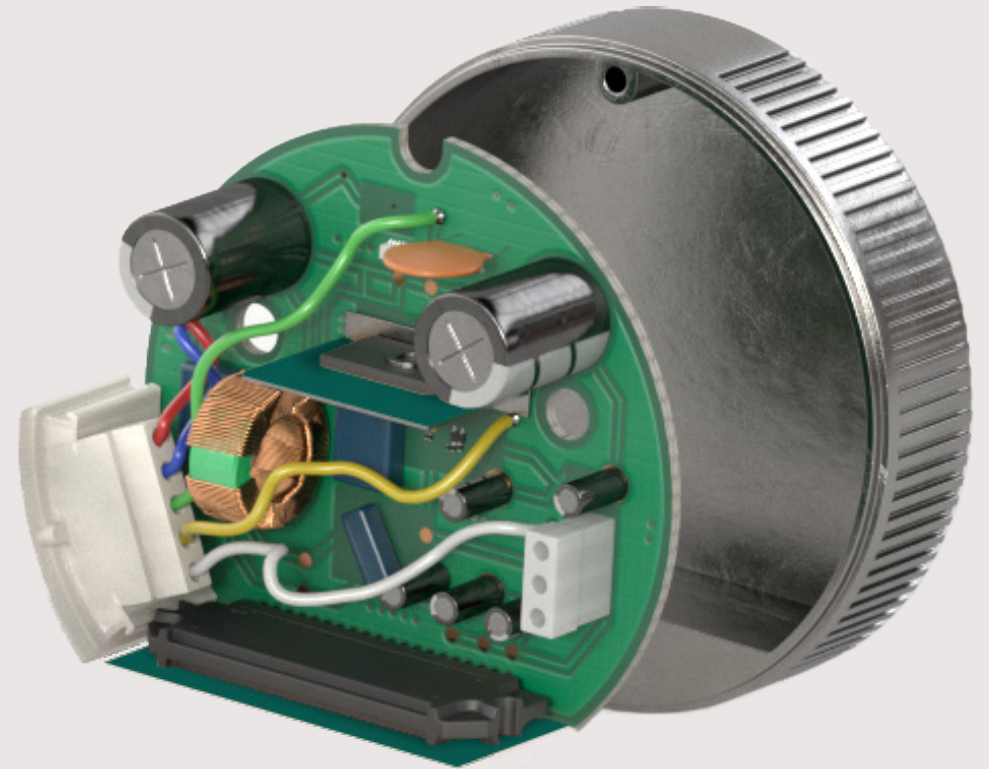




CASE STUDY

**BERGQUIST Phase Change Material
Reliably Manages Heat in Motor
Controllers**





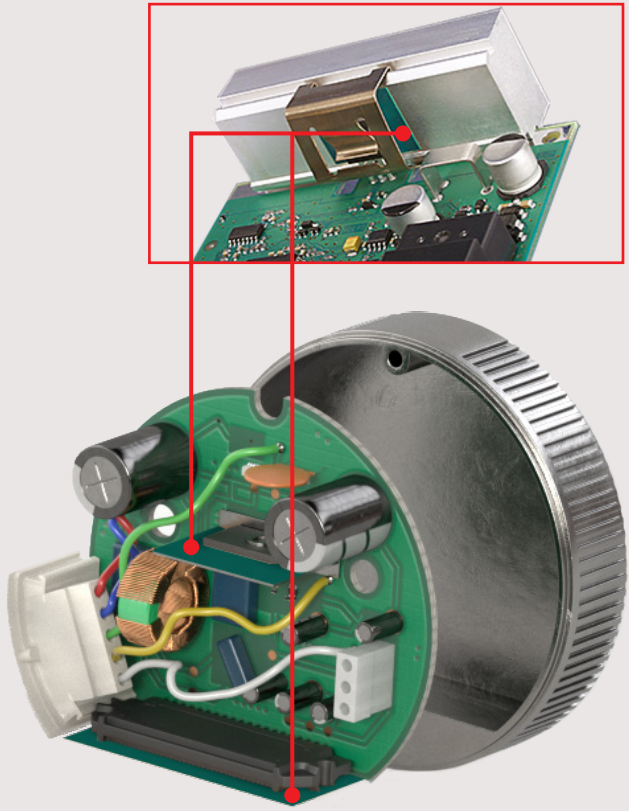
Customer Challenges

- Modern-day motor drives are integrating more complex power devices to manage growing energy efficiency requirements. The customer's next-generation motor controller required a thermal interface material (TIM) to manage new performance challenges and higher power densities.
- As the IC power module is subjected to motor vibration, reliability and stability of the thermal interface material – with no material migration – is critical to enable operational integrity.
- Any thermal material selected had to meet challenging metrics: Electrical isolation with high dielectric strength (>5000 Volts) and low thermal resistance are necessary to meet in-application conditions.



Customer Requirements

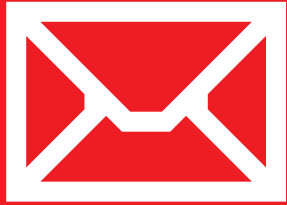
- **Process and Resource Efficiency:** The manufacturing set-up dictated a thermal material with easy handling that could be quickly integrated into the customer's current process with no equipment investment required.
- **Fast Sampling and Evaluation Technical Support:** Samples were needed almost immediately to complete the competitive evaluation and product commercialization timelines. Proactive trial coordination and virtual capability were necessary due to on-site COVID19 restrictions.
- **High Reliability:** IC power modules for motor controllers employ next-generation semiconductors and have higher power densities. The conditions require robust regulation of heat dissipation for consistent, long-term performance.



Henkel Solution

- Henkel's ***BERGQUIST HI-FLOW THF 1600P*** phase change TIM was recommended and samples supplied quickly for evaluation. Ultimately, the customer selected this cost-competitive product over other materials as it delivered the following capabilities:
 - High Reliability: The 1.5 W/m-K material exhibited excellent temperature cycling performance capable of managing operational peaks with no degradation or thermal property loss after high temperature (120°C) exposure for 500 hours. The material also performed well under vibration testing and has superb dielectric strength.
 - Simplified Handling and Storage: BERGQUIST HI-FLOW THF 1600P is supplied on a release liner for easy handling in high-volume production and can be stored for up to 12 months for streamlined inventory management and less material waste. This has improved production throughput and reduced inventory by 15% to 30% at customer production site.
 - Long-term Integrity: Unlike thermal greases, which pump out and lose effectiveness over time, Henkel phase change TIMs are solid at room temperature and flow at the transition temperature to fill gaps and dissipate operational heat, extending lifetime performance which increased customer field reliability and reduced field returns by 20% to 40%.
 - For this customer, BERGQUIST HI-FLOW THF 1600P has facilitated a seamless production ramp with excellent in-application performance. The customer is now producing 1.5 million motor controllers annually with reported satisfaction from their end customer.

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