

Does laser welding cause distortions in thin austenitic steel structures Assembly?

The objective of this study concerns simulation of Laser welding process, in a context of thin austenitic steel structures assembly. Experiments and numerical simulations have been performed in order to predict, in a robust way, distortions induced by the Laser welding.

How a bipolar plate is welded?

One of the production steps of such bipolar plates is the joining process of its two halves. Laser welding is a suitable method for such an application since it is fast, non-contact, automatable, and scalable. Particularly important aspects of the weld seam are the weld seam width and depth.

Is micro-welding a problem in ultra-thin plates?

At present, the research on the physical mechanism of the micro-welding process on the ultra-thin plate is lagging behind the actual application--especially in the aspects of the influence of different laser pulse waveforms on the solder joints size--and the explanation of the defect formation is relatively weak.

How can laser spot micro-welding improve the welding efficiency?

The bonding performance between the upper and lower plates is effectively improved. It can reach the required weld depth in a short time and improve the welding efficiency of the laser spot micro-welding process.

How is laser spot welding performed on ANSI 304 stainless steel sheet?

Optimized process parameters of LSMW on the ANSI 304 stainless steel sheet. The laser spot welding experiments are carried out according to the process parameters set by the optimized waveforms, and the weld depth and the mechanical properties of different modes are obtained, as shown in Figure 12.

Does laser energy attenuation mode affect weld depth?

The results show that laser energy attenuation mode (LEAM) can only obtain shallow weld depth because of the premature decay of the laser power of waveform, resulting in the laser beam that cannot be concentrated in the keyhole. The temperature inside the keyhole of LEAM fluctuates significantly, which shows a downward trend.

The present invention relates to a wide band type thin steel plate connection once flattening and capacitor energy storing welding method used for the welding technical field. Two wide...

Bipolar plates are structured thin metal sheets and are, next to the membrane electrode assembly (MEA), one of the main components of polymer electrolyte membrane fuel ...

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structures assembly. Experiments and numerical simulations ...

In order to further understand the energy deviation characteristics and internal laws in the process of high-power disk laser deep penetration welding, a multisensory fusion system was set up to monitor and analyze the variation of the energy in the different depth of the keyhole. Two different sensing technologies were integrated. The first was photodiode sensing ...

In welding processes involving stainless steel thin plates, they are prone to warping, which can be attributed to various factors. To control the distortion during welding, it is essential to first understand the impact of different welding methods on the deformation. Related reading: [How to Fix Stainless Steel Welding Deformation?](#) The majority of welding techniques ...

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Laser beam welding is the state-of-the-art technology for joining micro-formed metal foils in the manufacturing of bipolar plates for proton exchange membrane fuel cells. ...

Liquid cooling plate manufacturing involves various welding processes such as vacuum brazing, friction stir welding, nitrogen shielded welding, argon arc welding, laser welding, diffusion welding, and more. Each ...

In this study, a three-dimensional finite element model for laser welding of a thin plate with the thickness of 0.07 mm was established based on the thermal-elastic-plastic FEM approach to simulate the temperature field and deformation of the ultra-thin 316 stainless steel in the pulsed laser welding process. A one-way coupling ...

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This paper reports a mechanism understanding how to reduce the solder joint failure phenomenon in the laser spot micro-welding process of ultra-thin steel sheets.

In this study, an effective numerical model was developed for the calculation of the deformation of laser-welded 3 mm 304L stainless steel plates with different gaps (0.2 mm, 0.5 mm, and 1.0 mm).

The technique properties of the joints should also be taken into account during design, as ignoring these properties can easily lead to welding distortion. The welding process is a significant aspect of steel structure construction, and a well-planned welding process can effectively reduce welding distortion and stress concentration.

This paper mainly studies the effects of different laser pulse waveforms on the LSMW process in a practical welding production, and a 3D transient mathematical model coupling weld pool, laser, and the keyhole is developed to observe the LSMW process and to explain the main causes of the welding defects from the perspective of ...

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