

STRIKEGRID[®]

**Lightning Strike Protection
for Composite Structures**

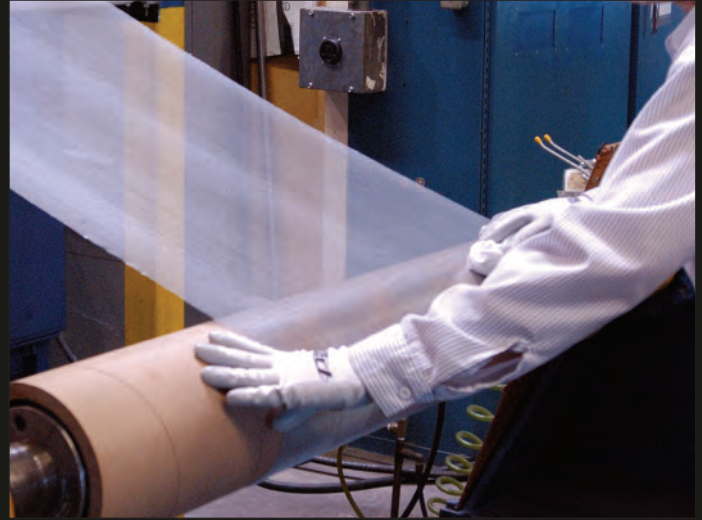


THE GILL CORPORATION-MARYLAND



STRIKEGRID®

Lightning Strike Protection for Composite Structures



PROTECTION WHERE YOU NEED IT MOST

Lightning strikes can cause devastating effects including welding of metallic flight control surfaces, vaporization of resin from localized composite strike areas and explosion of fuel vapors within fuel tanks. "The aircraft must be protected against catastrophic effects of lightning" states the U.S. Federal Aviation Regulation – FAA 25.581 Composites have been used on aircraft for over 30 years and do not readily conduct away the extreme electrical discharge generated by a lightning strike so the electrical current seeks any metal paths that may be available.

STRIKEGRID® CEF is a phosphoric acid anodized (PAA) continuous expanded aluminum foil (CEAF) product that also includes a proprietary coating which combines to negate the effects of galvanic corrosion when used in conjunction with carbon prepreg materials. STRIKEGRID® can be bonded to aircraft structures either as an outer ply or embedded 'one-ply down' beneath a layer of surfacing film.

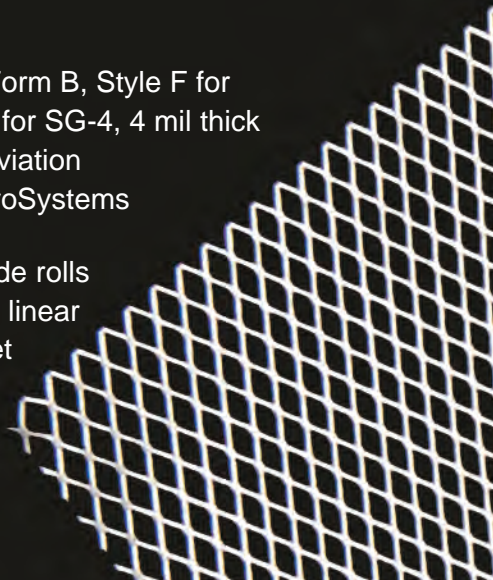
Independent 200,000 amp lightning strike testing of composite test panels was performed at Lightning Technologies, Inc. (LTI) in Pittsfield, MA and results show STRIKEGRID® achieved superior protection versus industry incumbent copper and phos-bronze mesh products of similar thickness and composition.

STRIKEGRID® QUALIFICATIONS

Boeing BMS 8-336, material specification for Type 1, Class 2, Grade 013, Form B, Style F for SG-3, 2 mil thick material and Type 1, Class 2, Grade 016, Form B, Style F for SG-4, 4 mil thick material. Boeing BMS 8-336, Boeing D-800, Goodrich RMS-0523, HAFEI Aviation Q/2AJ640-2009, Mitsubishi (MHI) 5200MAS, MRAS STMB-M533, Spirit AeroSystems SMS-110101B.

