

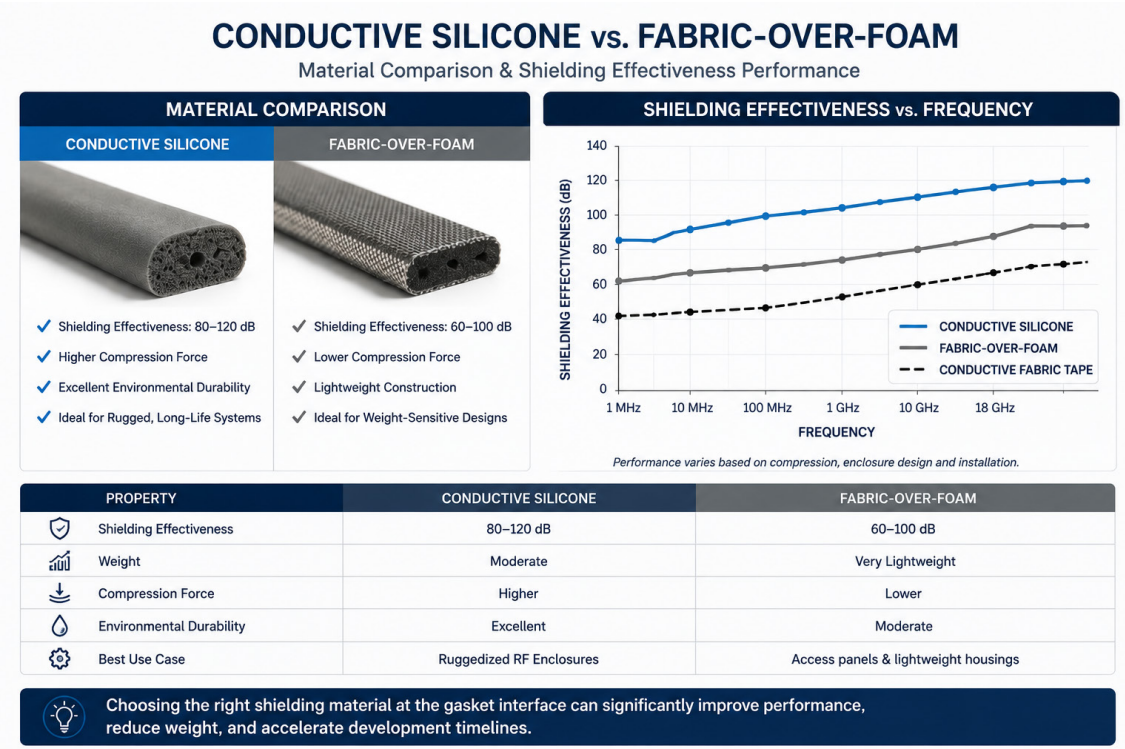
EMI Shielding & Lightweight Sealing Strategies for UAV & RF Defense Systems



Modern UAV and RF defense systems require lightweight sealing solutions that also provide high EMI shielding effectiveness. Conductive silicone and fabric-over-foam materials each offer distinct performance advantages depending on frequency range, compression requirements, and environmental exposure.

Why EMI Shielding Matters in UAV Systems

As UAV platforms become more compact and electronically dense, EMI leakage becomes increasingly difficult to manage. RF interference can degrade communications, radar functionality, ISR payloads, and signal integrity—especially in GHz-range applications. Many EMI issues originate at the enclosure interface itself. Improper gasket compression, inconsistent grounding paths, and material degradation can all contribute to shielding failures during Engineering Validation Testing (EVT) or Design Validation Testing (DVT) testing.



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How Shielding Effectiveness Changes with Frequency

Conductive silicone generally provides more stable shielding performance across higher frequency ranges and harsh environmental conditions. Fabric-over-foam can reduce weight and closure force but may experience reduced durability in rugged outdoor or vibration-intensive defense environments.

Lightweight Sealing Strategies for UAV Platforms

For weight-sensitive UAV applications, engineers often optimize gasket geometry and material selection simultaneously. Silicone foams and low-density conductive elastomers can reduce enclosure weight while maintaining effective environmental sealing and grounding continuity.

Typical design recommendations include:

- Target gasket compression of 20–30%
- Minimize gasket cross-section where possible
- Validate shielding performance early in EVT
- Evaluate compression set during thermal cycling

Rapid Prototype-to-Production Support

Rapid prototyping helps defense engineering teams validate shielding performance before committing to tooling or enclosure redesigns. Waterjet-cut conductive silicone gaskets can typically be produced within 24–48 hours to accelerate development timelines.

Stockwell Elastomerics supports aerospace and defense programs with:

- AS9100 / ISO 9001 certified manufacturing
- ITAR-registered operations
- Custom silicone and conductive gasket fabrication
- Application engineering
- DFM support

Request a Rapid EMI Shielding Prototype

Work directly with an application engineer to evaluate conductive gasket materials, optimize enclosure sealing, and accelerate UAV RF system validation.

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