

**ROUND
HOUSE
SURF CO.**

BIOFIBIX

SURFBOARDS PROTOTYPES CHARACTERIZATION

TECHNICAL REPORT

March 2025





ROUNDHOUSE

SURF CO.

Aim of the collaboration

1.

BIOFIBIX HYPERMAT 300 APPLICABILITY TO HIGH PERFORMANCE SURFBOARDS



TERMS AND CONDITIONS

- Tested material : BIOFIBIX HYPERMAT 300
- Expanded Polystyrene (EPS)/Epoxy construction
- MD Surfboard's high-performance model selected : The Sharp Sword
- Two prototypes made with different reinforcement constructions tested

- Show the use of BIOFIBIX HYPERMAT 300 for performance sport and leisure applications
- Give strong and pertinent feedbacks to BIOFIBIX on their material for a use in high performance surfboards manufacturing

PARTS IN THE PRESENT DOCUMENT

- Processing and manufacturing report
- In-Water testing report





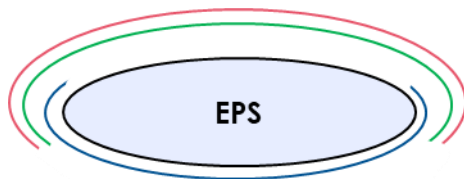
SURFBOARDS SPECIFICATIONS AND CONSTRUCTIONS

Length x Width x Thickness x Volume

5'10¹¹/₁₆" x 18⁷/₈" x 2⁷/₁₆" x 28,7 Liters

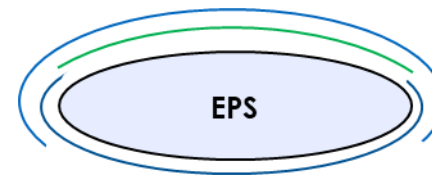
B1_DECK + RAILS

- EON FOAM 30 kg.m³ – no stringer - RHSC
- Epoxy resin system - SURFCLEAR EVO / SD MEDIUM by SICOMIN
- BIOFIBIX HYPERMAT 300 g.m² —
- Shapers Australia 4OZ (135 g.m²) plain glass fibre fabric —
- 30 g.m² glass surfacing veil —



B2_DECK INLAY

- EON FOAM 30 kg.m³ – no stringer - RHSC
- Epoxy resin system - SURFCLEAR EVO / SD MEDIUM by SICOMIN
- BIOFIBIX HYPERMAT 300 g.m² —
- Shapers Australia 4OZ (135 g.m²) plain glass fibre fabric —



EASE OF MANUFACTURING FOR STANDARD HIGH PERFORMANCE SURFBOARD CONSTRUCTION

Experience with BIOFIBIX HYPERMAT 300 reinforcement has highlighted several specific features to be taken into account with this particular reinforcement. Preliminary tests conducted by RoundHouse Surf Co. confirmed that vacuum application was essential. It should be noted that the traditional technique for manufacturing surfboards is wet lamination. Although not widely used, vacuuming after wet resin application is common among board manufacturers who work with fibres other than glass (i.e. carbon and plant fibres). The use of this method makes it possible to absorb the excess resin needed to impregnate the fabric, enhance the mechanical properties and limit the thickness of the composite skin and also fold the reinforcement over the underside of the board when the board's rail is covered, as with the B1 board. Given that the reinforcement has a higher weight per unit area than conventional fibreglass reinforcements used in the manufacture of high-performance surfboards (i.e. 300 g.m^{-2} instead of 135 to 200 g.m^{-2}), it was decided to use the HYPERMAT 300 reinforcement only on the deck of the board and to keep a fibreglass hull so as not to make the final board too heavy.

Construction B1 allowed for experimentation with full reinforcement of the deck and covering of the rails. The aim was to obtain unique behaviour and also to test the rail sanding stage, which is generally the most complex in the case of plant fibre reinforcements. In this case, only an ultra-lightweight (30 g.m^{-2}) fibreglass surface layer covers the BIOFIBIX reinforcement.


The aim of the B2 construction was to insert the HYPERMAT 300 only where it is mechanically strategic, on the deck, thereby limiting the final weight of the board to bring it closer to a 'standard' high-performance board but with greater compressive strength at the supports. In this configuration, a lightweight 135 g.m^{-2} fabric is placed over the HYPERMAT 300 and covers the rails.

Overall, the objectives were met and the results presented later are in line with the initial intentions. From an implementation perspective, the main lesson learned is that the sanding behaviour of HYPERMAT 300 seems less problematic than woven flax fibre reinforcements. This can be explained by two hypotheses: one is the BIOFIBIX technology used to treat the fibres, and the other is that this type of reinforcement does not require linen fibre thread, which could lead to better impregnation of the reinforcement and therefore limited 'pilling'. That said, the thickness of the fabric still requires important work to achieve the desired quality.



