SUBJECT	**RESPONSE TO LAA MANDATORY TECHNICAL DIRECTIVE MTD-02-2026 (DRAFT FOR CONSULTATION) — CRACKS IN E-PROPS CARBON PROPELLER HUBS**
WRITTEN BY	**LAVRAND Anne (CEO)**
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E-Props (Electravia SAS) hereby submits this formal response to the Light Aircraft Association's proposed Mandatory Technical Directive **MTD-02-2026, Cracking in E-Props Carbon Propeller Hubs**, circulated for consultation on 13 April 2026, with a closing date of 27 April 2026.

E-Props fully acknowledges the LAA's responsibility for airworthiness oversight and we welcome the opportunity to respond within the consultation process. However, we respectfully but firmly request that the proposed MTD be substantially amended in its scope of applicability, on the basis of the technical evidence set out below.

1. Summary of Previous Analysis — Document HEP-2025-0967

In August 2025, an E-Props Durandal DUR-3-175-C4-T three-blade propeller operated in the UK was reported to the BMAA (British Microlight Aircraft Association) with a suspected "crack" on hub S/N 238340. E-Props responded within minutes of receiving the report, explaining that the visible anomaly was not a structural crack but a **resin pocket** — a localised surface phenomenon with no bearing whatsoever on mechanical integrity.

E-Props immediately offered to replace the affected half-hub on aesthetic grounds, while clearly confirming that there was no safety risk.

Despite these clarifications, LAA published Alert A-10-2025 on 28 August 2025, without prior consultation with E-Props.

E-Props then requested the return of the complete propeller for rigorous technical assessment. The full assessment is documented in **HEP-2025-0967** (15 September 2025), conducted by Jérémie Buiatti, E-Props Founder, Technical Manager and Designer. Key findings:

- **Visual inspection**: screw washers were found embedded in the carbon, confirming incorrect bolt installation. Despite this, the hub structure was entirely intact.
- **Test bench assessment**: the propeller was subjected to torque oscillation testing reproducing Rotax 912 80 hp engine conditions, running for 60 continuous minutes.
- **Thermal camera inspection**: no hot spots were detected anywhere in the area of the resin pocket. The anomaly poses **no risk of spreading**.

Conclusion of HEP-2025-0967: With this resin pocket present, the hub is fully capable of meeting EASA CS-22J standard criteria throughout its rated TBO of 4,000 hours. The surface anomaly does not weaken the hub in any way.

2. Scope of Applicability — Identified Propellers

The potential anomaly is strictly and exclusively limited to 22 Durandal three-blade propellers sold in the United Kingdom, traceable to a specific and precisely identified manufacturing batch. All 22 propellers are identified by their 44 hub half-serial numbers, listed in the table below (E-PROPS ERP PALADIN extract):

Prop. #	Front half-hub S/N	Rear half-hub S/N
1	127298	134284
2	127725	129985
3	127595	133928
4	127375	134662
5	135989	135992
6	135374	136290
7	136263	136579
8	137251	137269
9	136274	236485
10	136764	236527
11	236412	236491
12	136264	136613
13	236734	236736
14	236824	237635
15	136743	**238340**
16	239380	239531
17	269163	269166
18	269285	269321
19	269317	269327
20	269315	269332
21	269813	269839
22	270266	270276

S/N 238340 (propeller #15, shown in red) is the hub that presented the resin pocket reported in August 2025 and physically assessed in document HEP-2025-0967.

All other E-Props propeller hubs are definitively unaffected by this phenomenon:

- **Two-blade, four-blade, and five-blade hubs**: produced exclusively from long-fibre carbon fabric with CNC finish-machining. HexMC compression moulding was never used for these models.
- **Three-blade Durandal hubs manufactured before November 2022 or after October 2024**: produced from long-fibre carbon fabric with CNC machining. Full fibre continuity throughout.

In all of these hubs, the fibre length exceeds the part dimensions: there are no zones of fibre discontinuity, and no resin pocket formation mechanism exists.

The basis for this precise delimitation — established through E-Props' ERP PALADIN production traceability system (currently undergoing OSAC/EASA validation under **PART 21G**) — is set out in the following sub-sections.

