LOCTITE® BERGQUIST®

APPLICATION USE CASE

Autonomous Vehicle Server Applications Achieve Performance Objectives with Rugged Thermal Control Solution

01 Application Challenges and Objectives

Autonomous vehicle on-board computers control all operational communications. High power, fast devices are required for near-immediate response, which has led next-generation designs to incorporate more components, bigger CPUs and challenging power densities that result in elevated functional temperatures.

To secure vehicle performance and safety, a robust heat dissipating solution that can withstand harsh automotive environmental conditions is needed for the main communication control system.

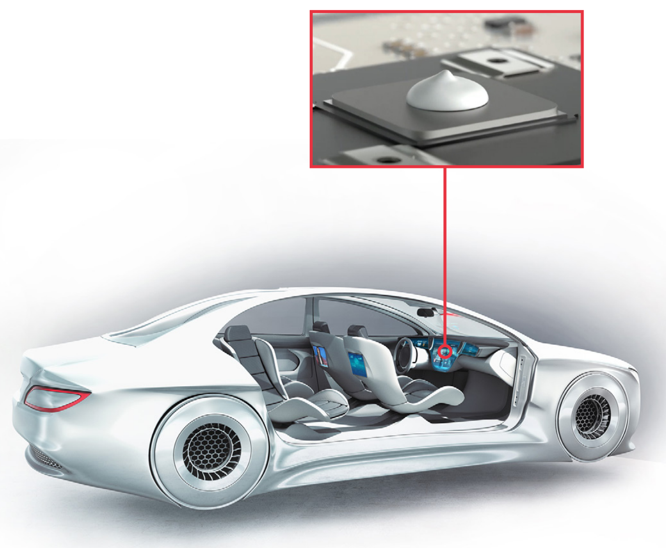
Multiple printed circuit boards with various components and tolerances are employed in next-generation vehicle servers, so a resilient thermal management material that is adaptable for different deposit locations and volumes is ideal.

02 Process and Performance Requirements

The on-board computer is a complex construction with several layered high-density printed circuit boards (PCBs) and cooling plates; the system requires a high thermal conductivity solution (> 6.0 W/m-K) to manage the intense thermal load.

Any thermal interface material selected should provide the ability to leverage existing automated dispensing equipment to accommodate manufacturing efficiencies and precise deposition of diverse shapes, volumes and patterns.

Stability in operation, particularly with respect to vibration, is required to ensure reliability of this mission-critical vehicle system.



03 Henkel Solution and Results

Providing high thermal conductivity of 6.0 W/m-K in combination with post-deposit stability, Henkel's BERGQUIST® *LIQUI-FORM* TLF 6000HG thermal gel is well-suited for automotive computing system applications and has consistently performed better in evaluations than competitive materials. The one-part formulation requires no mixing and can often be applied using existing TIM dispensing equipment.

Importantly, BERGQUIST® *LIQUI-FORM* TLF 6000HG is soft and conformable, inducing very low component stress. Excellent wet out fills gaps and displaces air across the PCB between heat-generating components and cooling plates, ensuring low thermal resistance through provision of a continuous, high conductivity thermal path.

The rugged thermal management gel provides optimum performance in challenging applications:

- High vertical stability and effective gap filling up to 3.0 mm gaps enables excellent thermal performance regardless of device orientation.
- Withstands stress, high vibration, disparate CTE tolerances, extreme temperature fluctuations and provides excellent mechanical stability.
- Automation friendly, BERGQUIST® *LIQUI-FORM* TLF 6000HG can be dispensed at a rate of 17 g/min and applied in small or large volumes, which is essential for high UPH automotive control unit production.

As automotive electronics become more sophisticated, extreme temperature control will continue to be a dominant design consideration. Demanding vehicle computing applications are increasingly incorporating BERGQUIST® *LIQUI-FORM* TLF 6000HG.

Contact:
Keri Fladeboe
keri.fladeboe@henkel.com
Phone: 612-552-4863

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