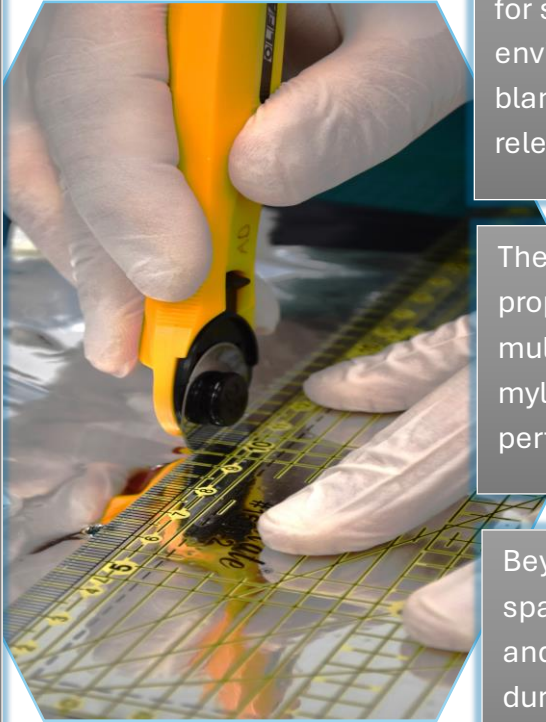


For more information contact us

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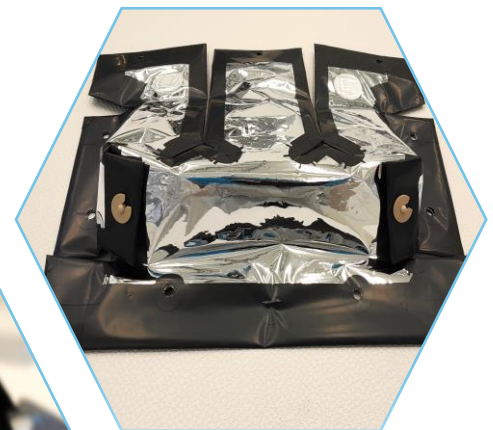
MLI Catalogue



Multilayer Insulation (MLI) is a key thermal control element for spacecraft, preventing excessive heat loss or gain from environmental sources. Most modern spacecraft use MLI blankets to manage heat, with areas cut out for radiators to release waste heat.

These blankets also protect internal components such as propellant tanks, batteries and instruments. MLI consists of multiple layers of low-emittance films, made of aluminized mylar or polyimide layer depends on the necessary performance, to minimize conductive heat transfer.

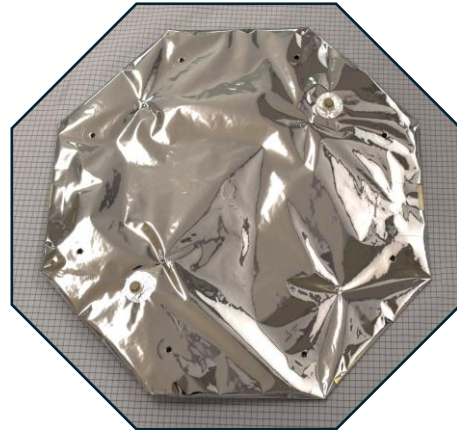
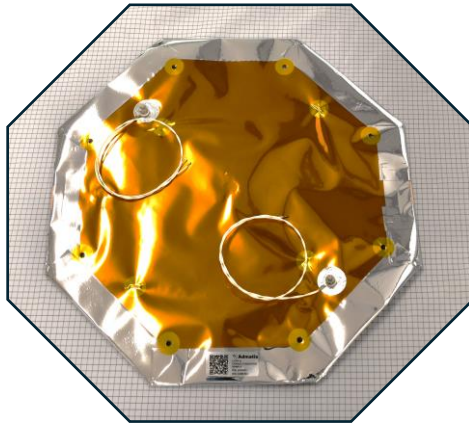
Beyond thermal control, MLI blankets also protect spacecraft from micrometeoroids, atomic oxygen, radiation and other environmental threats, while designers consider durability, flammability, and exposure to corrosive elements also.



