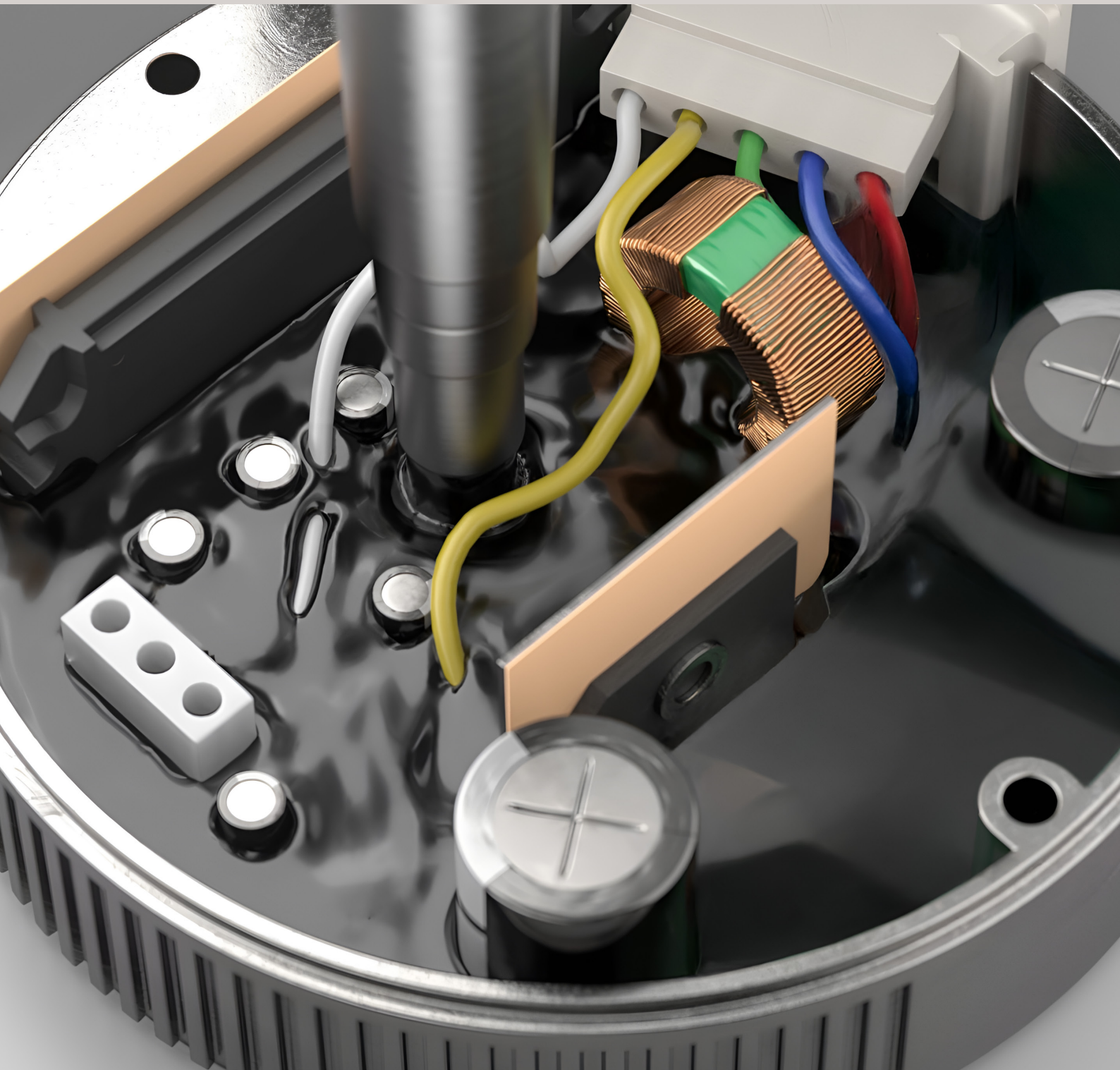
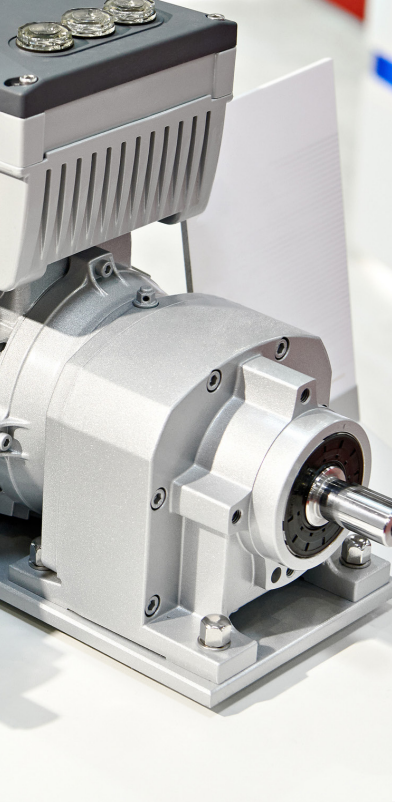
LOCTITE®

