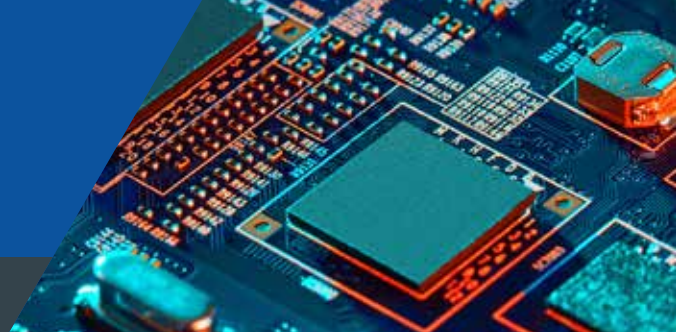


# SILVAR™ & SILVAR-K™

Metallic Composite Materials for Electronic Thermal Management Applications

## TECHNICAL DATASHEET



### Technology & Microstructure

Silvar™ and Silvar-K™ are composite materials with microstructure consisting of two inter-penetrating metallic phases: pure silver and granule form Invar™ or Kovar™ alloys. To manufacture Silvar™, a porous Invar™ or Kovar™ preform made via powder metallurgy is infiltrated with liquid silver. After infiltration, the material is rolled in a type of microstructure presented on the micrograph as shown on reverse side. Here the dark phase is Invar™ or Kovar™ and the light phase is silver.

### Typical Physical, Thermal, and Mechanical Properties

Property, (Unit of Measure)	Silvar™	Silvar-K™
Coefficient of Thermal Expansion, ( $\mu\text{m}/\text{m}/\text{c}$ )	7.2 (20C - 225C)	7 (20C - 400C)
Thermal Conductivity, (W/mk)	130	110
Thermal Capacity, (J/cc C)	3.19	3.19
Density, ( $\text{g}/\text{cm}^3$ )	8.9	8.8
Young's Modulus (GPa)	110	125
Electrical Conductivity, (%IACS)	35	18.5

### Technological Advantages

- Lightweight as compared to Cu/Mo and Cu/W
- Controlled CTE up to 400C
- Silvar™ and Silvar-K™ can be readily stamped (in many cases to net-shape), machined and plated
- Silvar™ and Silvar-K™ are easily laser welded to Invar™ and Kovar™ and present a unique advantage in applications where glass-metal seals are employed
- Technology for materials manufacturing is well established and our engineers are always ready to assist customers with their application

### Typical Applications

- Microwave carriers and heatsinks
- Microelectronic package baseplates
- Solid state laser packaging applications



Typical microstructure of Silvar™ and Silvar-K™

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