Compositions

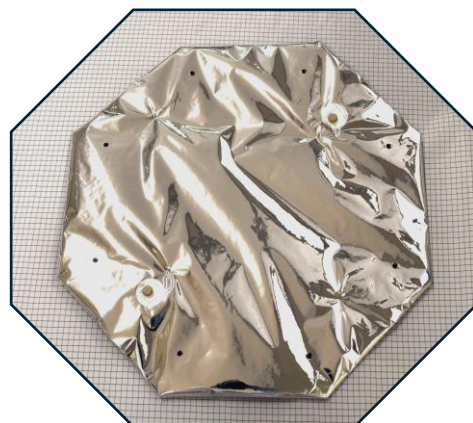
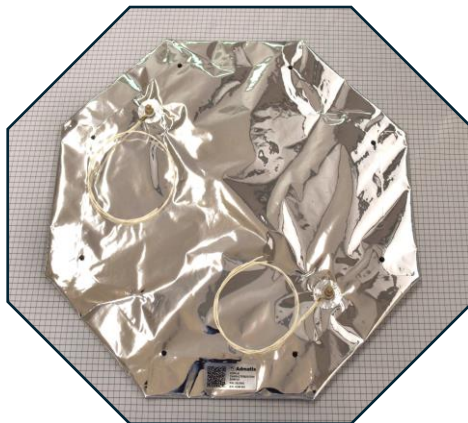
Internal Blanket (COPE A)

- Material: two side aluminized pet reflector with pet veil spacer
- Operating temperature: -180/ +150 °C
- Area weight: 230 g/m²
- Thermal Performance:
GL: 0.008 W/m²K
GR: 0.006 m²/ m²



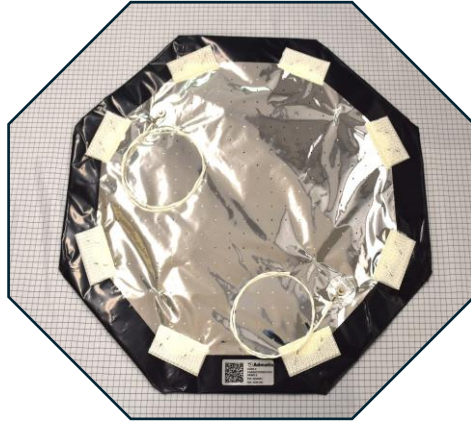
Spacerless Internal Blanket (COPE B)

- Material: two side aluminized embossed pet reflector without spacer
- Operating temperature: -180/ +150 °C
- Area weight: 300 g/m²
- Thermal Performance:
GL: 0.015 W/m²K
GR: 0.006 m²/ m²



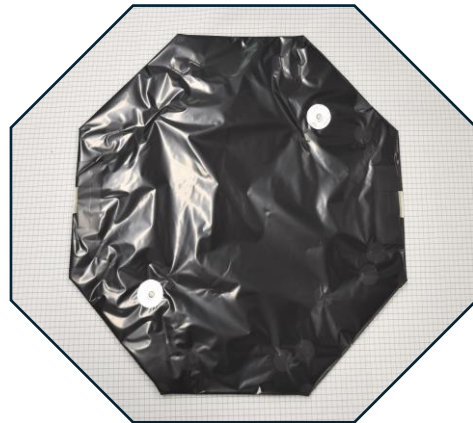
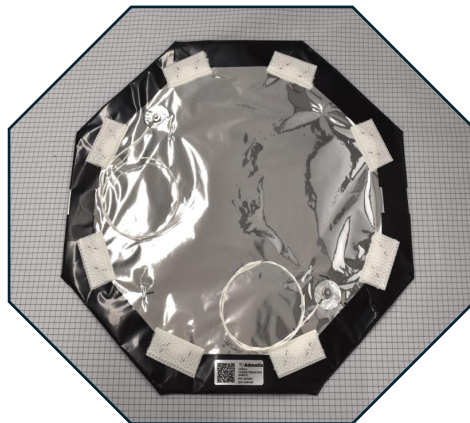
Low Temperature External Blanket (COPE C)

- Material: two side aluminized pet reflector with pet veil spacer
- Operating temperature: -180/ +150 °C
- Area weight: 308 g/m²
- Thermal Performance:
GL: 0.012 W/m²K
GR: 0.004 m²/ m²



