Prefabricated Multilayer Insulation Product

AstraWrap™ is a prefabricated **layup** at the core of multilayer insulation (MLI). Available in a variety of standard layer counts or to your custom specification, AstraWrap™ is ideal for passive thermal control systems on spacecraft and in high thermal efficiency ground-based vacuum systems.

Features:

- Ultrathin double aluminized polyester film reflector layers to provide efficient thermal performance with minimal weight and stiffness.
- Reflector separation is provided by polyester netting to minimize weight and layer-to-layer conductivity.
- AstraWrap™ is provided in a standard material width of 48 inches and in a standard length of 10 linear feet. Additional widths up to 54 inches available by special order.
- Additional film treatments:
  - Perforations – allows air trapped beneath or within the blanket to vent during rocket ascent, so blankets do not billow or detach from structure.
  - Crinkling and embossing - offers a lower layer density and less layer conduction when properly installed. These treatments can be used to eliminate the need for a spacer with a small impact on thermal performance.

Product Number*	Spacer Included	Perforated	Embossed
AW001-48-XX	Yes	No	No
AW002-48-XX	Yes	Yes	No
AW003-48-XX	No	No	Yes
AW004-48-XX	No	Yes	Yes

*XX denotes number of reflector layers or reflector/spacer layer pairs (as applicable) in the layup. Can be either 10, 15, or 20 Layers

Material Properties

Product Type	Number of Layers	Areal Density (kg/m2)	Thickness (cm)	Average Layer Density (layers/cm)	Operating Temperature °F(°C)	Expected Effective Emissivity
AW001 & AW002	10	0.181	0.34	29	-452 (-269) to +300 (149)	0.0046
	15	0.272	0.45	33	-452 (-269) to +300 (149)	0.0044
	20	0.362	0.55	36	-452 (-269) to +300 (149)	0.0042
AW003 & AW004	10	0.110	0.18	56	-452 (-269) to +300 (149)	.0099
	15	0.165	0.31	48	-452 (-269) to +300 (149)	.0066
	20	0.220	0.43	46	-452 (-269) to +300 (149)	.0055

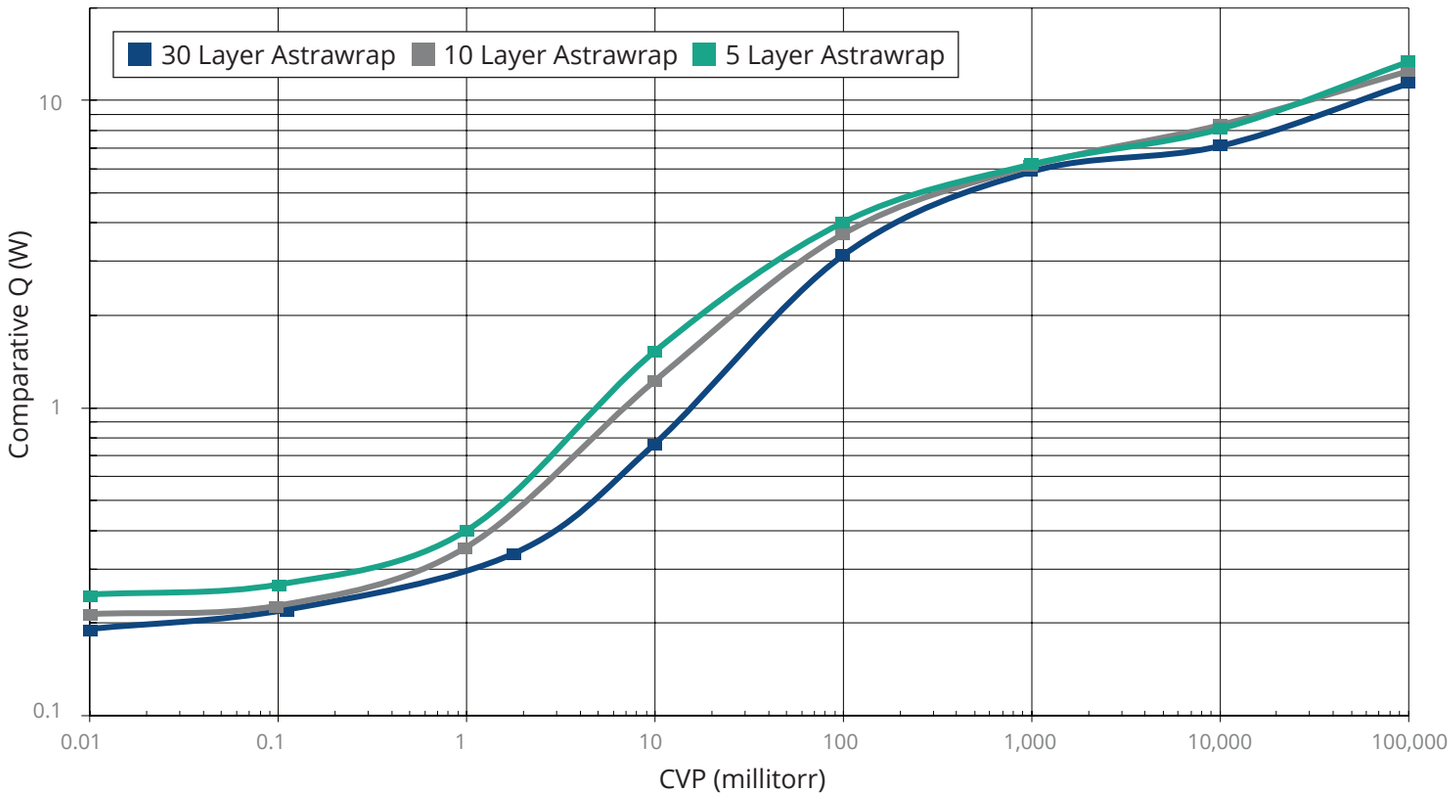
* Note: Expected Effective Emissivity is calculated based on measured values of a blanket unaffected by edge effects and related discontinuities. Actual blanket performance will vary depending on a variety of design and installation factors.

Applications

- Satellites – All Sizes
- Launch Vehicles
- Space Stations
- Cargo Spacecraft
- Human-flight Spacecraft
- Lunar/Planetary Orbiters & Landers
- Spacecraft Ground Support Equipment
- Spacecraft TVAC Testing

Thermal Performance

Comparative Thermal Power (Watts) to Cold Vacuum Pressure (CVP)
(300K Warm Boundary Temp, 77K Cold Boundary Temp)



Usage

- Used to create fully formed blankets to be applied to a variety of spacecraft structures.
- Can be combined with specialized outer layer materials for customized optical or environmental properties (high or low emissivity, atomic oxygen resistance, etc.).
- With light-weight polyester netting, AstraWrap offers a lower cost-to-orbit than utilizing spun-bond spacer materials.