

METALCASTING E-SMARRT

Energy-Saving Melting and Revert Reduction Technology



High Temperature Aluminum Metal Matrix Composite (Al-MMC) Alloy

As part of the Energy-Saving Melting and Revert Reduction Technology (E-SMARRT) program, Eck Industries is developing a production-capable cast Al-MMC alloy with an operating temperature capability of 250-300°C. Al-MMCs consist of nonmetallic reinforcements incorporated into an aluminum matrix. Al-MMCs have better stiffness, wear resistance and thermal conductivity than base aluminum alloys. Currently available cast aluminum alloys have maximum effective operating temperatures of approximately 200°C. While this temperature capability is adequate for traditional applications, demands from important industrial sectors as well as the military require lightweight alloys that can operate in temperature ranges of 250-300°C.

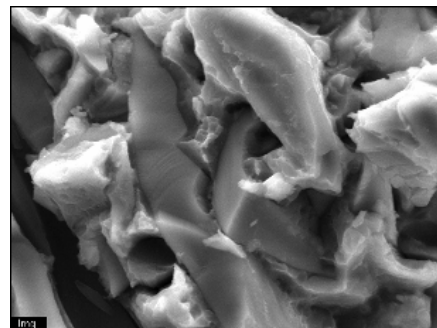
SUCCESS STORY

Problem: Current high-temperature casting needs are being met by the use of titanium alloy castings. Titanium castings have the desired strength, but the end components are heavier and significantly more costly. In addition, the energy requirements for production of titanium alloy castings are significantly higher than those required for the production of aluminum alloy castings.

Solution: Eck successfully developed a process to cost-effectively produce a high temperature Al-MMC alloy. The technology was demonstrated on a light aircraft engine cylinder head part.

Benefits:

- Weight reduction for improved fuel economy with current powertrains
- No loss in strength / material properties
- Eck already has a potential customer for the material developed



"The development of a reliable, high temperature, light-weight material that is easy to cast and has good fatigue properties has generated significant interest from customers in the aerospace and air control markets. Improved alloy performance drives innovative designs that improve overall energy efficiencies."

--David Weiss

VP Engineering/R&D, Eck Industries, Inc.



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