



MATERIEL THERMIQUE & ELECTRONIQUE

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[Advanced Solid Conduction](#) > k-Core®

Conduction Heat Transfer Expertise from k Technology

Advanced solid conduction concepts from k Technology are used in thermal applications all over the world.

Among its primary thermal solutions, k Technology developed the patented k-Core heat transfer system, which uses encapsulated graphite to help alleviate heat in high-power electronics for applications in aerospace, military and commercial applications. The k-Core material uses APG as an insert within an encapsulating structure. k-Core can be fabricated by employing most conventional thermal management materials as the encapsulant (e.g., aluminium and copper alloys, ceramics, and composites), as dictated by user need and application. Light in weight, the passive k-Core system is highly conductive thermally and offers designers the ability to tailor coefficients of thermal expansion (CTE) if needed. The k-Core heat transfer system is typically designed for a specific application by our experienced engineering team.

Because k-Core can be encapsulated in a wide range of conventional thermal management metals and materials, k-Core heat transfer products provide “drop-in” replacements for the solid metal conductors. As a result, thermal designers can significantly reduce their electronic component temperatures, thereby improving performance, reliability and greatly prolonging the life of your most valued electronics systems.

k Technology’s products are used in aerospace satellites, [avionics](#) and military aircraft such as the F-35, F-22 and F-16 fighter planes. k Technology thermal management products also cool high power density electronic packaging, [power electronics](#) and other applications requiring [high-performance heat transfer](#).

The k-Core Product Line

- Patented encapsulated APG material system has three times the conductivity (k) of copper with the mass of aluminium
- APG graphite provides a high k path
- Encapsulant sets the CTE and structural properties
- Encapsulant material is selected to satisfy requirements
- Drop-in replacement for conventional conduction solutions

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Table 1 k-Core Material Properties with Various Encapsulant Materials

Material	Thermal Conductivity (W/mK)		Density (g/cm ³)		Coefficient of Thermal Expansion (CTE) (ppm/K)	Specific Conductivity (conductivity/density) (W/m·K/g/cm ³)	
	w/o APG insert	with k-Core	w/o APG insert	with k-Core		w/o APG insert	with k-Core
Copper (OFHC)	390.0	1176.0	8.90	4.92	16.9	43.8	239.2
Beryllium	220.0	1108.0	1.80	2.08	13.5	122.2	533.7
Aluminium Beryllium (62% Be)	210.0	1104.0	2.10	2.20	13.9	100.0	502.7
Aluminium (6061)	180.0	1092.0	2.80	2.48	23.6	64.3	441.0
AlSi (40% Si)	126.0	1070.4	2.53	2.37	15.0	49.8	452.0
Magnesium (AZM)	79.0	1051.6	1.80	2.08	27.3	43.9	506.6
Kovar	14.0	1025.6	8.40	4.72	5.9	1.7	217.5

Custom thermal management solutions tailored to specific user needs. From one-of-a-kind spacecraft components that satisfy specific and demanding requirements to the production of thousands of thermal cores and [heat spreaders](#) to a given specification, k Technology has the expertise and experience to solve your thermal management challenges.