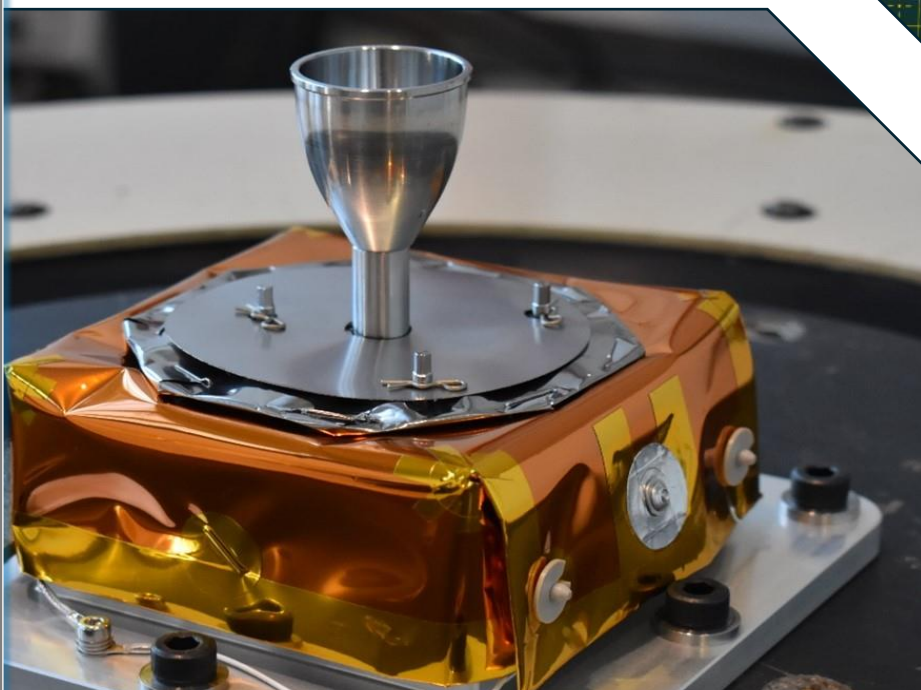
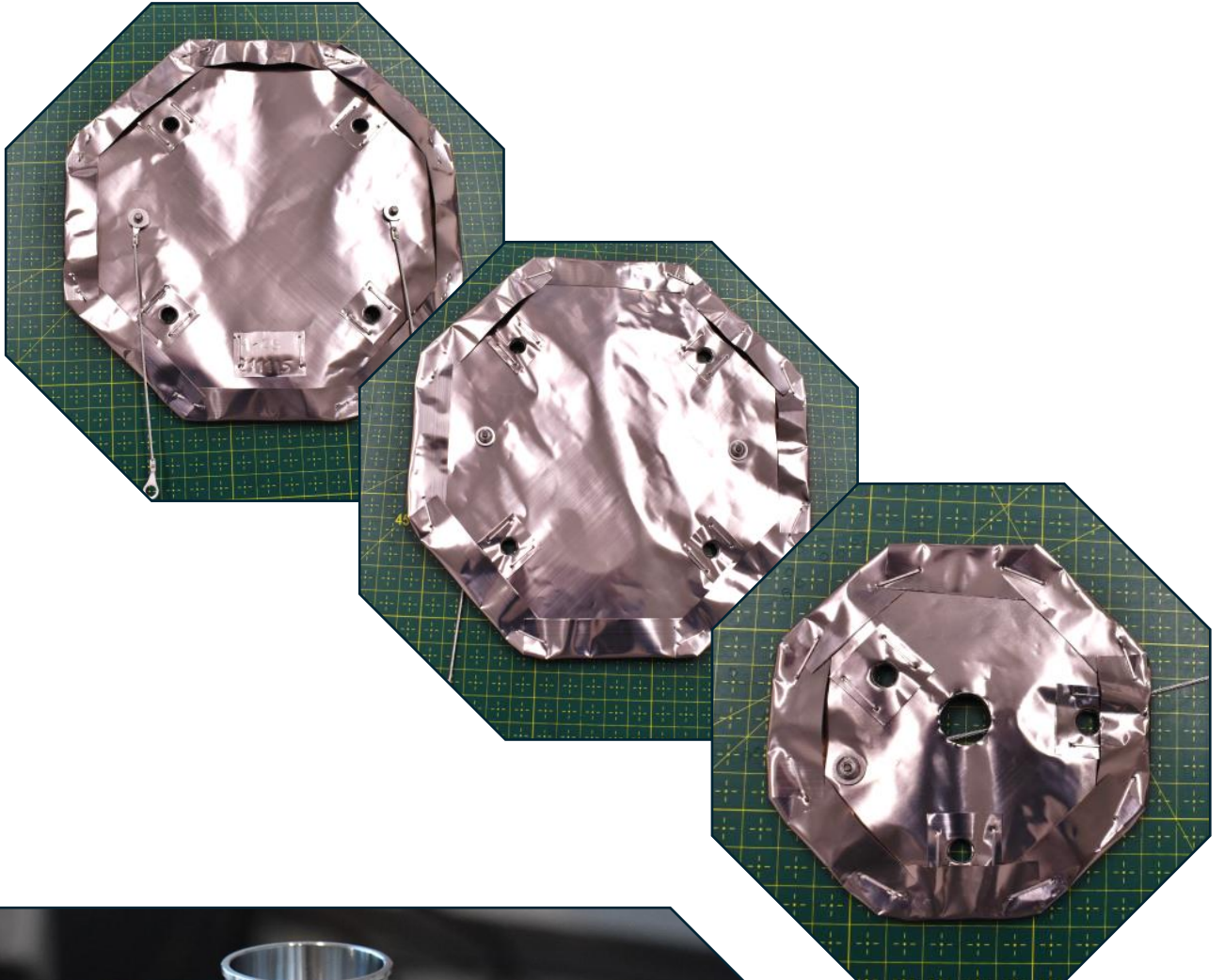
Temperature External Blanket (COPE D)

