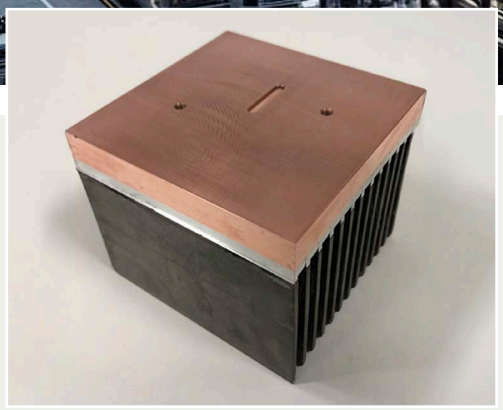


Multi-Material Heat Sink

A heat sink is a component that absorbs and dissipates heat from a device to prevent it from overheating. Using a dual material version can significantly improve efficiency.

Value Summary

Traditional Manufacturing methods struggle to combine materials. SPEE3D's Cold Spray Additive Manufacturing (CSAM) technology enables the combination of different materials in an innovative way. This example of a heat sink has the dual benefit of increasing the thermal efficiency of the component, whilst also reducing the risk of post machining failure of the fin section.

Production Method	Production Time
Traditional Manufacturing	6-8 weeks
SPEE3D CSAM	4.2 hours

Background

The multi-material heat sink is an innovative solution for efficient heat dissipation in high-performance applications. Copper offers excellent thermal conductivity, while aluminum is known for its lightness and strength. These advanced heat sinks are used in electronics, automotive, and other applications where efficient heat dissipation is critical.

The Challenge

The production of multi-material heat sinks poses significant challenge as it requires the combination of materials with different physical and chemical properties. Traditional methods such as welding or soldering require high temperatures that can lead to distortion or material damage. The alternative is to use a bonding agent, which can reduce the thermal transfer between materials, meaning larger sized components are required to achieve suitable heat dissipation.

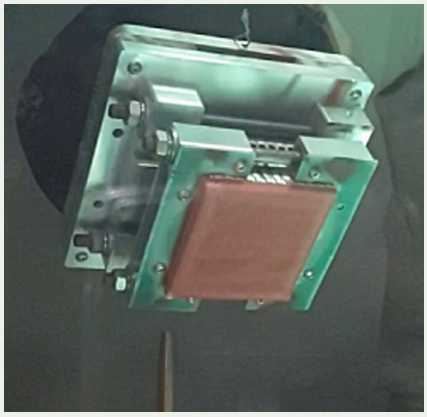
The Solution

CSAM offers an innovative solution by bonding materials at low temperatures, improving the structural integrity and thermal properties of the heat sink. The spraying of material provides a full-surface bonding of two materials.

The Value

With CSAM technology, components with two or more different materials can be quickly and efficiently customized to meet specific customer requirements and adaptations.

From design to deployment in 4.2 hours after receiving extruded fins

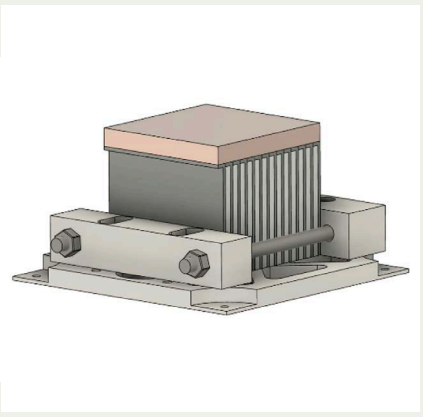


Print: 10 minutes

Copper 0.8kgs
of material

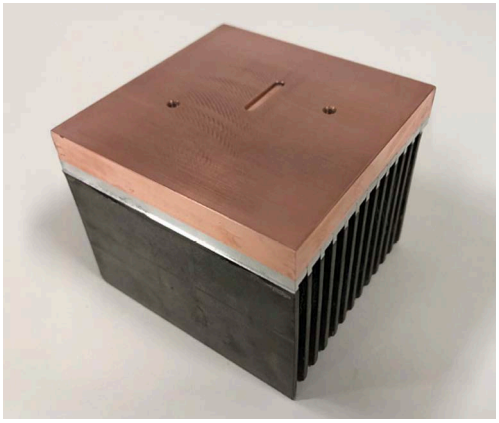
Cook: 2 hours

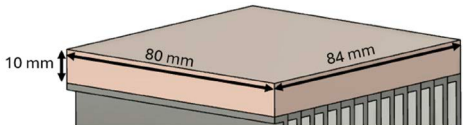
Heat treated in a standard
air furnace



Cut: 2 hours

Critical surfaces machined
on CNC





About The Equipment

Heat sinks are essential components in thermal management that serve to efficiently dissipate the heat generated by electronic or mechanical devices. They are usually made of thermally conductive materials such as aluminum or copper and increase the surface area of the heat-generating component in order to better dissipate the heat to the environment.

Heat sinks are used in many areas, including:

Electronics: In computers and other electronic devices to cool processors and other heat-sensitive components.

Automotive: To cool engines and other components.

Aerospace: To regulate the temperature of critical systems.

There are different types of heat sinks, including passive heat sinks, which rely on natural convection, and active heat sinks, which use additional cooling mechanisms such as fans.

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