SURFBOARDS CHARACTERISTICS

B1_DECK + RAILS




Final weight : 2.57 kg
Total base resin quantity used: 1,59 kg
HYPERMAT composite Wf : 33.7%
Deck skin thickness : 0.85 ± 0.04 mm
Rails skin thickness : 1.07 ± 0.06 mm
Total manufacturing time : 22 hours

*Weight differences compared to :

Standard EPS-glass : +5 %
Standard EPS-flax : +3.3 %
Standard PU-glass : -9.3 %

B2_DECK INLAY



Final weight : 2.43 kg
Total base resin quantity used: 1,32 kg
HYPERMAT composite Wf : 33.7%
Deck skin thickness : 0.95 ± 0.04 mm
Rails skin thickness : 0.49 ± 0.02 mm
Total manufacturing time : 19 hours

Weight differences compared to :

Standard EPS-glass : +2.5 %
Standard EPS-Flax : +0.8%
Standard PU/glass : -11.5 %

COMPARISONS AND CONCLUSIONS

The weight evolution throughout the manufacturing process confirms that both prototypes remain fully aligned with the target range of modern high-performance shortboards. When compared to industry references, both boards remain highly competitive. It must be noted that reference boards include a wooden stringer, which was not integrated in these prototypes.

Resin consumption represents a major processing parameter. Total base resin usage reached **1.59 kg for B1** and **1.32 kg for B2**, reflecting the high absorption capacity of the HYPERMAT 300 reinforcement. The measured composite fibre weight fraction ($W_f \approx 33.7\%$) confirms correct consolidation under vacuum but also highlights the naturally high resin demand of this non-woven reinforcement compared to traditional fiberglass fabrics. Vacuum bagging is therefore essential to ensure proper impregnation, skin homogeneity, and controlled fibres content. Without vacuum consolidation, achieving consistent laminate quality and mechanical performance would be difficult.

In terms of labour, manufacturing time is significantly impacted. A standard glass/EPS surfboard requires approximately **11 hours** of manual work. **B1 required 22 hours**, nearly doubling production time. This includes approximately **7 additional hours** dedicated to vacuum preparation and processing, plus around **2 extra hours of sanding**. **B2 required 19 hours**, representing a +76% increase compared to standard glass/EPS construction, but a noticeable optimization compared to **B1**. It is important to underline that, when compared to flax-based surfboards manufactured with traditional woven fabrics, the total production time remains within a similar range. HYPERMAT does not create a radical disruption in processing time relative to other natural-fibre constructions, but it does remain significantly more time-consuming than standard fiberglass builds.

A key drawback remains resin overconsumption. The HYPERMAT structure requires substantial resin uptake to ensure full wet-out. A potential optimization pathway would be the implementation of a **vacuum infusion process**, allowing better control of fibre-to-resin ratio, improved repeatability, and reduced excess resin. Developing such a process could represent a strategic evolution for ROUNDHOUSE SURF CO and potentially position the company at the forefront of advanced composite surfboard manufacturing

In conclusion, BIOFIBIX HYPERMAT 300 proves fully compatible with modern surfboard manufacturing processes, including lightweight performance-oriented constructions. Weight targets remain competitive, structural skin integrity is validated, and industrial scalability appears achievable with process optimization. The following section shows the water testing of the two prototypes to explore their feeling and technical performances.

TESTING CONDITIONS

This testing campaign aimed to evaluate how two different reinforcement approaches influence the dynamic performance of high performance shortboard in real surfing conditions. The comparison focused on speed generation, drive out of turns, flex response, rail engagement, vibration dampening, and overall board feel.

Day of testing : Saturday, February 21st 2026

Location : Le Sillon, Saint-Malo (35)

Start : 11:35 am

End : 12:45 pm

		10h	11h	12h	13h	14h
Model	Wind (kts)	12	11	12	13	15
GFS 13 km	Gusts (kts)	18	18	20	21	22
21.02.2026	Direction	↗	↗	↗	↗	↗
	Air temp (°C)	11	11	12	12	14

		10h	11h	12h	13h	14h
Model	Swell (m)	0.6	0.5	0.7	0.8	0.7
GFS-Wave 16 km	Period (s)	12	12	12	12	12
21.02.2026	Direction	↘	↘	↘	↘	↘

Tide coefficient : 94

Water height at the start : 10.06 m

Water height at the end : 7,24 m



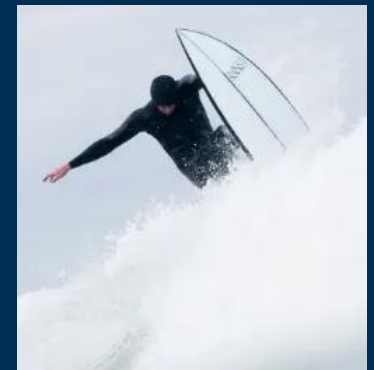
SURFER 1

Initials : ML
 Size : 1.78 m
 Weight : 71 kg
 Ideal volume : 28,5 L
 Stance : Regular
 Level : Confirmed
 Specificity : strong feet power



SURFER 2

Initials : VG
 Size : 1.75 m
 Weight : 61 kg
 Ideal volume : 26,5 L
 Stance : Regular
 Level : Confirmed
 Specificity : Light



SURFER 3*

Initials : MD
 Size : 1.88 m
 Weight : 75 kg
 Ideal volume : 30,5 L
 Stance : Goofy
 Level : Confirmed
 Specificity : tall and fast
**tested another day in similar conditions*



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In-Water testing

3.

