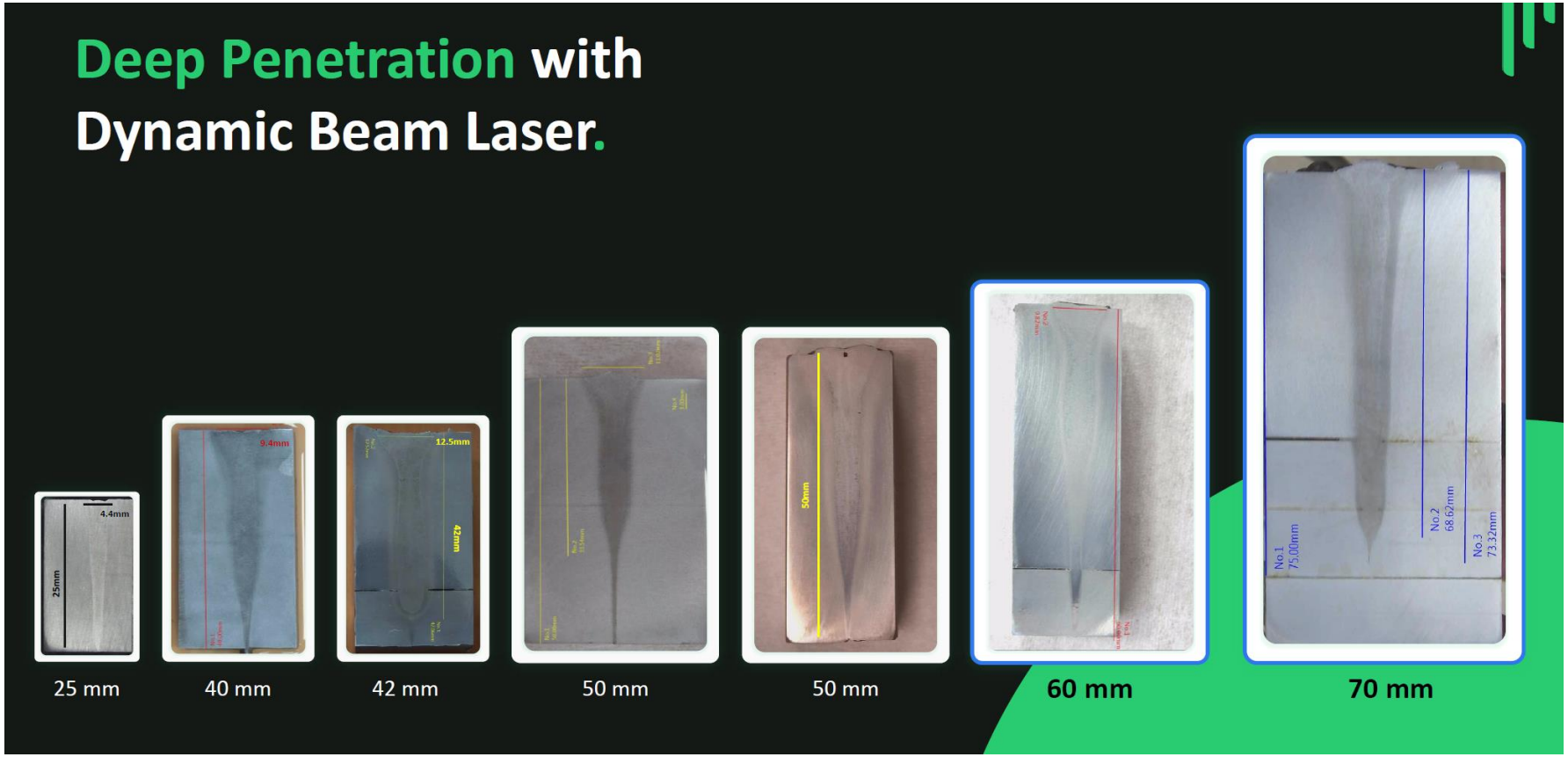
Thick metal welding



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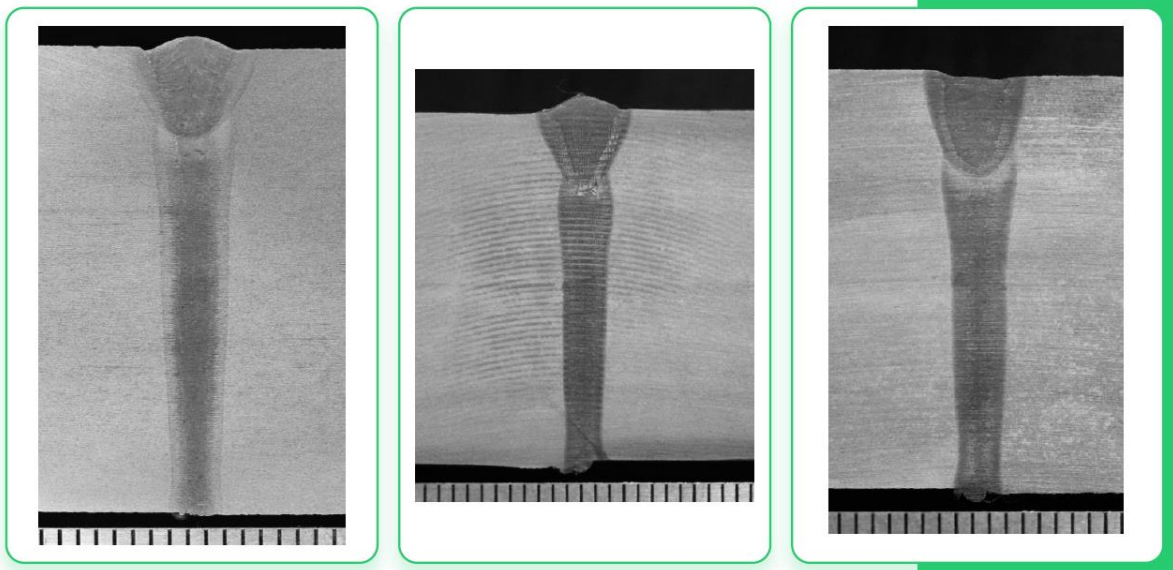
Thick metal welding