POWERING RELIABILITY IN HARSH ENVIRONMENTS

NEXT-GENERATION POLYURETHANE *POTTING SOLUTION*

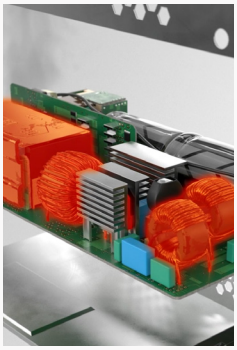




RELIABILITY STARTS WITH PROTECTION

Industrial and power electronics often operate in hot, humid, and corrosive environments where moisture and ionic contaminants accelerate metal degradation. These conditions can drive silver migration, producing dendritic growth that increases leakage currents and can ultimately short circuit printed wiring boards. Ensuring corrosion resistance and stable insulation performance under sustained humidity and temperature stress is therefore essential to long-term system reliability.

LOCTITE® SYCAST US 8000 A/B meets these demands with strong electrical and mechanical performance. Its dielectric strength of 24 kV/mm and surface insulation resistance above 10^8 after 500 hours at 85°C/85% RH help prevent leakage paths and maintain insulation integrity in humid conditions. Mechanical durability is proven through stable adhesion under long-term heat exposure, with lap shear strength exceeding 5 MPa after 3,000 hours at 150°C.

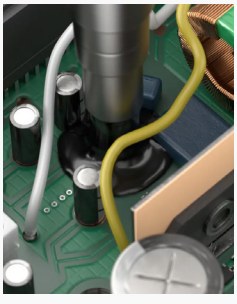


Environmental Stress: Heat, Moisture, and Vibration

Industrial and power electronics are continuously exposed to extreme operating conditions where heat, moisture, and vibration combine to threaten component integrity. High temperatures accelerate chemical degradation, while humidity enables moisture ingress that promotes corrosion and electrical leakage. Mechanical vibration adds another layer of stress, weakening solder joints and encapsulants over time. Together, these environmental factors accelerate failure mechanisms such as silver migration, delamination, and insulation breakdown, making robust protection essential for long-term system reliability.

Material Limitations: Rigidity, Poor Flow, and Unbalanced Mechanical Properties

Traditional potting materials often struggle to provide both mechanical flexibility and reliable encapsulation. Rigid formulations can crack under thermal cycling or vibration, while materials with poor flow fail to fill fine gaps or complex geometries, leading to voids and inconsistent insulation. Many existing polyurethane or epoxy systems lack the right balance between strength and compliance, limiting their ability to absorb stress and maintain adhesion under harsh operating conditions. These limitations increase the likelihood of performance degradation and early field failures.

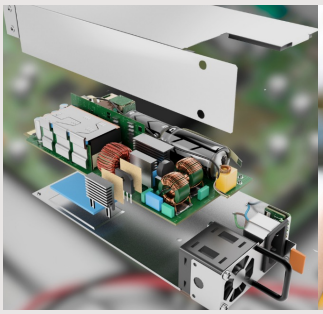


Compliance Pressure: UL 746 / 94 Requirements and Cost Constraints

As reliability standards tighten across global markets, manufacturers face growing pressure to meet UL 746 RTI and UL 94 V-0 safety certifications without driving up material or processing costs. Achieving both thermal endurance and flame retardancy in a single formulation requires precise material design and rigorous validation. Balancing these compliance demands with production efficiency, throughput, and affordability remains a key challenge for designers seeking to deliver safer, more durable electronic systems while maintaining competitive manufacturing margins.

