

ARLON[®] Silicone Substrates in Battery Energy Storage Systems Flexible Heaters

Flexible heaters play a key role in various components within battery energy storage systems (BESS) such as battery modules and packs.

What is a flexible heater?

A flexible heater is a thin, lightweight device with a flexible structure that can conform to various shapes and surfaces.

It is designed to generate and distribute heat uniformly using materials like silicone for applications requiring efficient and variable thermal control.

Flexible heaters are especially important in BESS applications with wide temperature variation, exposure to extreme temperatures, or as a requirement for precise thermal control.

A flexible heater helps:

- Maintain optimal operating temperature
- Improve battery efficiency
- Uphold battery safety

Flexible heaters can be made with different materials depending on the specific application requirements. Some common materials include silicone, polyimides, mylar, and TPE.



Why silicone?

Silicone substrates are the materials of choice in flexible heaters due to their excellent thermal and electrical insulation properties, flexibility, and resistance to harsh environmental conditions.

Material Requirements

Flexible heaters used in battery energy storage system (BESS) modules and packs have specific material requirements that are dependent upon the operating conditions and thermal management needs of the application.

Some key requirements include:

- Efficiency
- Thinner thickness to save space for higher energy density
- Quick preheating
- Long battery cycle life
- Temperature uniformity
- Safety
- Durability
- Long term performance (10+ years)
- UL yellowcard
- Chemical resistance
- Cost effectiveness



ARLON[®] Silicone Substrates

As the world leaders in flexible heater silicone materials, ARLON[®] silicone substrates are designed to meet the challenging demands of BESS flexible heater applications.

Our materials help optimize battery cycle life and performance, improve reliability, and uphold safety.

Material Advantages

Long Term Performance

Referred to as the gold industry standard, ARLON silicone substrates are designed to last 10+ years, outperforming competitive materials.

UL Certification

Horizontal burn rated (UL94 HB) and vertical burn rated (UL94 V-0)
UL-recognized relative thermal index (RTI) ratings up to 220°C (428 °F)

Thin Construction

With materials as thin as 0.25 mm (10 mils), engineers can easily design around tight space constraints and complex battery geometries, optimizing application space.

Extreme Temperature Stability

Maintains high performance across a wide temperature range from -54 to 232 °C (-65 to 450 °F)

Chemical & Environmental Resistance

Resistant to corona, arc-tracking, UV, ozone, moisture, and many common environmental chemicals

Efficient & Precise Heating

Thin construction enables fast, uniform, and precise distribution of thermal energy, increasing heat transfer efficiency and maintaining optimal application temperature.

Safety

Excellent dielectric strength withstands high voltages applied without allowing electrical current to flow through unintended paths. Additionally, the substrates are carefully engineered to meet industry standards and regulations.

Get Started

Scan the QR code to learn more about our ARLON silicone flexible heater materials and capabilities, or visit <https://bit.ly/3ICkaMf>

