


LightMat Capability Data Sheet

Laboratory:	Sandia National Laboratories
Title:	Adaptive Resistance Welding of Aluminum Alloys
Class:	Processing/Manufacturing
Description:	Sandia National Laboratories has the ability and process understanding to use advanced wave synthesis to generate high direct current (DC) pulses coupled with a frictionless ram system that produces resistance welds in aluminum stems and tubes for high-pressure gas reservoirs. Using adaptive welding controls, the system has proven to be capable of developing alloy projection welded stems and pinch welds on aluminum alloys 2219 and 3003.
Capability Bounds:	Welding currents are limited to 150 kA DC. Limits on cross-sectional areas that can be welded have not been established but are expected to be in the range of 75–100 mm ² .
Unique Aspects:	Advanced waveform synthesis technology has been combined with adaptive feedback control to develop a unique resistance welding capability for aluminum alloys. The capability allows for welding with millisecond feedback control at currents up to 150 kA, a frictionless actuator, and process diagnostics for weld dynamic response characterization. The capability has been demonstrated on projection welding of fill stems on pressure vessels and closure pinch welding of aluminum tubes.
Availability:	This capability is located within SNL's limited area. As such, access is subject to security clearance requirements.
Capability Expert:	Michael Maguire, mcmagui@sandia.gov , 925-294-3045
Image:	 <p>Adaptive waveform synthesis welding machine and a projection welded stem on an aluminum pressure vessel proof tested to 40 ksi.</p>
References:	-
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