

Welding

Thick Section Stainless Steel

Laser Welding is a technique widely used in high volume industrial manufacturing as a method of joining metallic materials. By using a laser beam concentrated into a high-intensity focused spot, laser welding offers many advantages over other more conventional welding processes. Advantages include; lower heat input meaning lower distortion and smaller heat affected zones, higher welding speeds which lead to improved production rates and single-side access to the joint area, coupled with fiber optic beam delivery providing easier automation.

In the case of thick section stainless steel welding, the power provided to the focused spot on the material surface is of sufficient intensity ($1 \times 10^{-6} \text{ W/cm}^2$) to form a keyhole into the workpiece, this keyhole creates a melt pool that can be manipulated along the weld joint, allowing the material to be welded in a single pass, without the need for any filler wire.

The example photos show a 6mm stainless steel (316) butt weld using our redPOWER 4.5kW QUBE fiber laser. An inert gas (Argon) shield was used to help maintain a full penetration, repeatable, defect-free joint. The top surface of the weld is consistent, clean and smooth meaning there is no need for any secondary cleaning process.

Weld requirements such as top bead width, weld interface width, penetration depth and welding speed can all be modified to suit the application by correct selection of the appropriate optical configuration and laser process parameters.

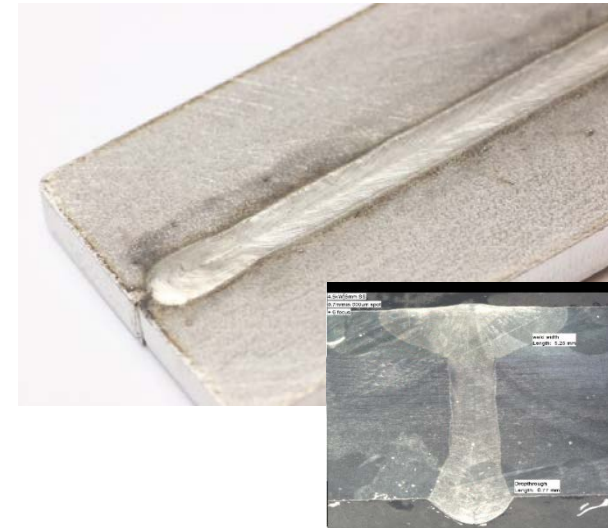
Application Parameters

Type	redPOWER QUBE 3kW – 8kW
Power	4.5kW
M ²	13
Beam Ø	0.6mm
Speed	1m/min
Modulation	Continuous wave (CW)

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