- Material: two side aluminized polyimide reflector with glass veil spacer
- Operating temperature: -180/ +200 °C
- Area weight: 398 g/m²
- Thermal performance:
GL: 0.012 W/m²
GR: 0.005 m²/ m²



Very High Temperature Blanket (THRUST)

- Material: titanium reflector with glass veil spacer
- Operating temperature: -180/ +650 °C
- Area weight: 880 g/m²
- Thermal performance:
GL: 0.15 W/m²K
GR: 0.042 m²/ m²



Cover Layers

- **One side Aluminized Black Kapton**

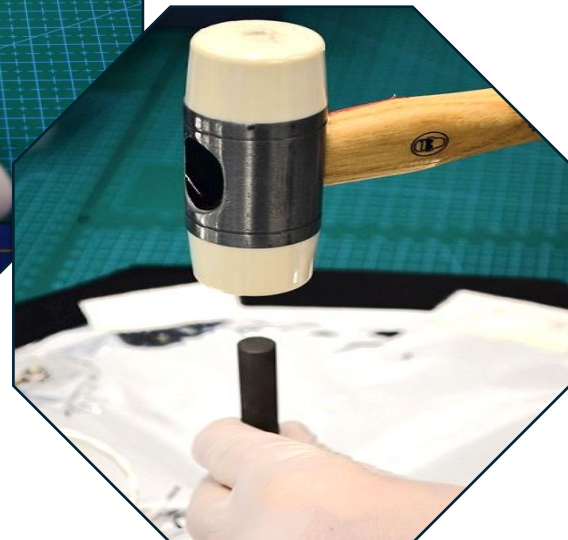
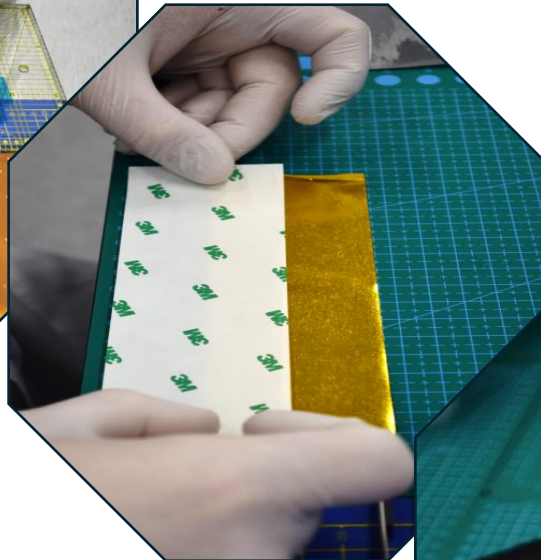
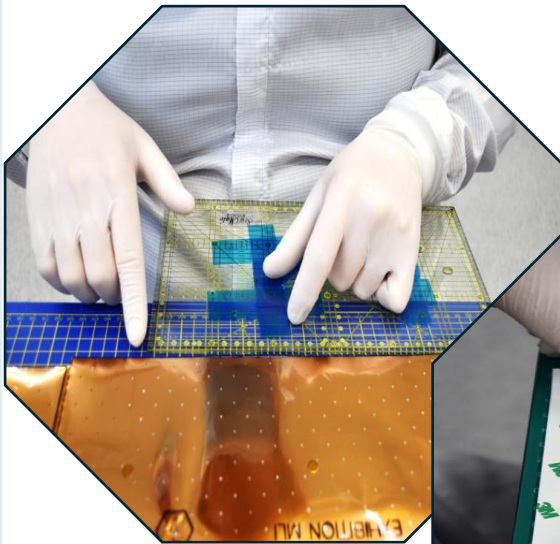
Kapton side absorptance $\alpha \geq 0.9$; Kapton side emittance $\varepsilon \geq 0.8$

