

# High-Performance Materials for UAV and Drone Systems

## Designing for Performance in the Air

In UAV and drone design, every gram and every seal matters.

Performance in the air starts with materials engineered for reliability, safety, and long-term stability.

Rogers materials are trusted by aerospace engineers worldwide for their proven performance in vibration control, thermal stability, and environmental sealing.

From BISCO® silicone foams and PORON® polyurethane foams to ARLON® specialty silicones, each material helps keep critical systems light, quiet, and flight-ready.

When precision and endurance are non-negotiable, our materials give engineers the confidence to design drones that perform flawlessly—every mission, every time.



## Engineering Challenges in UAV Design

### Ingress Protection (IP67/IP68):

Safeguard sensitive electronics, sensors, and avionics from dust, moisture, and water immersion under operational conditions.

### Vibration and Shock Resistance:

Isolate and protect printed circuit boards, sensors, and payloads from continuous rotor, propulsion, and environmental vibrations.

### Thermal and Altitude Cycling:

Maintain consistent compression, sealing, and material performance during rapid temperature fluctuations and changes in atmospheric pressure.

### Flame and Smoke Safety Compliance:

Ensure all components, enclosures, and materials meet applicable fire and smoke standards, such as UL 94 V-0 and FAR 25.853, to mitigate fire risk.

### Weight Optimization:

Minimize structural and component mass to maximize flight endurance, maneuverability, and payload capacity without compromising reliability.

## APPLICATION OVERVIEW

Application	Recommended Material	Typical Thickness	Why It Works
Battery Compression Pads	PORON <sup>®</sup> Polyurethane Foam / BISCO <sup>®</sup> Silicone Foam	1–4 mm	Lightweight, resilient, and electrically insulating; maintains uniform compression over repeated cycles.
Avionic & Payload Gaskets	BISCO Silicone Foam	1–25.4 mm	Provides superior environmental sealing and flame/smoke resistance, staying flexible across extreme temperatures.
Sensor & Camera Isolation	PORON Polyurethane Foam	2–5 mm	Protects delicate electronics with vibration damping and consistent mechanical performance.
Engine & High-Heat Gasketing	ARLON <sup>®</sup> Specialty Silicone / ARLON <sup>®</sup> Fluorosilicone	1–4 mm	High heat, chemical, and flame resistance ensures reliable sealing in extreme conditions.
Flexible Heaters	ARLON Specialty Silicone	0.5–3 mm	Thermally stable and conformable, electrically insulating, ideal for seamless heater integration.
Vibration & Shock Absorption	PORON Polyurethane Foam / BISCO Silicone Foam	3–12 mm	Absorbs energy from rotor and propulsion vibrations, reducing stress on critical components.
Wire & Cable Sealing Tape	ARLON <sup>®</sup> & MOX-TAPE <sup>®</sup> Self-Fusing Tape	0.25–1.3 mm	OEM and industry-certified, electrically insulating, high-temperature self-fusing silicone tape available in various configurations.
Thermal Interface Adhesive for Electronics	ARLON <sup>®</sup> Thermabond <sup>®</sup> Adhesive	0.1 mm & up	Thermally conductive, stress-decoupling adhesive that performs under extreme temperature and environmental conditions.

## SPECIFICATIONS

**Fire & Flame Safety:** These standards evaluate flammability, heat release, smoke and toxicity levels, and mechanical durability — ensuring materials meet the strict safety and performance demands of aerospace, UAV, and drone applications.

UL94, ASTM C1166, ASTM D3675, ASTM E1354

**Military & Aerospace Compliance:** These specifications define mechanical, thermal, chemical, and flammability performance requirements for elastomers, foams, seals, and tubing, ensuring materials meet application standards.

A-A-59588, MIL-T-83284 , MIL-P-22241B , AMS 3301-3304, ASTM D1056 (2D1-2D5), ASTM D6576, SAE AS22759

For more information and to request a sample, please contact our team of experts at [solutions@rogerscorp.com](mailto:solutions@rogerscorp.com)