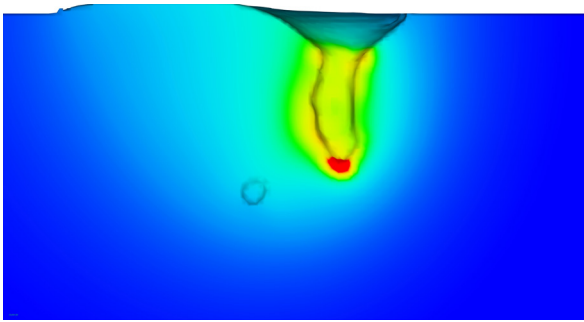# FLOW-3D® WELD

We Solve the Toughest CFD Problems

FLOW-3D WELD provides powerful insights into laser welding processes to achieve process optimization. With better process control it is possible to minimize porosity, heat affected zones and control microstructure evolution. To accurately simulate laser welding processes, **FLOW-3D WELD** implements all the relevant physics such as laser heat sources, laser-material interaction, fluid flow, heat transfer, surface tension, solidification, multiple laser reflections and phase change.
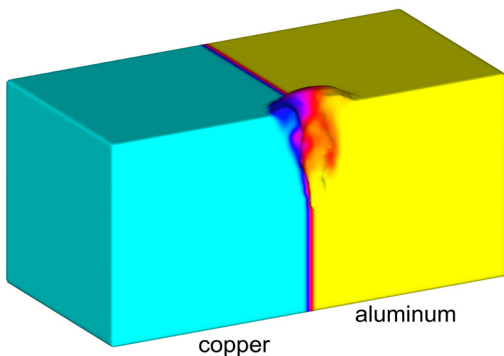
LASER WELDING SIMULATIONS

Bubble formation due to keyhole collapsing

KEYHOLING

Keyhole-induced porosity is a major cause of defects in laser welding of aluminum alloys. **FLOW-3D WELD**'s models are used to optimize process parameters such as laser power and scan speed to help mitigate porosity formation, ensuring high weld quality.


Alloy concentration in the weld joint during a multi-material laser welding process

MULTI-MATERIAL LASER WELDING

FLOW-3D WELD provides detailed information about melt pool dynamics and the subsequent weld bead quality in multi-material laser welding processes. By incorporating temperature-dependent material properties for both alloys, **FLOW-3D WELD** accurately captures the concentration of each alloy in the melt pool. This can be used to analyze the quality and strength of the weld joint.
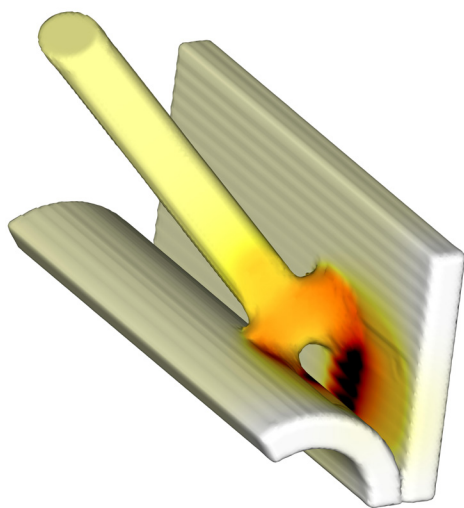
FLOW-3D® WELD

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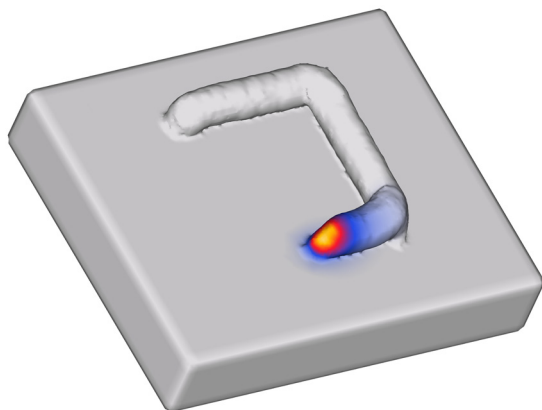
Laser cladding simulation showing the shape of the clad deposit

LASER CLADDING

FLOW-3D WELD is used to simulate laser cladding processes and analyze process parameters such as powder injection rate, laser power and scan speed, which influence the shape of the clad bead deposit and the eventual microstructure.

Melting and temperature profiles of the wire in a laser brazing process

LASER BRAZING

In laser brazing, **FLOW-3D WELD** can be used to determine the influence of brazing parameters such as laser power and wire configuration and feed rate on process stability and formation of the brazing joint. Additionally, **FLOW-3D WELD** can predict thermal stresses and heat affected zones in the brazing joint.

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