- **One side Aluminized Polyimide:**

Polyimide side absorptance $\alpha \leq 0.4$; Polyimide side emittance $\varepsilon \geq 0.7$

- **Two side Aluminized Polyimide:**

Absorptance $\alpha \leq 0.14$; Emittance $\varepsilon \leq 0.035$



Venting Solutions

- **Factory Perforation:**

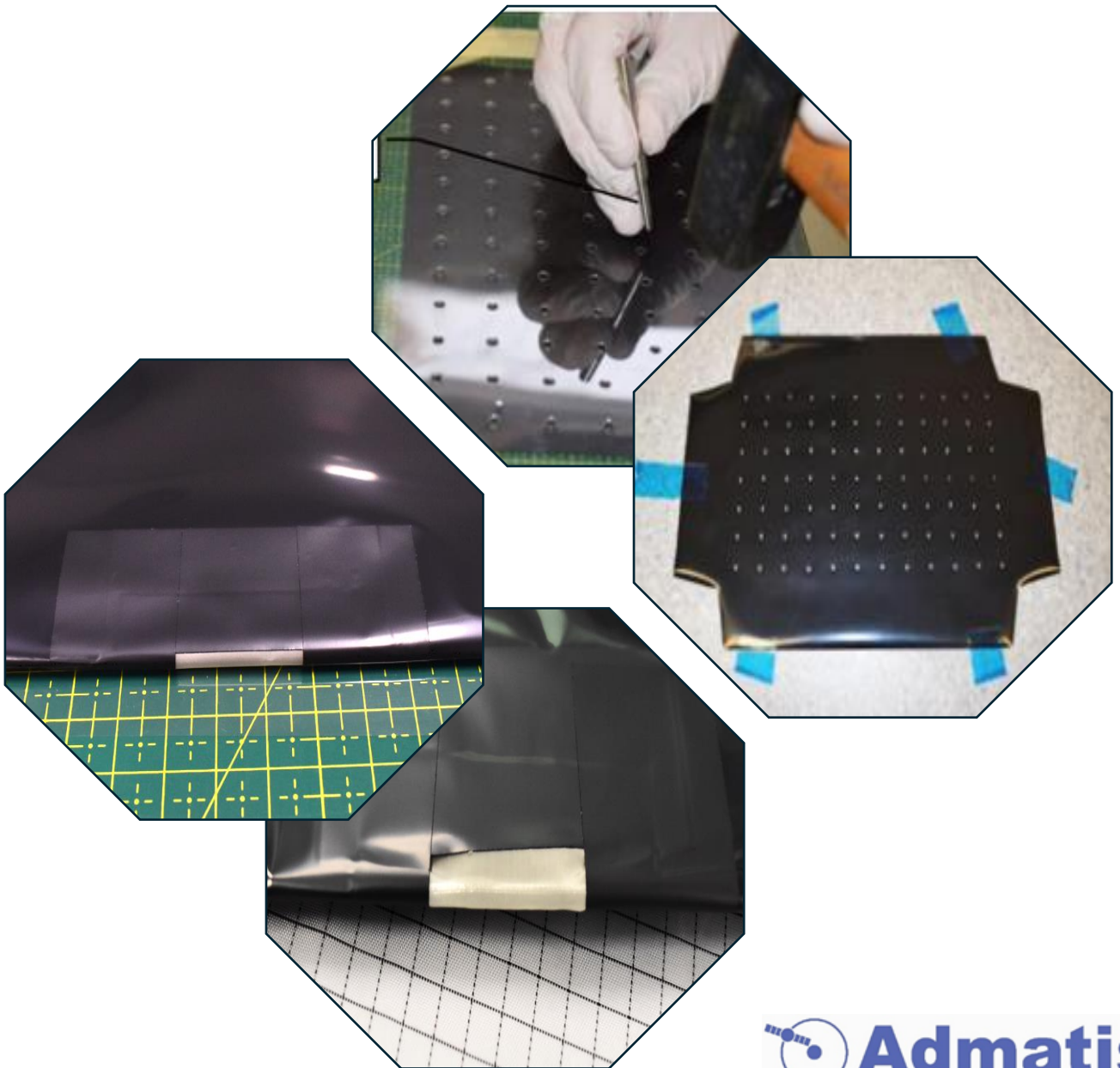
Reflector layers and the inner cover are perforated by the manufacturer.

