

DEXMAT

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Galvorn[®] Guide





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See the [specifications sheet](#) for all our products and their properties.





Galvorn® is the lightest, strongest, and most flexible conductive material on the planet.

This advanced carbon material is produced by aligning and densely packing carbon nanotubes (CNTs) into fibers or films, which can then be constructed into yarns/wire and fabric for a variety of applications. This guide offers best practices for working with the material. If the guidance you seek is not covered here, please do not hesitate to [contact our team](#) directly.

Handling

How to cut Galvorn

- Use a razor blade, preferably coated to reduce oxidation (titanium nitride (TiN), or similar); change blades often.
- Cut under tension, or with the material bound together (tape, glue, or the insulation provide sufficient tightness).
- Cut with a soft backer (like a cutting board)
- Laser trimming has proven to work for precise cuts, especially for film and fabric where the above methods will be more difficult.

How to control fraying and edge finishing

- We recommend only attempting connections with freshly cut material; change blades often. However, here is our advice for frayed conductors: Wetting with a small amount of concentrated alcohol (isopropanol, methanol, ethanol etc) or deionized water works quite well for grooming the fibers back into a tight bundle.
- Use non-braided insulation; molded insulation does not fray.

How to terminate Galvorn

Electrically

- Crimping, compression, or silver epoxy are our recommended methods.
- If your Galvorn wire is insulated, we recommend a precision wire stripper, specifically one with single or double “V” shaped blades, such as this [Jonard Tools ST-500 Adjustable Precision Wire Stripper, 20-30 AWG](#).
- Take the following steps: Set gauge to correct size, insert, squeeze the lever, rotate 180 degrees around the axis of the wire, pull firmly, release.
- Keep connectors well matched to the material size.

Mechanically

- Some rope terminations work well with Galvorn. Braided eyelets offer good strength retention, but not 100%.
- We recommend Galvorn be terminated using crimping or compression.
- Brazing works fantastically but requires specialized equipment and annealed material. [Contact us](#) for more information.

How to insulate Galvorn

- Keep the process within temperature limits to prevent de-doping. See “Temperature Rating” below.
 - DexMat offers pre-insulated wire, [contact us](#) if interested.
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How to bond and achieve adhesion

- Galvorn is compatible with most common adhesives (ex. epoxies, super glue, etc.)
 - Galvorn can be fastened mechanically (ex. compression fittings, clamping, bolting, etc.)
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How to remove residue

- As with any fiber, Galvorn may shed. However, this poses no inhalation risk.
 - Offcuts can pose a problem for electrical equipment due to their conductivity.
 - We recommend using an adhesive lint roller or a vacuum to manage them.
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How to introduce automation

- If you are using automated tooling for wire processing—such as measuring, cutting, stripping, or crimping machines—we ask that you collaborate with us to tune fiber properties (primarily stiffness) for optimal processing.

Environmental Considerations

Temperature Rating

There are three important temperature limits to consider when using Galvorn.

1. The temperature at which Galvorn's properties will be permanently altered.
 2. The temperature at which Galvorn will burn in air.
 3. The temperature at which the product will fail in an inert environment.
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Temperature Limit for Maintaining Electrical Properties

Electrical dopant chemicals are present in Galvorn to increase its conductivity. These dopants cannot withstand as much heat as the CNTs themselves. The dopants begin to slowly evaporate out of the CNT network structure at temperatures above 100°C; they are almost entirely removed in a matter of minutes at temperatures above 250°C. Once the dopant has been partially or entirely removed, the electrical conductivity of the product will permanently decrease to around 25% of the original conductivity.

Temperature at Which Galvorn Will Burn in Air

In normal air, oxidation starts happening between 300°C and 400°C. Our CNT products should therefore survive operating temperatures up to 300°C in an atmosphere of normal air; they should also be able to survive temperatures slightly above this for short periods of time, albeit with some oxidation of the CNTs. In order to be conservative in avoiding damage due to oxidation, we suggest 250°C as a temperature rating for stable long-term operation, with 300°C as a temperature rating for short-term exposures of a few hours at a time.



Temperature at Which Galvorn Will Fail in an Inert Environment

In the absence of oxidizers, CNTs can withstand much higher temperatures. The CNTs that we use as raw material are synthesized at temperatures around 1000°C, so we believe that our Galvorn CNT products should survive temperatures at least that high in inert environments; we have confirmed by experiment that they withstand temperatures of at least 1000°C in vacuum, but we have not characterized their mechanical or electrical properties in that temperature range.

Please note: *The effects of high temperatures on the thermal conductivity and the mechanical properties of Galvorn fiber are still under study. Exposure to high temperatures in oxygen-free atmospheres might either improve or degrade thermal and mechanical performance, depending on the amount of tension or other stresses applied to the fiber while it is heated. Sustained exposure to temperatures above 300 degrees C in the presence of oxygen is not recommended; this will damage the structure of the CNTs, and we expect this to lead to a swift degradation of mechanical, thermal, and electrical properties.*

Corrosion

Galvorn does not corrode, but designers should select appropriate materials when using Galvorn in an aqueous environment to avoid the possibility of galvanic corrosion in nearby metals.

Safety & Handling Precautions

Please refer to the Safety Data Sheet (SDS) [here](#).

Storage

We recommend storing Galvorn in a controlled environment: 15-25 °C; 30-70% relative humidity.

Disposal

Please dispose of Galvorn in accordance with local laws and regulations. If you are interested in recycling Galvorn, please [contact us](#).





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Thank You

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