STRIKEGRID® CEF is now available in roll form for SG-3 (2 mil) in 24" wide rolls and SG-4 (4 mil) material in 36" wide rolls. Both SG-3 and SG-4 are 2,500 linear foot rolls (splices allowed per roll will be two or less, with a minimum 50 feet between splice locations).

STRIKEGRID® CEF is currently used on Boeing B737, B777, B787, 747-8 and the MRJ (Mitsubishi Regional Jet) aircraft.





STRIKEGRID® – CEAF
Lightning Strike Protection
for Composite Structures

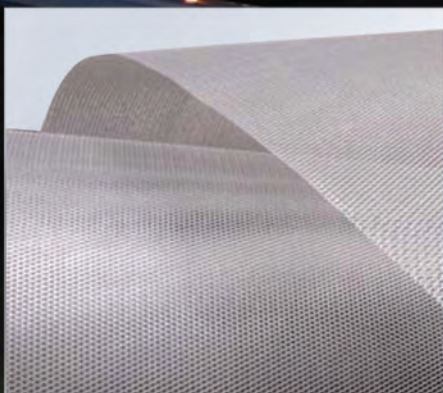
Lightning is one of the deadliest weather phenomenon to plague commercial aircraft. Lightning bolts are channels of electric energy that measure from 2" in width to bolts anywhere from 200' up to 20 miles long. The average lightning stroke is 6-8 miles long.

Estimates say on average that every U.S. commercial aircraft is struck by lightning more than once a year. Each time a lightning bolt strikes an unprotected surface, up to 200,000 amps of electricity will seek the path of least resistance.

Lightning is a threat from nature that must be considered during the design and certification of all aircraft. STRIKEGRID® products protect surfaces of flight structural components including flaps, slats, ailerons, spoilers, rudders, elevators, fixed wing components, vertical and horizontal stabilizers, wing to body fairings, engine nacelles and radomes.

Protecting the body of an aircraft from lightning strikes involves wicking away the electrical charge through the conductive metal structure. The increase of composites materials in aircraft structures offers an opportunity to incorporate lightning strike protection to the fuselage and other critical areas of an aircraft. Alcore, Inc. has created a product to address this unpredictable phenomenon of nature in their STRIKEGRID® Continuous Expanded Aluminum Foil (CEAF).

STRIKEGRID® CEAF is the industry's highest performing lightning strike dissipation material. Phosphoric acid anodized and coated with a proprietary coating, STRIKEGRID® CEAF outperforms all other ductile materials.



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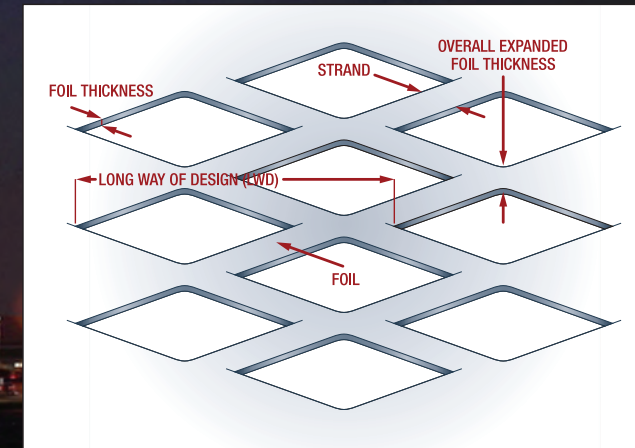
STRIKEGRID® APPLICATIONS

- Aircraft control surfaces
- Exposed composite surfaces
- Composite fuselage and aircraft engine nacelles
- High-performance composite structures
- Marine and naval panels
- Wind turbine blades