- **Custom Perforation:**

If there are critical areas where the perforation is not allowed, the perforation pattern designed and manufactured individually.

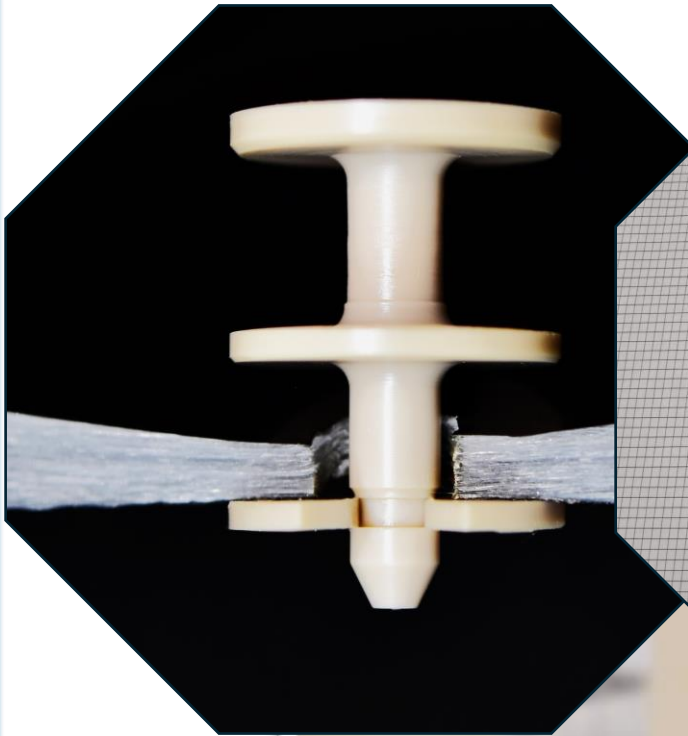
- **Edge Vent Edge Vent:**

Used when the vent path needs to be directed away from specific areas.

