

Typical properties	Al-Dia 300	Al-Dia 400	Cu-Dia 300	Cu-Dia 400	Ag-Dia 500	Cu- or Ag-Dia 600 *
Thermal Conductivity [W/mK] (@RT)	350-400	400-450	350-400	400-450	450-550	>550 *
Coefficient of Thermal Expansion [ppm/K] (@RT)	8-9	9-10	6-7	8-10	7-10	<8 *
Density [g/cm <sup>3</sup> ]	~3	~3	~6	~6	~6.5	~6 *

\* experimental/under development

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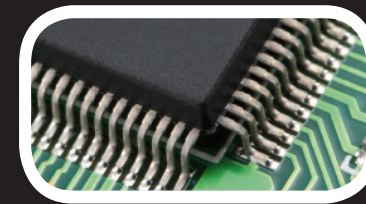
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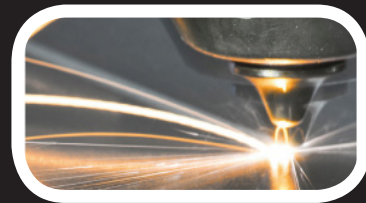
## heat sinks & heat spreaders for:



microelectronics



solid state lasers



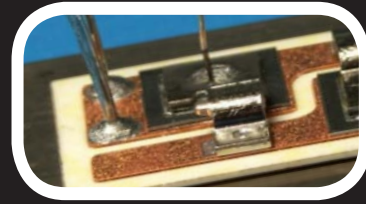
RF antenna crowbar



HB-LEDs



power electronics

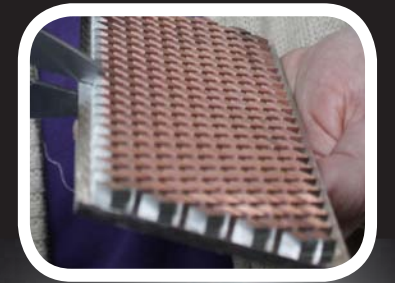
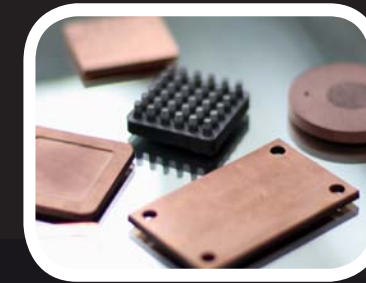


laser diodes



## high performance cooling

350 - 500 W/mK thermal conductivity  
6 - 10 ppm/K thermal expansion  
Ra < 3µm high surface quality



produced by **RHP TECHNOLOGY**



## Advanced Thermal Management Materials

DiaCOOL Metal Diamond Composites combine excellent thermal conductivity with a Coefficient of Thermal Expansion (CTE) tailored to packaging materials and semiconductors. Polishing ( $R_a < 3\mu\text{m}$ ) and cutting (water-jet, laser, wire-cut EDM) is possible. These easy to integrate materials offer advanced thermal management opportunities for applications such as:

- ▀ Integrated heat spreaders and submounts for laser diodes
- ▀ Advanced forms of heat sinks
- ▀ Heat Sink or Heat Spreaders in CPUs
- ▀ Base plates in high power electronics (e.g. IGBT base plates)
- ▀ Heat Spreaders for LED and HB-LEDs
- ▀ Heat Sink for RF and microwave packages
- ▀ Heat Sink for microelectronic packages
- ▀ Thermal management of high thermally loaded electronic components

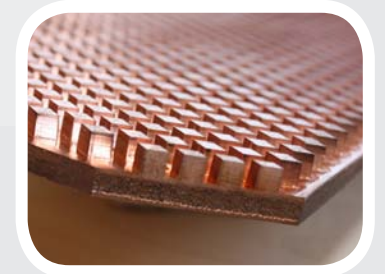
DiaCOOL materials are of interest for applications as heat sinks, heat spreaders, heat slugs or base plates to provide a reliable and sufficient cooling.

## Geometries, Materials and Applications

DiaCOOL plates such as aluminium-diamond, copper-diamond or silver-diamond can be produced in various sizes between 10mm x 10mm to 150mm x 150mm with thickness typically ranging from 2 mm to 20 mm. Due to the use of the sandwich technology DiaCOOL is able to provide plates with a high surface quality.

By using hot pressing technology to prepare this type of materials, it is possible to realize sandwich structures or even parts with a certain complexity. Due to the use of the sandwich technology DiaCOOL materials are characterized by a high surface quality. Examples for applications of this type of materials are given in several areas of micro-, power- or optoelectronic devices such as: Heat spreaders or lids for CPUs in high performance computing or server applications; Cooling plates for LED or laser diodes; Base plates for high power modules (e.g. IGBT)

DiaCOOL offers Metal-Diamond composites with properties tailored in a certain range. **Aluminium-Diamond, Copper-Diamond and Silver-Diamond** MetalMatrixComposites.



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