TESTING INFORMATIONS AND BOARDS SCORES

B1_DECK + RAILS

TOTAL WAVES ACCOUNT : 29
Max speed recorded* : 19.7 km/h

Flex - 2.5/5

Low dynamic flex. The board resists deformation under load, resulting in limited spring-back through turns.

Drive & Projection - 3/5

Adequate down-the-line drive, particularly when the wave provides natural push. However, the board does not actively amplify rider input. Projection out of turns remains moderate.

Speed Generation - 3/5

Speed builds smoothly but relies heavily on wave energy rather than rider-induced flex and release. Pumping does not significantly increase acceleration.

Vibration Dampening - 5/5

Outstanding dampening characteristics. The board absorbs chatter effectively and eliminates unwanted rebound. Rail engagement feels smooth and controlled, especially in more windy/choppy sections.

B2_DECK INLAY

TOTAL WAVES ACCOUNT : 28
Max speed recorded* : 21.8 km/h

Flex - 4/5

Dynamic and responsive. The board flexes under load and releases efficiently, generating acceleration. Sensitive underfoot, requiring precise weight distribution.

Drive & Projection - 3.5/5

Strong drive through rail engagement. Noticeable projection out of bottom turns and cutbacks, even in weaker sections.

Speed Generation - 4.5/5

Immediate acceleration from take-off. Rider input translates directly into forward speed. Pumping and compression through transitions effectively create additional speed.

Vibration Dampening - 4/5

Very good dampening considering the increased flex. The board remains controlled without excessive chatter or rebound.





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In-Water testing

3.

TESTING CONCLUSIONS

Beyond the numerical ratings, both prototypes displayed clearly distinct personalities in the water.

The first board felt noticeably bigger underfoot, with a sensation of increased volume and fuller rails. Although the dimensional differences are minimal in absolute terms, they were perceptible while paddling and riding. The added rail thickness translated into slightly more buoyancy and a more “corky” feel, contributing to stability but reducing sensitivity during rail-to-rail transitions. The ride felt smooth, planted, and controlled, yet less sharp in high-tempo maneuvers.

By comparison, the second board felt more refined in its volume distribution and more performance-driven overall. It sat lower in the water, offering a more direct connection between rider input and board response. Rail engagement felt cleaner, speed generation more immediate, and projection out of turns noticeably stronger. The overall sensation was lighter, faster, and more reactive. From a durability perspective, both boards showed very encouraging results.

After approximately 30 waves ridden per board, impact-related dings remained limited compared to what would typically be observed with a standard construction. Pressure dings were still present; however, these are largely attributable to the very low-density foam core rather than the reinforcement layer itself. The HYPERMAT fabric appears to significantly enhance impact resistance, which represents a clear technical advantage. This characteristic opens interesting development perspectives for applications where deck compression and impact durability are critical, such as surfkite boards.

Structurally, both constructions were designed with lightweight performance in mind. However, the absence of a stringer raises legitimate questions regarding long-term break resistance under heavy load. While no structural weaknesses were observed during testing, further mechanical validation would be advisable. For future development, integrating a stringer could be considered depending on the intended board category. A traditional wooden stringer would be well suited for barrel-oriented boards requiring maximum longitudinal stiffness and impact resistance. For a lightweight, high-performance shortboard, a unidirectional hybrid carbon/flax stringer could offer an optimal balance between tensile strength, controlled rebound, and reduced weight, while maintaining a progressive and lively flex pattern.

Overall, both prototypes confirm the technical relevance of the reinforcement strategy. One configuration emphasizes smoothness, stability, and comfort, while the other enhances responsiveness, energy return, and high-performance capability. The reinforcement approach therefore proves to be a powerful tuning variable, capable of shifting the board’s identity from durable everyday usability to refined performance equipment.



- BIOFIBIX HYPERMAT 300 has demonstrated full compatibility with modern surfboard manufacturing processes while maintaining competitive high-performance weight targets.
- Manufacturing complexity increases due to vacuum processing requirements and higher resin uptake, which impacts labor time and production cost.
- Process optimization — particularly through vacuum infusion — represents a clear opportunity to improve resin efficiency, repeatability, and industrial scalability.
- Durability results are highly encouraging, with significantly reduced impact dings compared to conventional constructions after repeated use.
- The material enhances impact resistance, making it also particularly relevant for applications where deck compression and structural durability are critical, such as surfkite.
- Reinforcement placement directly influences board behaviour, allowing designers to tune flex response, speed generation, stability, and overall ride feel.



Overall, HYPERMAT 300 offers a good balance between performance potential, durability improvement, and product differentiation, positioning it as a credible solution for performance surfboards.

THANK YOU.

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