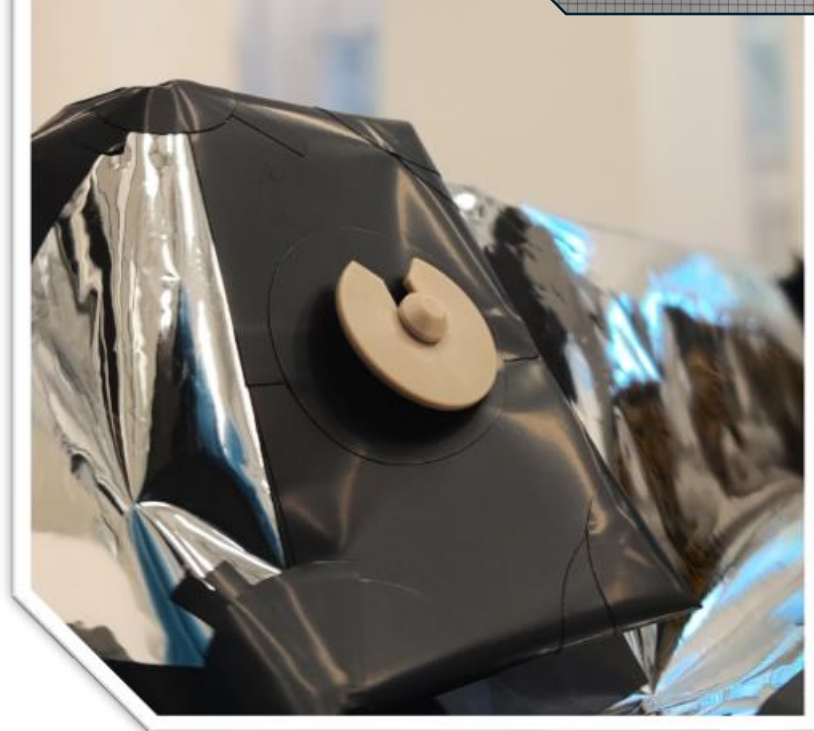
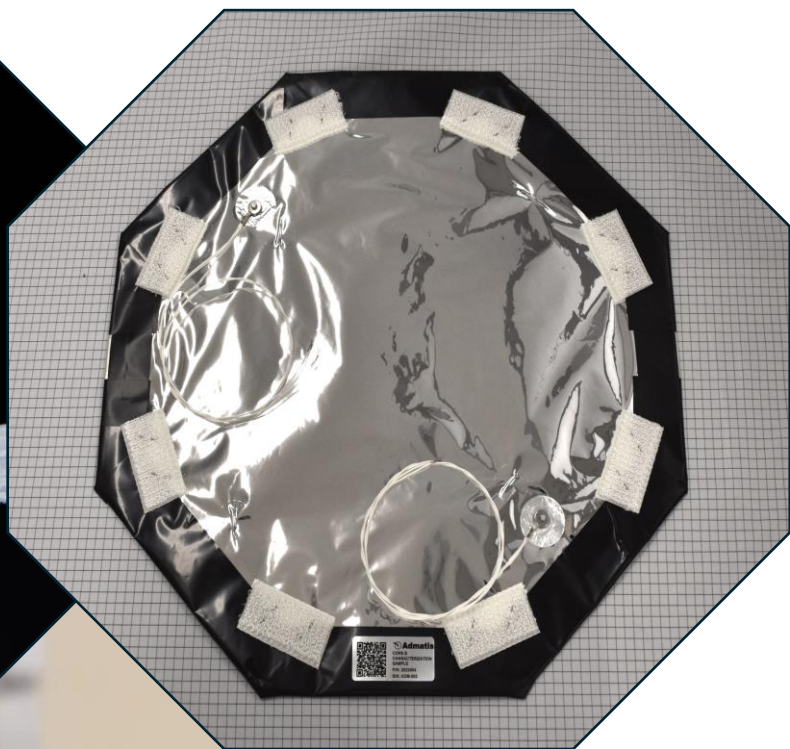


Fixation Methods

Standoff



Velcro



Cleanliness

- MLI manufacturing carried out in ISO8 cleanroom
- Critical cleaning and packaging of MLI carried out in ISO6 clean bench



Qualification

- Humidity testing, representing 9 years of on ground storage
- Launch loads:
 - Vibration test
 - Venting test
- Cleanliness
 - Outgassing test according ECSS standard
 - Bakeout
- Environmental testing representing LEO orbit operation:
 - Thermal cycling
 - Proton and electron irradiation
 - ATOX irradiation
 - UV irradiation
 - Thermal performance measurement in representative 3D MLI cube

