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## Gas turbine blade tip alloy selection for alloy-247LC

**Thaddeus Strusinski**

Siemens Energy USA North Carolina Winston-Salem Service Center, USA

Gas Turbine hot gas path components use highly alloyed Nickel and Cobalt castings (i.e. CM-247, IN-738, IN-939, Rene-80, GTD-111, MGA-1400, EGY-768, MAR-M 509, etc). The alloying elements such as Al, W, C, Ti, & Ta used in these alloys increase the difficulty of achieving good castings and good welds. Siemens has been improving the gas turbine by incorporating ALLOY- 247LC into the blade design. ALLOY-247LC, a gamma prime strengthened nickel based superalloy, has been quite a challenge with which to qualify welding processes. High strength nickel based superalloys can be very expensive to produce into weld fillers. Typically, with minimum lot sizes, these weld filler alloy costs can approach \$200,000 USD. And the final mechanical properties studies verifying appropriateness of alloy systems can approach \$1,000,000 USD. An upfront selection process is needed to reduce these developmental investments. This presentation uses a Six Sigma Tool to compare and down select 15 potential candidates of weld filler alloys specifically for Alloy-247LC. This is a novel way of looking at the mechanical and physical properties of superalloys from a “survive the weld and post weld heat treatment” strategy. This technique reduces the number of experiments and focuses on the top two down selected weld filler candidates.

### Biography

Thaddeus Strusinski has completed his Masters in Materials Engineering from Rensselaer Polytechnic Institute In Troy NY. He is a Welding Materials and Process Expert for gas turbine components. He has worked as a Journeyman Welder for 6 years prior to college, and is capable of performing his own weld trials. With 30 years as an Engineer he has experiences at GE, Mitsubishi, Liburdi and Siemens, solving gas turbine alloy welding challenges.

[ted.strusinski@siemens.com](mailto:ted.strusinski@siemens.com)

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