DESIGN CASE STUDY

SOLAR TEAM TWENTE

PROJECT DETAILS

Customer: **Solar Team Twente**

Application: **Solar Car Engine**

Technology: **Brazed Fin**

Industry: **Research / Green Energy**

Location: **Twente, Netherlands**

THE DESIGN CHALLENGE

In May of 2015 Aavid, Thermal division of Boyd Corporation, in Bologna, Italy received an urgent request from our favorite student racing team - Solar Team Twente from the University of Twente.

They had designed, built and tested an amazing solar car with one and only ambition: win the **World Solar Challenge 2015** driving across the Australian Desert. In 2012 Aavid had developed a cooling solution for their solar-powered control electronics. Now they needed a radical weight reduction to help improve the solar car's performance.

Timing was short. To make the race qualification deadline, we needed to conceptualize, analyze, build, test and deliver prototype cooling solutions in just a few weeks. Working closely with Solar Team Twente, that is exactly what we did.

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THE AAVID SOLUTION

The existing solution used by the team was developed by Aavid in Bologna, Italy in 2012. It was constructed from formed aluminum fins brazed to a baseplate. During the tests for the competition in 2013, the team observed that in operation the heatsink was "too cold to be true". At a weight of **0.74 kg (1.6 pounds)**, the cooling solution was clearly oversized, overweight and over performing for the latest reduced heat load.

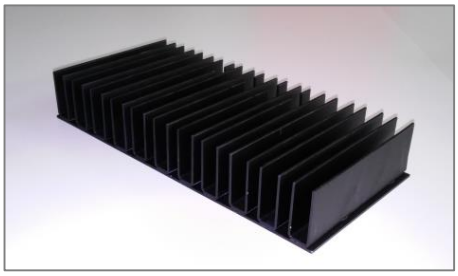
> "Modeling predicted that Aavid could to reduce the weight of the thermal solution by 50%"

We needed to very quickly re-optimize the design for minimum weight while maintaining adequate thermal performance. Analysis showed that we could significantly reduce the fin height and pitch. The team decided to stick with the brazed assembly process, so the base and fin thicknesses were set at the minimums required for brazing.

Modeling predicted that Aavid could to reduce the weight of the thermal solution by 50% reaching **0.36 kg (0.8 pounds)** while meeting the thermal requirements. Aavid rapidly formed the fins, used CNC to machine the base, brazed together the entire structure, sand-blasted it, and applied a black anodize finish to enhance radiated transfer.

Solar Team Twente completed the test and the results were exactly as Aavid predicted - great thermal performance at half the weight. Best of luck to Solar Team Twente in Australia!

For more information on this incredible team visit ***www.solarteam.nl***



Result of Baseline Design

Result of Optimized Design – 50% reduction in weight

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