ENGINEERED FOR HARSH INDUSTRIAL ENVIRONMENTS

LOCTITE® STYCAST US 8000 A/B is a next-generation 2K polyurethane potting compound developed to eliminate silver migration and ensure long-term insulation reliability.



In high-volume manufacturing, potting materials must combine speed, consistency, and durability. LOCTITE® STYCAST US 8000 AB delivers void-free encapsulation, fast curing, and long-term stability – ensuring reliable performance in demanding power and industrial applications.

Advanced Formulation: < 20 ppm Ionic Content, UL 746 RTI 140°C, UL 94 V-0

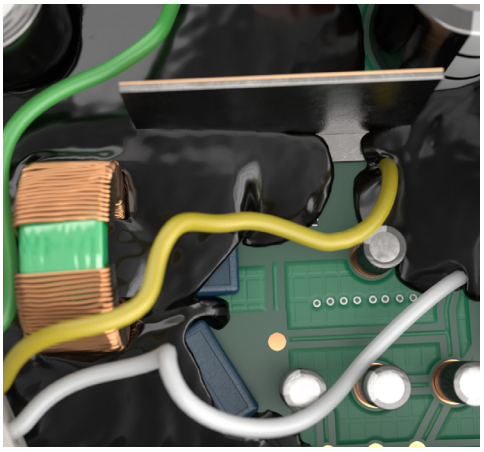
LOCTITE® STYCAST US 8000 A/B is engineered with an exceptionally low ionic content, below 20 ppm – to minimize the risk of corrosion and silver migration in high-humidity environments. Certified to UL 746 RTI 140°C for electrical and mechanical endurance and UL 94 V-0 for flame retardancy, it provides the safety and thermal stability required for power and industrial control systems. This advanced formulation delivers consistent performance across temperature extremes, ensuring protection and compliance in the most demanding operating conditions.

Electrical & Mechanical Protection: Flexible Yet Strong

Designed for both strength and resilience, LOCTITE® STYCAST US 8000 A/B combines an A85 Shore A hardness with an impressive 9 MPa tensile strength, providing a unique balance between flexibility and rigidity. This allows the potting compound to absorb thermal expansion and vibration without cracking or losing adhesion. The material's optimized modulus supports mechanical integrity under continuous load, maintaining encapsulation quality and minimizing stress on delicate components and solder joints.

Reliability Proven: Maintains Dielectric Strength Under Stress

Extensive testing demonstrates LOCTITE® STYCAST US 8000 A/B's ability to maintain high dielectric strength and insulation resistance even after prolonged exposure to 85°C / 85 % RH conditions. The formulation resists moisture absorption and ionic conduction, preserving its electrical insulation properties throughout accelerated aging and environmental stress testing. This proven reliability ensures long-term field performance, reducing failure rates and warranty risks in mission-critical industrial and power-electronics applications.



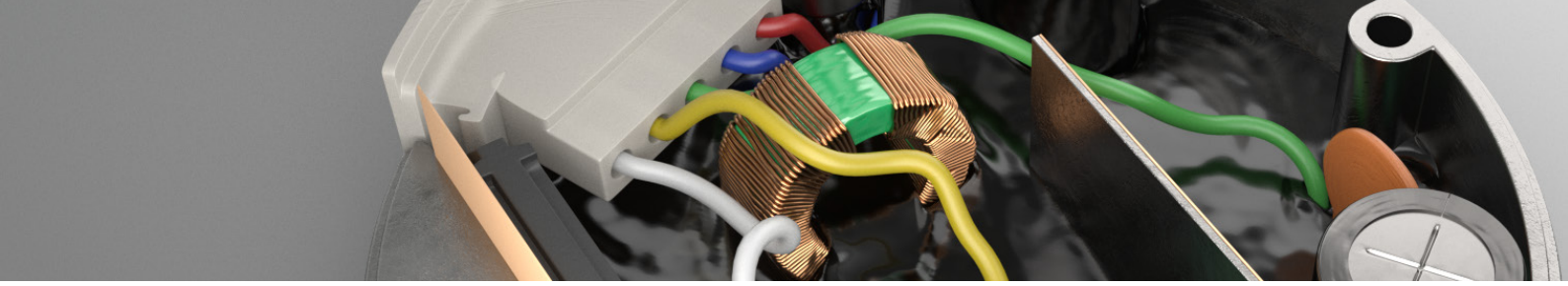
SUSTAINABILITY WITHOUT COMPROMISE

LOCTITE® STYCAST US 8000 A/B is solvent-free and VOC-free, reducing emissions and improving workplace safety while maintaining superior performance.