Using filler wire to overcome gaps & undercuts

- Mild steel (S355JR) 25mm
- Butt weld



- Stage 1: root weld
- Stage 2: filler material

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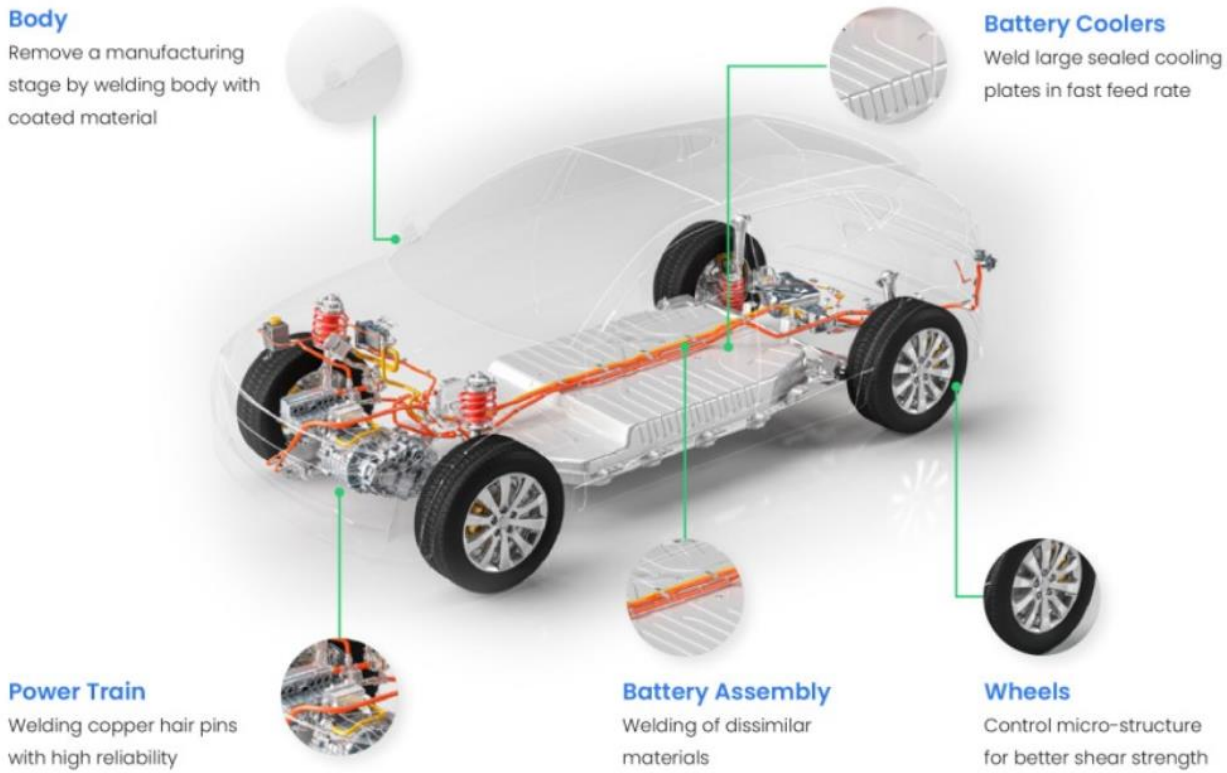
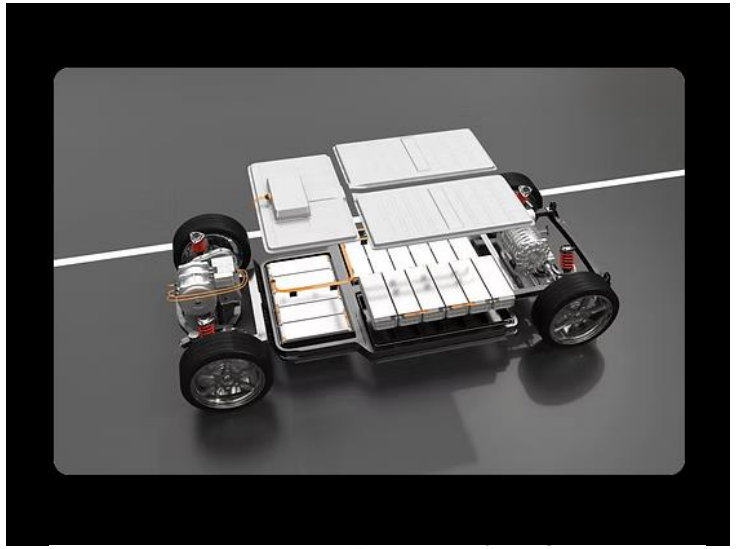
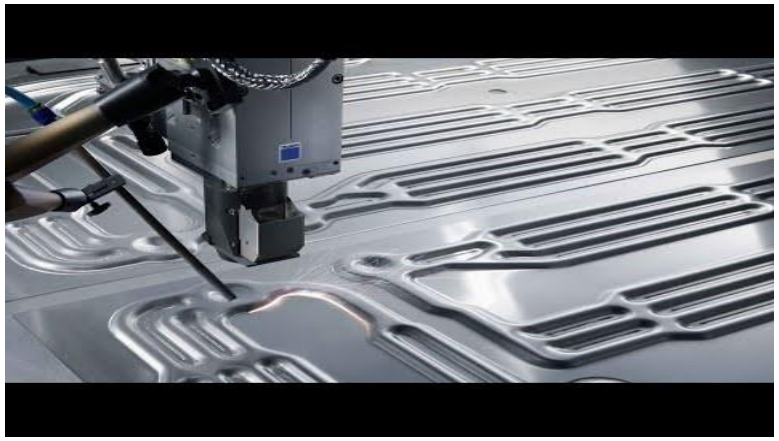
