

Permeable Membrane Heat Sink

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- Mechanical Engineering

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- Heat Exchanger
- Heat Transfer
- Mechanical Engineering

Microchannel heat sinks have been an active research area since the early 1980s and have a wide applicability due to their ability to efficiently remove large amounts of heat in a compact space. Many of the current solutions to improve heat sink performance including manifold techniques, optimization of fin and channel shape, and features to alter flow characteristics. These techniques are inefficient and not widely accepted. There is a need for a new technology that can improve the performance of heat sinks.

Researchers at Purdue University have developed a new technology that is a heat sink with novel porous features. This technology increases the area available for fluid flow and heat transfer, allowing potential benefits in both hydraulic and thermal performance. It also reduces the need for separate fluid distribution, which reduces the overall heat sink volume of the heat sink. This eliminates the need to bond with multiple parts and also eliminates interfacial thermal resistances. This new technology could change how heat sinks are used with power electronics, radars, portable electronics, avionics, and more.

Advantages:

- Reduces need for separate fluid distribution
- Reduces overall heat sink volume
- Eliminates need to bond multiple parts
- Eliminates interfacial thermal resistances

Potential Applications:

- Power electronics
- Radars
- Portable electronics
- Avionics

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