



Technical Process Bulletin

LOCTITE EA 9837.1LS AERO

Epoxy Lightning Strike Protection Adhesive

(KNOWN AS SynSkin 9837.1LS)

Description

Loctite Aerospace laminates LOCTITE EA 9837.1 AERO composite surfacing film and LOCTITE film adhesives with lightweight conductive screens or foils to provide a family of singular films that can be used as a conductive lightning strike surfacing layer for composites. Many customers purchase bare copper plus a separate surfacing film and lay up each ply separately. The bare copper is very fragile and difficult to handle. These LS (Lightning Strike) products provide the user with much easier handling and lay-up, improved surface quality of the cured composite part, greater protection of the composite surface as well as protection of the conductive screen during sand and fill operations.

Conductive Foil

Loctite Aerospace Lightning Strike Products are currently offered with Dexmet conductive materials that are manufactured by Dexmet Corporation. Dexmet is a nonwoven metallic mesh that is produced from a solid foil and is perforated and processed to create outstanding formability and excellent adhesion to composite laminate structures. Since it begins as a solid foil, it can be produced from nearly pure metals for maximum electrical conductivity. In contrast, most woven options must be alloyed in order for the metal to have enough strength to withstand the weaving operation. Alloys traditionally used by the aerospace industry typically have conductivity levels of approximately fifty percent of the Dexmet base metals. Woven products tend to have a high resistivity at every cross over point due to the localized double thickness, and are not as uniform in thickness. The term 'Dexmet screen' shall be used to identify the conductive material in this datasheet.

All products are processed through a calendering, annealing and cleaning process. Loctite Aerospace LS Products are currently offered with copper screens that have an areal weight of 0.015, 0.022, 0.029 or 0.040 lb/ft² (73, 107, 141 or 195 grams/m²). The bare copper screen is very fragile, especially the low areal weight versions. The addition of a surfacing film makes it much easier to position and handle the copper without distortion.

Features

Provides protection for the fragile metal screen, especially during sand and fill operations

Improved handling of Dexmet screen

Combined surfacing and lightning strike protection for composites in one product:

LOCTITE EA 9837.1LS AERO versions:

- Provide maximum protection of the copper mesh.
- LOCTITE EA 9837.1LS AERO contains a unique combination of filler materials in a resin matrix. It is nearly impossible to sand through cured
- LOCTITE EA 9837.1LS AERO It protects the copper much better than an all epoxy film adhesive.
- Provide high quality paintable surfaces
- Can greatly reduce the cost of surface preparation for painting
- Reduce raw material part numbers and kitting time
- Co-curable with prepregs



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Lightning Strike Testing

High current tests were performed on flat, carbon fabric, solid laminate panels and a splice joint to evaluate the ability of LOCTITE EA 9837.1LS AERO .030/.029 and /.022 to protect composites from the damage of Zone 1A lightning strike attachments.

Each of the test articles showed Zone 1A strike point damage over a 6 to 7 inch diameter area, with delamination over a two inch diameter area. No damage was observed on the back sides of the panels. The splice panels exhibited a similar size of damage area, as well as damage along the splice where current transitioned from one side of the panel, across the splice joint of the LS film, to the opposite side. No damage was observed on the back surfaces of the panels and the splice joints remained intact. These results were considered to be functionally acceptable so Zone 2 strikes, which are less severe, were not tested.

Loctite QC Acceptance Testing

QC testing is performed on the unlaminated composite surfacing film/adhesive film. A certification is obtained from the supplier of the Dexmet screen, and its areal weight is confirmed during Receiving Inspection testing. Final QC on the laminate is limited to appearance and areal weight, thereby reducing the costs of redundant QC. Users interested in establishing values and tests for routine QC acceptance should request the Loctite Aerospace standard acceptance tests which will provide details on test methods and values used to certify the surfacing film of interest.

Handling

This product is supplied in roll form and is ready to use as received. The film should be removed from cold storage and allowed to warm to room temperature prior to opening sealed bag. The indicator on the desiccant should be blue. The Dexmet side of the film should be positioned and co-cured on the prepreg side of the part. This will allow easy repositioning of prepreg if necessary and provide maximum surfacing protection of the screen.

Application

Storage Life - This product requires refrigerated storage. Store @ 0°F/-18°C or below for maximum storage life. Warranty life @ 0°F/-18°C is 12 months from date of shipment. Store only in sealed containers to prevent moisture contamination. Allow all moisture to evaporate before opening for use.

Lightning Strike Product Listing

Below are Loctite's standard film/screen combinations. Custom laminates are available subject to viable volumes, minimum order and pre-approval for manufacturability. Please contact your local Loctite Aerospace sales representative for samples and details.