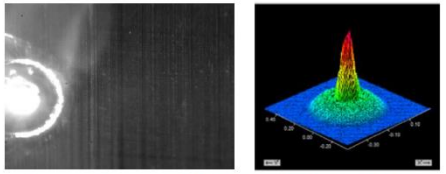
EV applications

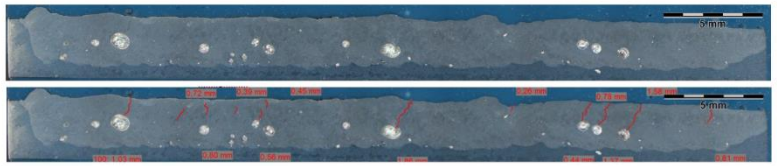


EV applications

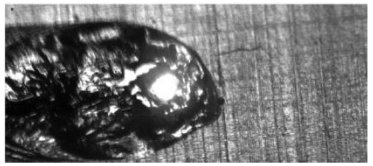


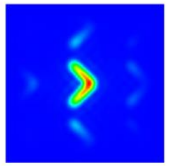


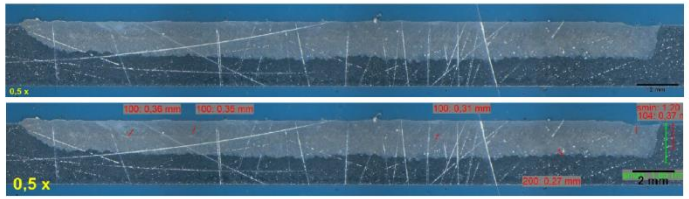




Parameter: Disk laser, BLW 50/50, focal diameter 250/1000; power = 4,5 kW, speed = 100 mm/s







