

HiK™ (High Thermal Conductivity) Plates

Overview

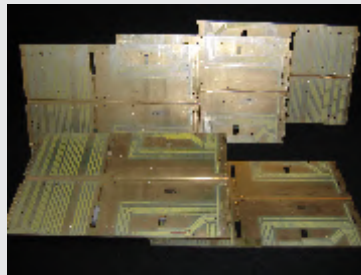
HiK™ plates are heat spreaders made by embedding heat pipes into a structural plate. Heat pipes, because of their two phase behavior, have effective thermal conductivities between 10,000 and 200,000 W/m-K depending on the heat pipe length. The installation of heat pipes into an aluminum plate increases the effective thermal conductivity from 600 W/m-K to 1200 W/m-K.

ACT's HiK™ Aluminum Plate Specifications:

Materials	Copper/Water Heat Pipes Aluminum Plates
Dimensions	Max: 60 cm x 60 cm
Thickness	1.8 to 6.0 mm
Heat Flux	Design Dependent
k Effective	600 to 1,200 W/m-K

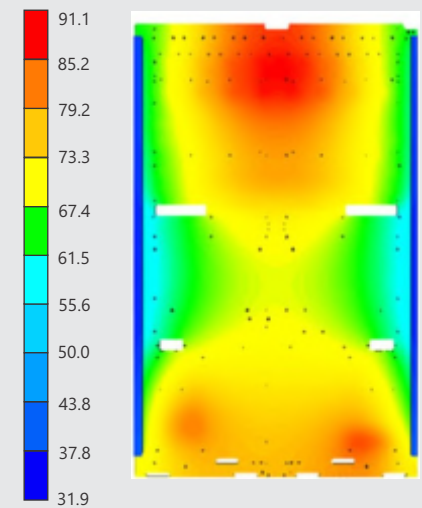
The layout of the embedded heat pipes is designed based on the heat source profiles and locations.

A higher number of heat pipes may be embedded in areas on the plate where large heat sources are attached. Even with the embedded heat pipes, the HiK™ aluminum plate is lighter weight than an equivalently sized conventional aluminum plate.



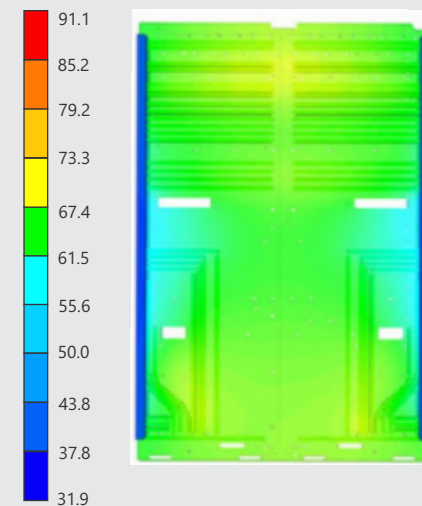
HiK™ Aluminum Plates for military cooling

Temp (°C)



(a) Temperature Profile on an aluminum plate

Temp (°C)



(b) Temperature Profile on a HiK™ plate

The conventional aluminum plate's highest temperature was 90.3° C whereas the HiK™ aluminum plate is 69.1° C. This is a considerable performance improvement.

Quick Facts:

- Freeze-thaw tolerant
-55°C to +85°C survival
- Shock & vibration
ACT frequently delivers shock & vibration tolerant hardware
- Environmental considerations
Corrosion resistant coatings