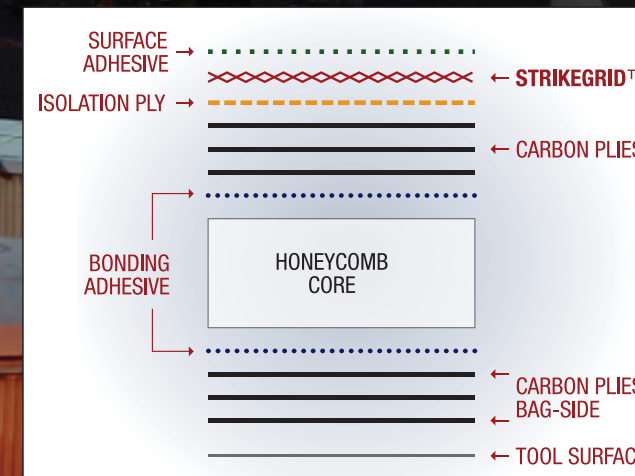
FEATURES

- Able to withstand lightning strikes of up to 200K amps
- Unsurpassed corrosion resistance and bond durability
- Elevated temperature performance to 350°F/177°C
- Prevents surface micro-cracking
- Fire and fungus resistant
- Eliminates the need for priming
- Highly adaptable with ply-cutting equipment when combined with surface films
- Available in continuous rolls

STRIKEGRID® CEAF SCHEMATIC



STRIKEGRID® LAYERING SCHEMATIC



STRIKEGRID® LIGHTNING STRIKE TEST RESULTS

Lightning Protection	SG-4	016 Copper	016 Phos Bronze	None	SG-4	None
Isolation Layer	S-2 Glass	None	None	None	S-2 Glass	None
Honeycomb	KOREX	KOREX	KOREX	KOREX	Fiberglass	Fiberglass
Test Panel Photo						
TTU (NDI) Inspection						
NDI Damage Assessment	2" dia. mesh only	11" dia. Damage thru 2 ply layers	9" dia. thru hole	12" dia. thru hole	3" dia. mesh only	10" thru hole

STRIKEGRID® CEAF PRODUCT INFORMATION

Product Designation	SG-3	SG-4
Grade	013	016
Aluminum Alloy	1145	1145
Width, inches (mm)	24" (610)	24" to 36" (610 to 915)
Weight, psf (gsm)	0.013 (63)	0.016 (78)
Overall Thickness, inches (mm)	0.002 (0.050)	0.004 (0.100)
Overall Thickness, mm	0.050	0.100

Qualifications

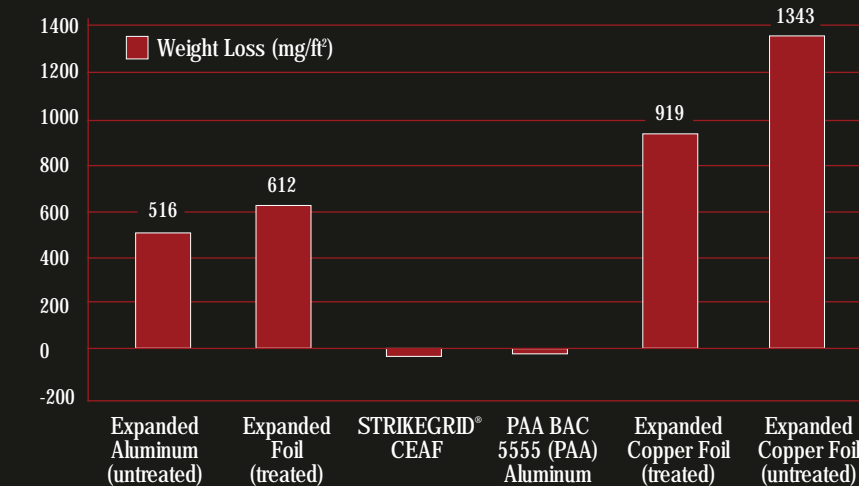
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Availability

STRIKEGRID® CEAF is available in continuous rolls

Roll Width	Length (linear ft)	Area (square foot)	Length (m)	Area (square meter)
24" (610mm)	250 to 1,250	500 to 2,500	76.2 to 381	46.5 to 232
36" (915mm)	167 to 833	500 to 2,500	51 to 254	46.5 to 232

STRIKEGRID® TYPICAL WEIGHT LOSS CHART



Typical Weight Loss - PAA Treated Aluminum Performance Versus Other Materials Tested in Accordance with ASTM B-117



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