2.1 Manufacturing Process During the Affected Period

Standard E-Props hubs are produced from long-fibre carbon fabric (fibre length exceeding the finished part dimensions) combined with CNC finish-machining, ensuring full fibre continuity throughout the part. Between November 2022 and October 2024, a compression moulding variant was introduced for certain Durandal three-blade hub half-hubs, using **HexMC®** material (Hexcel Corporation) — a moulding composite consisting of approximately 50 mm carbon fibre chips in an epoxy matrix. See: hexcel.com/products/hexmc-molding-composite

This process was adopted to reduce machining load on the CNC centre at a time when available floor space in the workshop prevented the installation of a second machine. Once the new production facility was built and a second

CNC centre commissioned, the compression moulding process was discontinued for new propeller production — in part due to occasional aesthetic imperfections observed on some parts. After October 2024, HexMC® hub deliveries were limited to a small number of spare parts supplied as replacements for existing propellers (none in the UK).

2.2 Mechanism of Resin Pocket Formation

In a small fraction of compression-moulded hubs, fibre migration occurred in the outer annular ring during the moulding cycle. Around the bolt holes in the outer flange, the short (50 mm) fibres tend to regroup around the mould pin, leaving localised zones with reduced fibre density — and in some cases, a pocket of resin without traversing fibres. This phenomenon is strictly confined to the outermost few millimetres of the hub periphery, in the immediate vicinity of the blade clamping bolt holes.

The central hub body, blade root retention geometry, and inter-half clamping surfaces all retain their full fibre continuity and structural integrity. This is an aesthetic and localised surface phenomenon, not a structural anomaly.

3. Safety Assessment — No Risk to Mechanical Integrity

E-Props states clearly and unambiguously: **there is absolutely no safety risk associated with the resin pockets that may be present on the 22 hubs identified in Section 2.**

The supporting evidence is as follows:

1. **Test bench and thermal camera evidence (E-PROPS document HEP-2025-0967 sent 15-09-2025)**: The hub with the most significant resin pocket (S/N 238340) was subjected to 60 minutes of torque oscillation testing under Rotax 912 80 hp conditions. Thermal imaging found no hot spots and no stress concentration in the affected zone. The anomaly poses no risk of spreading and no risk of structural progression.
2. **Material properties and localisation of the anomaly**: The resin pocket is confined to the outermost few millimetres of the hub periphery — a zone that carries no primary structural loads. The blade retention geometry, the clamping surfaces between hub halves, and the central hub body all retain full fibre continuity. A resin pocket in this peripheral zone represents a negligible fraction of the hub's structural capacity and affects none of the structural load paths.
3. **EASA certification**: The Durandal propeller range is EASA-certified. The design has been calculated and tested across the full load envelope, including conditions that encompass surface irregularities of this type, to a TBO of 4,000 hours.
4. **Operational track record**: The Durandal range has been in continuous service since 2013. **Over 10,000 propellers of this type fly in more than 80 countries.** In over 13 years of worldwide operation, **there has not been a single report of any mechanical failure, structural incident, or safety occurrence attributable to hub integrity** — not from any operator, not from any regulatory authority.
5. **Engine type compatibility**: Durandal propellers are designed for gear-reduced engines, which produce substantially lower torque oscillation amplitudes than direct-drive engines. This is the most benign possible operating environment for the propeller hub.

Regarding the specific concerns raised in MTD-02-2026:

Concern a — Reduced clamping force: A surface resin pocket on the outer flange of the hub does not affect the blade clamping surfaces between the two hub halves, nor the contact areas between blade roots and the hub body. Bolt clamping force is determined solely by bolt preload applied to the carbon structure, which is independent of surface resin pockets.

Concern b — Blade root security in bending: Blade root retention is provided by the interlocking geometry of the blade root within the hub cavity and by the clamping force of the bolts. A resin pocket on the outer rim of the hub has no geometric or mechanical connection to the blade retention mechanism.