Dynamic Beam Laser Parameter: frequency = 222,2kHz; power = 1,8 kW, speed = 100 mm/s

for Battery Cooling Plates

Channels Design
for Battery Cooling Plates

TRUMPF

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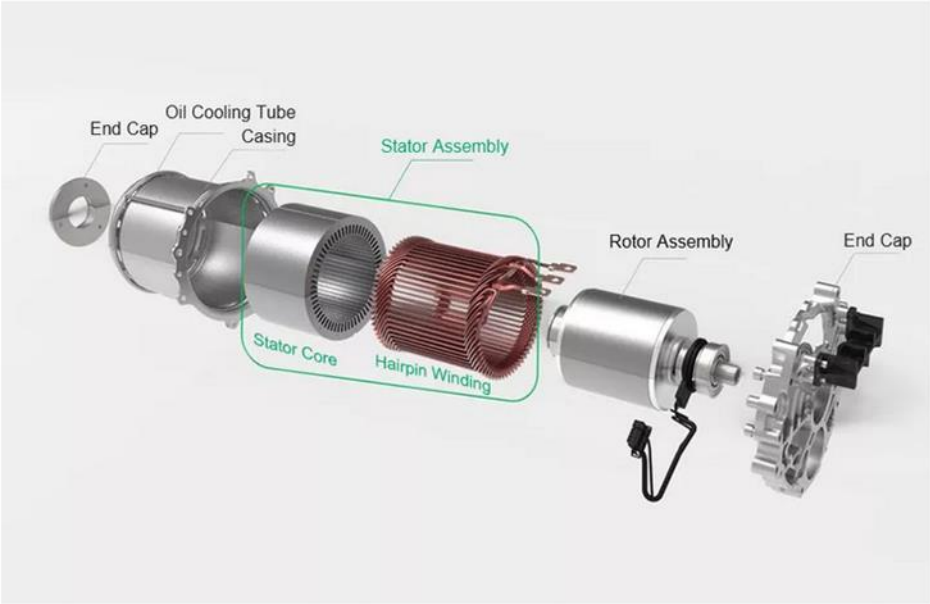
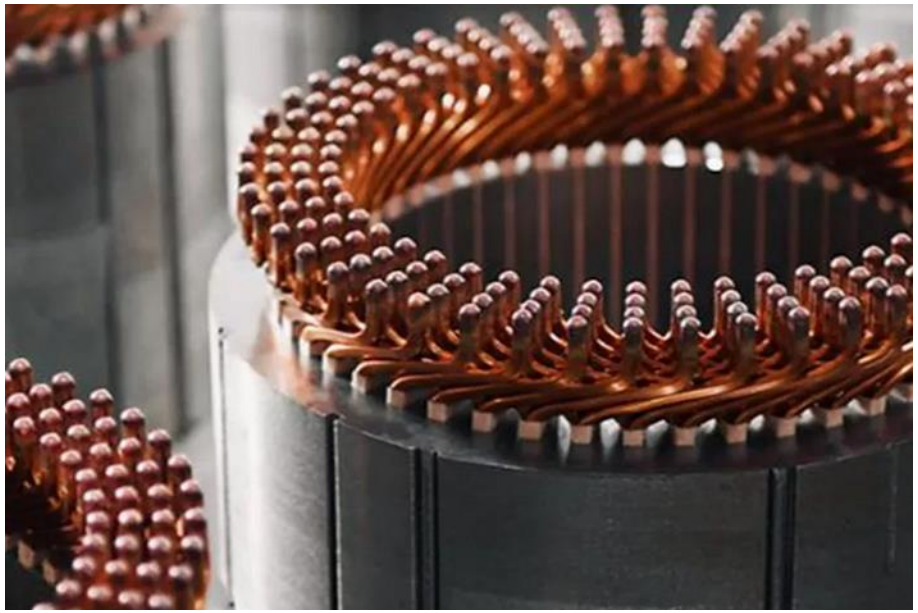
EV applications





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Thank you for your attention!
Any questions?

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Contact information:

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  spacho@utu.fi

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