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Loctite Aerospace Product	Dexmet Cu 0.015 psf (75g/m ²)	Dexmet Cu 0.022 psf (110g/m ²)	Dexmet Cu 0.029 psf (145g/m ²)	Dexmet Cu 0.040 psf (200g/m ²)
LOCTITE EA 9837.1 BT Supported 0.030 psf (150 g/m ²)	X	X	X	X

Loctite Aerospace Product	Product Features	Cure Temperature
LOCTITE EA 9837.1 BT Supported 0.030 psf (150 g/m ²)	<ul style="list-style-type: none"> - True composite surfacing film: it consists of a unique combination of filler materials in a proprietary resin matrix. - Provides the maximum protection for the Dexmet screen - cannot sand through 9837.1 resin/filler system during sand and fill 	250F/350F



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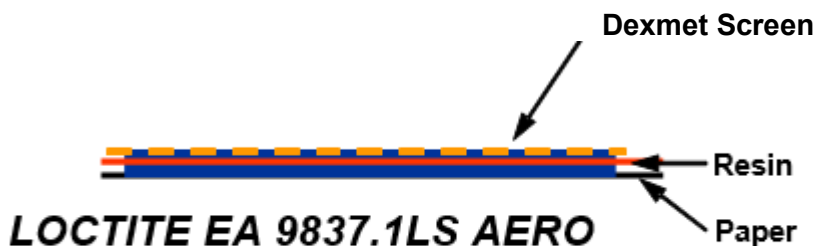
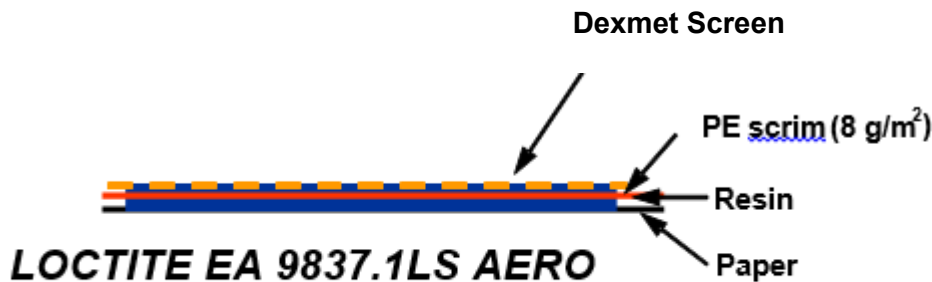
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Product Form

LOCTITE EA 9837.1 AERO and LOCTITE EA 9837.1LS AERO are not manufactured the same way. The LS version is a BT (Balanced Tack) configuration, whereas the regular product is a OST (One Side Tacky) configuration. Resin is needed on the Dexmet screen side of the polyester scrim, so that the mesh has something to adhere to. The scrim prevents the Dexmet screen from floating up to the tool side surface during cure. This provides more protection of the copper mesh as compared to an unsupported material.

Hysol film adhesives are typically designed to be a BT configuration, so the LS versions can be made using existing film adhesives.



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Open Assembly Time – This lightning strike surfacing film may be used within the following schedule after removing from above recommended cold storage:

@ 77°F/25°C at least 21 days.

The copper mesh may tend to detach from the surface film if left exposed to room temperature for a long time. Although the material may have an excellent out-time, we recommend that the LS products be used as soon as possible following cutting or kitting.

Lay-up - Application of the lightning strike surfacing film should be with the resin side facing the tool and the copper mesh side facing up / adjacent to the prepreg plies. Tools pre-treated with LOCTITE FREKOTE Sealer B-15 and LOCTITE FREKOTE 700 NC AERO Release Agent are recommended.

Curing - Please see the separate data sheet for the unlaminated surfacing film or film adhesive of interest.

Surface Preparation for Painting - Light sanding (150 grit) followed by solvent wipe to remove release chemicals and some imperfections. Pinhole filler should be applied to fill minor surface imperfections.

Cleanup - It is important to remove excess adhesive from the work area and application equipment before it hardens. Denatured alcohol and many common industrial solvents are suitable for removing uncured adhesive. Consult your supplier's information pertaining to the safe and proper use of solvents.

Handling Precautions

Do not handle or use until the Material Safety Data Sheet has been read and understood.

For industrial use only.

General:

As with most epoxy based systems use this product with adequate ventilation. Do not get in eyes or on skin. Avoid breathing the vapors. Wash thoroughly with soap and water after handling. Empty containers retain product residue and vapors, so obey all precautions when handling empty containers.

ONE PART

CAUTION! This material may cause eye and skin irritation or allergic dermatitis. It contains epoxy resins.

Revised 11/14

