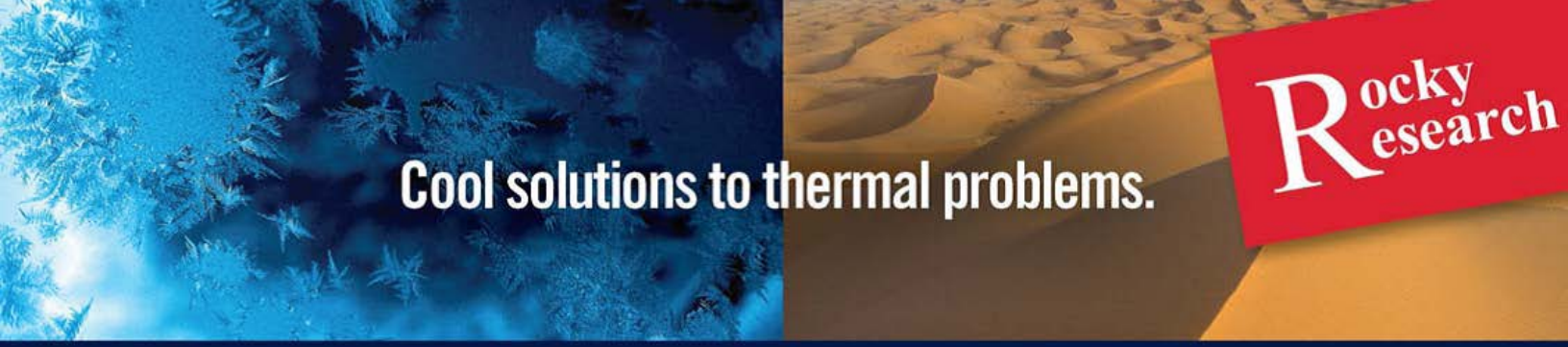

Heat Transfer and Electronics Cooling: Thermal Control

Over the last 20 years, heat transfer technologies have been utilized more and more for electronics cooling applications. As microchips grow smaller and hard drives work harder – thermal problems become larger and harder to solve. That's where Rocky Research comes in. While traditional approaches using natural convection and forced-air cooling strain to deal with current thermal loads, our experienced professionals are finding innovative ways to package and cool electronics as effectively as possible.

Thermal Control of Electronics

One of the most prominent industrial applications of heat transfer science and engineering has been electronics thermal control. Driven by the relentless increase in spatial density of microelectronic devices, integrated circuit chip powers have risen by a factor of 100 over the past twenty years, with a some what smaller increase in heat flux. The traditional approaches using natural convection and forced-air cooling are becoming less viable as power levels increase. Rocky Research provides a high-level thermal management solution from the perspective of a practitioner, as well as innovative products for electronics thermal engineering.

The challenge in electronics cooling may be viewed in terms of three different but non-separable problems. First, the chip temperature must be maintained at a relatively low level despite high local heat density. Second, high heat loads must be handled at the assembly or module level. Finally, the thermal environment in the computer machine room, office space, or telecommunications central office must be controlled and the overall rack heat load dealt with. Rocky Research has been working in all three fields and had considerable success with cost-effective and practical thermal solutions.

Timeframe Generation Chip Research Areas

A few of the major topics of interest are listed below:

Devices:

1. High performance spot coolers
2. Modulating heat pipe systems
3. Phase change cooling at small scale
4. Thermal battery systems

Design:

1. Small-footprint cooling systems
2. Closed rack mountable high-end workstations

3. Advanced, integrated thermal design tools
4. Frame and rack coolers

Equipment Room Thermal Design Materials:

1. Phase change materials for transient applications
2. Optimized fluids for liquid cooling