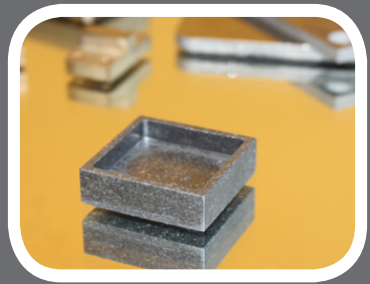




## Aluminium-Graphite

Baseplates for high power electronics  
Heat Spreaders in microelectronics  
Heat Sinks for RF or MW components  
Housings in hermetic packages  
Easy to machine  
6 - 10 ppm/K thermal expansion



a product by **RHP** TECHNOLOGY

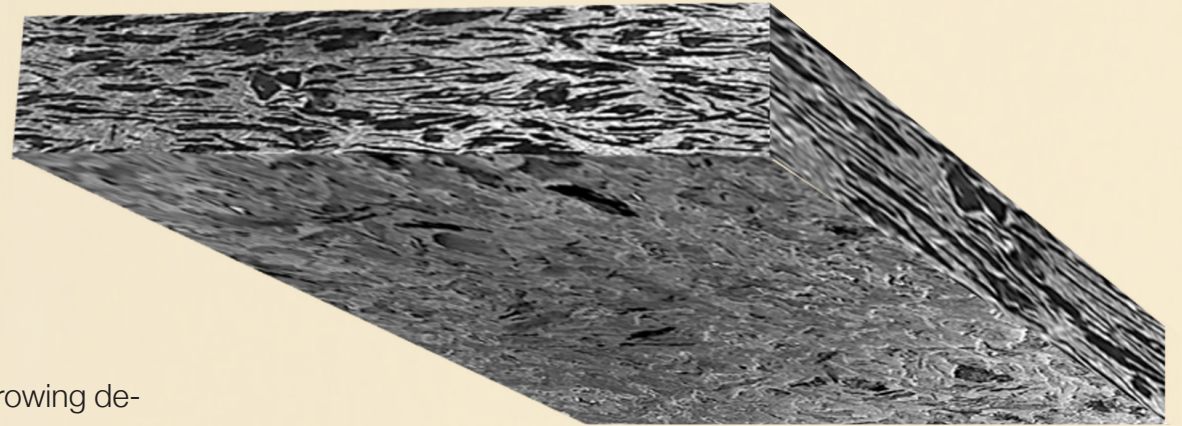
# Advanced Thermal Management Materials

Continuous miniaturization, Performance increase and growing demand in reliability of electronic components strive for efficient thermal management solutions. Heat dissipation of high performance electronics such as in microelectronic, power electronic or optoelectronic devices takes on great significance.

Aluminium-Graphite is an anisotropic material with excellent heat spreading properties combined with a Coefficient of Thermal Expansion (CTE) tailored to packaging materials and semiconductors. Furthermore this material is easy to machine and finds applications for advanced thermal management in a wide range of applications:

- Substrates and Heat Spreaders in Microelectronic devices.
- Integrated heat spreader and submount for laser diodes
- Advances for solid state lasers
- Heat Sink or Heat Spreaders in CPUs  
Base plates in high power electronics
- Heat Spreaders for LED and HB-LEDs
- Substrates or Heat Sink for RF and microwave packages
- Housings for high performance hermetic packages
- Thermal management of high thermally loaded electronic components

RHP cooling materials (Metal Graphite and Metal Diamond Composites) are of interest for applications as heat sinks, heat spreaders, submounts, heat slugs, hermetic housings or base plates to provide a reliable and sufficient cooling.



The thermophysical properties of Aluminium-Graphite can be adjusted due to the anisotropic material properties of the filler and by the used processing conditions to customise the product in the following range:

<b>Thermal conductivity (in-plane):</b>	<b>200 - 350 W/mK</b>
<b>Thermal conductivity (out-of-plane):</b>	<b>50 - 80 W/mK</b>
<b>Coeff. of Thermal Expansion (in plane):</b>	<b>6 - 10 ppm/K</b>

## Light weight and easy to machine

Aluminium-Graphite Materials are a light weight material solution for cooling of electronics where especially the spreading of heat is of importance. Graphite flakes which are used as fillers are a cost efficient filler material for the preparation of composite materials which combine a reduced coefficient of thermal expansion with a high thermal conductivity. Due to the anisotropic properties of graphite and the used powder metallurgical processing microstructural arrangements (orientation of graphite planes) are possible. This allows to customise the anisotropic behaviour of the material. In addition Aluminium-Graphite composite materials are characterised by an excellent machinability.



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