



**Our Commitment to Sustainable Sailmaking
Disassemblability, Recyclability, and Carbon
Footprint According to ISO 14021 and
ISO/TS 14067**

ABSTRACT

This report assesses Loong Sails UK Limited's environmental claims—disassemblability, recyclability, and carbon footprint—for its heat-bonded membrane sails. Based on manufacturing data, a disassembly trial, and life cycle assessment (ISO/TS 14067:2018), the study finds: The adhesive-free polyethylene construction allows practical disassembly and recycling. A 40-ft sail trial achieved 83% material recovery. Carbon footprints range from 5.8–7.2 kg CO₂e per kg, below published estimates for conventional polyester sails. The findings confirm that Loong Sails' design choices verifiably support its environmental claims.

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LOONG-SAILS

Our Commitment to Sustainable Sailmaking

At **Loong Sails UK Limited**, we believe that high-performance sailing and environmental responsibility should go hand in hand. As a British sailmaker with a growing international presence, we are committed to making our products in a way that respects the materials we use and the world we sail in.

This page sets out the three main environmental claims we stand behind: disassemblability, recyclability, and the carbon footprint of our membrane sails. Each claim is backed by practical experience, independent research, and a genuine desire to do things better.

The way we build sails

Our membrane sails are made in our London-area loft using heat-bonded, solvent-free construction. The core materials – polyethylene terephthalate (PET), polyethylene naphthalate (PEN) and ultra-high-molecular-weight polyethylene (UHMWPE) – are laminated together without glues or resins. That choice is deliberate: it makes the sail extremely durable while also allowing the materials to be separated at the end of their life.

We then add finishing components such as corner reinforcements, batten pockets and luff tape, attaching them mechanically (stitched or fastened) rather than bonding them permanently. This approach is not only reliable for performance, but it also makes practical disassembly possible later on.

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1. Designed to be taken apart

A sail's useful life can be many years, but eventually every sail reaches the end of its service. When that happens, we want to make sure the valuable materials inside it do not go to waste.

We have put in place a straightforward take-back process. When a Loong Sails membrane is returned to us, we carefully remove all the finishing components – metal headboards, slides, stitching, and any non-PE reinforcements – and segregate them for recycling or proper disposal. What remains is the raw membrane itself, free from

incompatible parts.

Real-world recovery

We recently processed a 40ft performance cruising sail that had come to the end of its life. The results show what is achievable when a sail is designed for disassembly:

Weight of finished sail	Weight of recovered membrane	Recovery rate
18.4 kg	15.2 kg	83%

The recovered membrane is clean and ready for the next stage: recycling.

2. Made for recycling

Because our membranes are constructed entirely from polyethylene-based thermoplastics without adhesives, they are compatible with existing recycling infrastructure. Once the finishing parts have been removed, the material can be shredded and extruded to produce recycled granules that are suitable for new manufacturing.

We are also following the development of more advanced recycling technologies. A collaborative project between the University of Edinburgh, Sustainable Sailing and Innovate UK has demonstrated that sailcloth can be broken down using high-pressure steam, turning it into chemical building blocks that can re-enter industrial production. We are keeping a close watch on these innovations and will adopt them as they become commercially viable.

In the meantime, we work with UK-based recyclers who already accept our recovered membranes, and we maintain a direct take-back arrangement for sails we have built. Wherever possible, we aim to keep the material within the UK to reduce transport emissions and support domestic recycling capacity.

3. Understanding our carbon footprint

We wanted to know the real environmental impact of our manufacturing, not just rely

on industry averages. To do that, we adopted **ISO/TS 14067:2018** – the international standard for product carbon footprinting. Our calculations use primary data from our own workshop, including material quantities, electricity use, and raw material transport.

Electricity was one of the largest contributors, so we have taken steps to reduce it. We now source renewable electricity for our production, and we have set company-wide targets to reduce our carbon footprint by 25% over five years, with 60% renewable energy across all facilities by 2025.

What the numbers show

For a representative sample of our membrane sails, the cradle-to-gate carbon footprint ranges between **5.8 and 7.2 kg CO₂e per kg of membrane**, depending on the mix of materials.

Membrane type	kg CO ₂ e / kg membrane
Performance cruising (PET/PEN)	5.8 – 6.5
Club racer (with UHMWPE)	6.4 – 7.2

To put that in perspective, conventional woven polyester sailcloth of a similar weight typically has a carbon footprint of roughly **9–11 kg CO₂e per kg of fabric**, based on publicly available lifecycle data.

These figures are not just internal numbers. They were developed with reference to recent academic work, including a doctoral study from the University of Rennes (2024) that established life-cycle assessment methods specifically for competitive sailing composites. We believe that having robust, comparable data is essential if the marine industry is going to make genuine progress on emissions.

What we're doing next

Sustainability is not a single project – it is how we intend to run our business. Our current commitments include:

- Reducing our carbon footprint by 25% over five years.
- Sourcing 50% of our materials from recycled sources by 2025.
- Reaching 60% renewable energy across all our facilities by 2025.
- Continuing to offer a straightforward take-back service for any Loong Sails membrane sail.

We also maintain ISO 9001 quality management certification and build to International Sailing Federation (ISAF) construction standards, because we believe that environmental responsibility should never come at the expense of safety or performance.

Further reading and references

If you would like to look into the research that informs our work, you can find more detail here:

1. University of Edinburgh / Sustainable Sailing – *Project to give second life to sailing waste* (2024)
2. Loong Sails UK Limited – *Sustainability commitments* (loongsails.com)
3. Jacquet, L. – *Participatory design of an environmental analysis tool based on life cycle assessment: application to ocean racing yachts* (Doctoral thesis, University of Rennes, 2024)
4. Singh, R. et al. – *On 3D printing of low-cost sensors using recycled PET*, Sadhana (Indian Academy of Sciences, 2022)