Its long service life and corrosion resistance reduce material waste and energy use, supporting a lower lifecycle carbon footprint. Fully RoHS and REACH-compliant, it helps manufacturers meet sustainability targets without compromising reliability.

LOCTITE® STYCAST US 8000 A/B is designed with sustainability at its core, featuring a solvent-free, VOC-free polyurethane formulation that significantly reduces environmental emissions and operator exposure during manufacturing. This VOC-free formulation supports safer production environments while aligning with global initiatives to minimize hazardous substances in electronic assembly. By meeting RoHS and REACH compliance standards, the material enables manufacturers to advance their environmental responsibility without sacrificing process performance or reliability.

Beyond its eco-friendly composition, LOCTITE® STYCAST US 8000 A/B extends sustainability through durability. Its superior moisture resistance, low ionic content, and long-term stability reduce the risk of premature component failure—cutting waste and maintenance costs throughout the product lifecycle. The material's extended operational life directly translates into fewer replacements, lower energy use across production and service, and a smaller overall carbon footprint, helping electronics manufacturers achieve their sustainability and efficiency targets in parallel.



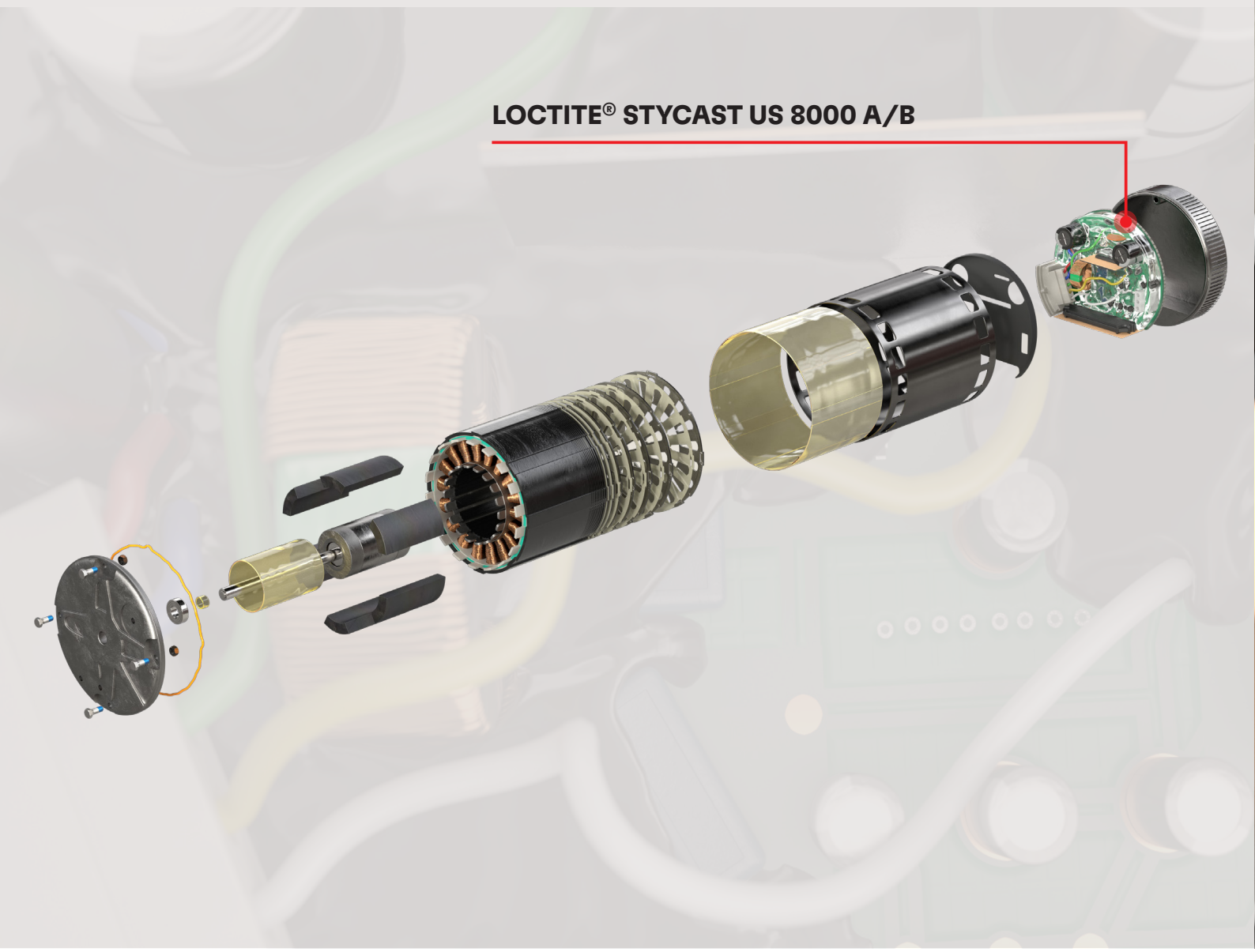
PROVEN IN POWER AND INDUSTRIAL APPLICATION

LOCTITE® STYCAST US 8000 A/B – Physical Properties

Property	Test method	STYCAST US 8000
Appearance	–	Grey Liquid
Mixed density	Pycnometer	1.16 kg/m^3
Mixing ratio	By weight (part A / part B) By Volume (part A / part B)	100 / 27.5 100 / 25.5
Viscosity at 25°C	Brookfield, RVT at 25°C	Part A: 8.000 – 14.000 mPa.s Part B: 200 – 400 mPa.s Mixed: 3.800 – 5.800 mPa.s
Pot Life at 25°C	Rheometer, 15TP-Ag method,	10 min.
Cure schedules	Heat oven	48 hr. at 25°C 2 hr. at 60°C 30 min. at 85°C
Flammability	UL 94 V0	V-0 (4 mm)
RTI	UL 746 B	140°C
Tg	by TMA	-5°C
CTE above Tg	by TMA	196 ppm/°C
Storage Modulus at 25°C	by DMA	127 MPa
Hardness	Shore A Shore D	89 36
Tensile Lap Shear Strength (TLSS)	Al-Al, 200 µm bondline	8.7 MPa
Tensile Strength (at break)	ISO 527-2 & ASTM638	9.0 MPa
Elongation (at break)	ISO 527-2 & ASTM638	87 %
Water Absorption	Stored at 85°C / 85% RH, 1,000 hr. Immersed in water at 25°C, 1,000 hr.	0.4 % 0.6 %
Weight loss	Stored at 130°C, 1000 hr.	1.5 %
Dielectric Strength	ASTM D149	24 kV / mm
Volume Resistivity	ASTM D257	315 Ω·cm
Surface Resistivity	ASTM D257	916 Ω
Dielectric Constant (Dk) / Dissipation Factor	ASTM D150 50 Hz 1 kHz 1 MHz	5.5 / 0.55 4.2 / 0.14 3.5 / 0.11
SIR	IPC TM-650	5.9x10^8