4. Formal Request for Amendment of MTD-02-2026

The current applicability of the proposed MTD reads:

> *"All aircraft operating under an LAA Permit to Fly fitted with an E-Props propeller with a carbon fibre reinforced polymer (CFRP) hub"*

E-Props formally requests that this applicability be replaced by the following:

> **"Aircraft operating under an LAA Permit to Fly fitted with an E-Props Durandal three-blade propeller whose hub carries one of the following half-hub serial numbers:**
>
> **127298, 134284, 127725, 129985, 127595, 133928, 127375, 134662, 135989, 135992, 135374, 136290, 136263, 136579, 137251, 137269, 136274, 236485, 136764, 236527, 236412, 236491, 136264, 136613, 236734, 236736, 236824, 237635, 136743, 238340, 239380, 239531, 269163, 269166, 269285, 269321, 269317, 269327, 269315, 269332, 269813, 269839, 270266, 270276"**

This amendment is essential because:

- **Only 22 propellers in the UK** are linked to the specific prepreg batch that could occasionally give rise to resin pockets.
- All other E-Props propellers — including all Durandal propellers manufactured before November 2022 or after October 2024, and all E-Props propellers of other models — are **definitively not affected** and must not be subject to mandatory airworthiness action.
- Applying a mandatory directive to an entire product line of over 10,000 aircraft, based on a single cosmetic surface anomaly on one hub which has been rigorously assessed and found to present no structural risk, is disproportionate and will cause unwarranted concern among operators of perfectly airworthy aircraft.

5. Compliance with Required Actions for the Identified Serial Numbers

For the **22 propellers (44 hub half-serial numbers) listed in Section 2** — and while firmly and unequivocally maintaining that there is **absolutely no safety risk** — E-Props accepts and will fully support the inspection actions set out in the "Required Actions" section of MTD-02-2026:

- **Inspection (Action 1)**: Operators should inspect the propeller hub (removing the spinner as necessary) for any surface anomalies on the outer flange and in the vicinity of the clamping bolts.
- **Anomaly reporting (Action 2)**: Should any surface anomaly be observed on one of the identified hubs, operators should contact E-Props at helices@e-props.fr before further flight. E-Props will assess the report (with photographic evidence) and, where a hub replacement is considered advisable — not for any safety reason, but as a quality measure — **E-Props will supply a replacement hub at no cost to the operator.**
- **Annual repeat inspection (Action 3)**: E-Props accepts the annual inspection interval for the identified serial numbers.

E-Props is fully committed to cooperating with LAA Engineering throughout this process and to ensuring that UK operators have complete confidence in their propellers.

6. Instructions for All Other E-Props Propellers

For **all E-Props propellers not listed in Section 2**, the applicable maintenance and inspection instructions remain those published in the following E-Props documents, available at aircraft.e-props.fr/docs.php:

- **EP-IMM-001-EPGU3-durandalID572_00100** — Durandal propeller Installation and Maintenance Manual (torque specifications, inspection intervals, crack tolerances).
- **HEP-GAP-V20-230302-EN** — E-Props General Assembly Procedures.

No additional inspection requirement beyond the standard periodic checks specified in these documents is warranted for propellers outside the scope defined in Section 2.

Conclusion

E-Props respectfully but firmly urges the LAA to amend MTD-02-2026 so that its scope is limited to **22 specific propellers traceable to a single identified manufacturing batch**, accurately reflecting the technical reality: **these propellers carry no mechanical risk.**

The Durandal propeller range has accumulated an unblemished safety record across 13+ years, 10,000+ propellers, and more than 80 countries — with zero structural failures, zero incidents, and zero safety reports from any operator or regulatory authority worldwide. E-Props takes its responsibilities as a manufacturer with the utmost seriousness. This is precisely why we cannot remain passive when a disproportionate mandatory directive risks creating unjustified alarm among operators of propellers that are, beyond any reasonable doubt, safe to fly.

E-Props confirms that a hub presenting a resin pocket of this type **remains fully compliant with EASA CS-22J certification requirements and retains its rated TBO of 4,000 hours.**

We would also draw the LAA's attention to a broader safety consideration: disproportionate airworthiness communications — when they apply mandatory action to an entire product fleet on the basis of a single cosmetic, peripheral anomaly — generate unnecessary background noise in the aviation safety system. This noise risks distracting operators and inspectors from genuine safety signals, and erodes confidence in products that are genuinely safe. A precisely scoped, technically grounded directive serves the interests of flight safety better than a broad one.

We remain available at any time to provide additional technical documentation, to arrange a visit to our production and test facilities, or to meet with LAA Engineering to resolve this matter constructively and definitively.

Vaumeilh, 14 April 2026

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Annexes

ANNEX 1 — E-Props Technical Document: Cracks on Hubs & Spacers (HEP-2025-0844, 18-08-2025)

ANNEX 2 — LAA Alert A-10-2025 (28 August 2025)

ANNEX 3 — E-Props Technical Assessment HEP-2025-0967 (15 September 2025)