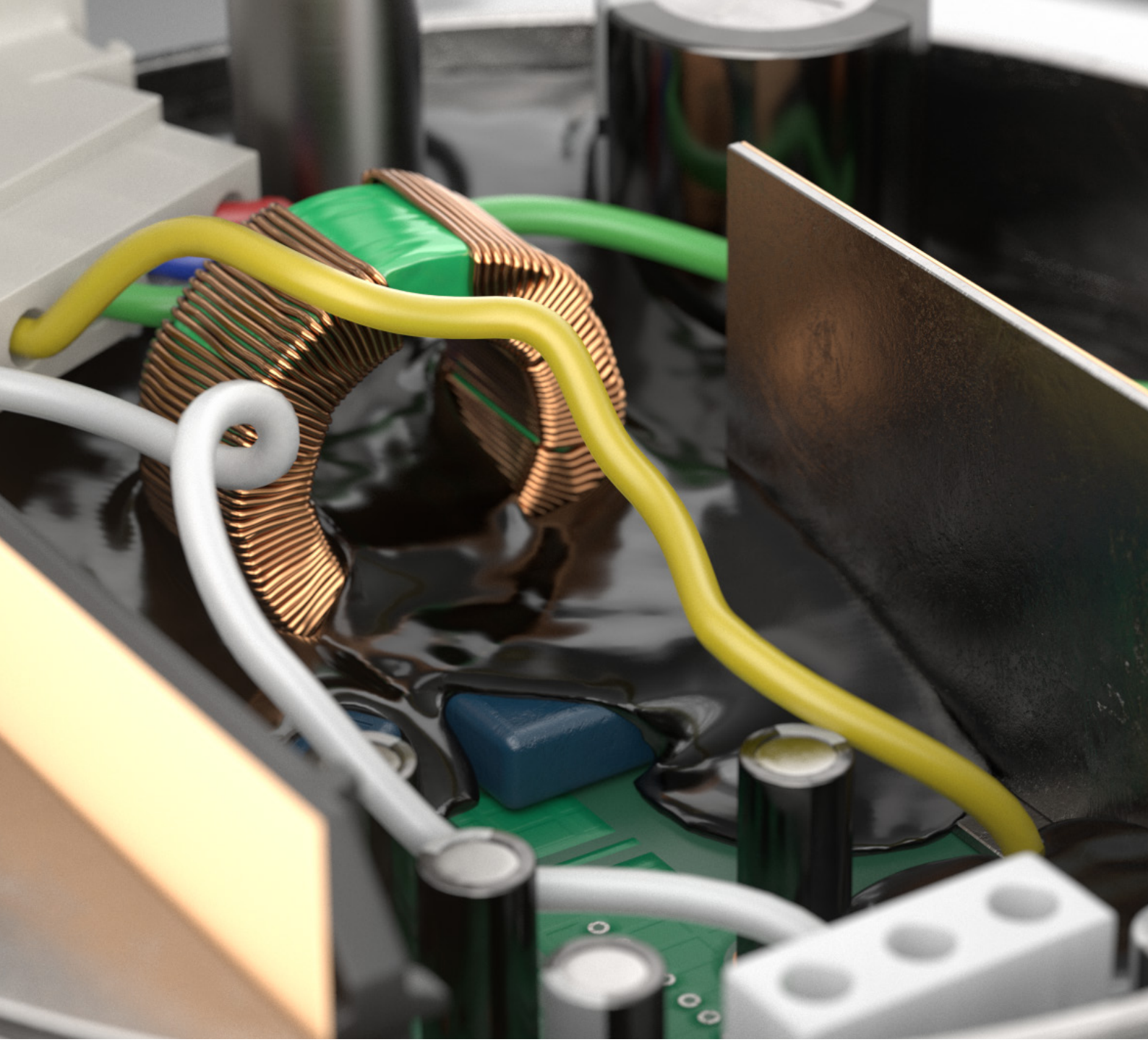
CUSTOMER SUCCESS

Reducing Warranty Claims Through Reliability



CHALLENGE

A leading global manufacturer of HVAC motor control systems faced recurring reliability issues caused by silver migration and moisture-related short circuits in their electronically commutated motors (ECMs). Operating in warm, humid environments, these systems experienced a 5 – 7% warranty claim rate due to corrosion and insulation failure. The customer needed a potting material that could withstand long-term heat and humidity exposure while maintaining electrical integrity and compliance with UL safety standards.



SOLUTION

Henkel collaborated closely with the customer's engineering team to evaluate, test, and implement LOCTITE® STYCAST US 8000 A/B across multiple production lines. The material's low ionic content (< 20 ppm), high RTI rating (140°C), and low moisture absorption proved critical in preventing ion transport and corrosion, while its fast 4:1 mix ratio enabled seamless integration into the customer's high-volume dispensing systems.

Following the transition to LOCTITE® STYCAST US 8000 A/B, the manufacturer achieved a 40% reduction in field failures and virtually eliminated moisture-related shorts. Cycle times improved through faster curing and consistent flow, while overall reliability and product confidence strengthened. The success validated Henkel's approach, combining advanced material science with process optimization, to deliver a durable, compliant, and globally scalable potting solution.

LOCTITE®

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