


Project Factsheets

Circular innovative advanced materials: facilitating the transition from design to markets (RIA)
(Innovative Advanced Materials for the EU and Made in Europe partnerships)

HORIZON-CL4-2026-01-MAT-PROD-05

Proposal working title: From Scrap Resistance to Circularity - Advanced Die Inserts for Equipment-as-a-Service

General information		
Programme Horizon Europe (HORIZON)		
Call INDUSTRY (HORIZON-CL4-2026-01)		
Type of action HORIZON-RIA HORIZON Research and Innovation Actions	Type of MGA HORIZON Lump Sum Grant [HORIZON-AG-LS]	
Deadline model single-stage	Opening date 06 January 2026	Deadline date 21 April 2026 17:00:00 Brussels time

HORIZON-CL4-2026-01-MAT-PROD-05 - HORIZON-RIA HORIZON Research and Innovation Actions	37 000 000	Single-stage	06/01/2026	21/04/2026	5000000 to 6500000	7
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Expected Outcome:

- Innovative advanced materials designed for circularity are adopted in products faster, through accelerated production
- Business models become available to enhance the use of circular innovative advanced materials in strategic value chains
- Resource efficiency (materials and energy) is increased significantly through a focus on circular advanced materials.
- Quality standards, harmonisation and regulatory requirements are addressed facilitating simplified market transition.

Aim 1 – Design Scrap-Resistant, Circularity-Optimized Die Steel

Develop impurity-tolerant AM die steels with defined chemistry windows, powder reuse limits, and scrap-to-feedstock pathways — enabling repeated recycling without performance loss.

Ambition: Shift alloy design from purity-optimized to circularity-optimized metallurgy.

Aim 2 – Enable Closed-Loop Die Steel handling

Establish an integrated circular process chain (powder reuse, scrap-to-wire DED repair, scalable repair methods, cross-scale quality validation under HPDC conditions).

Ambition: Transform AM tooling from linear production to regenerative lifecycle engineering.

Aim 3 – Create Circular Tooling as Equipment-as-a-Service

Validate economic and environmental benefits via pilot HPDC demonstration, LCA, Digital Product Passport, and benchmarking.

Ambition: Convert circular technology into a scalable, data-driven EaaS model for competitive European tooling.

Project Workpackages and (Potential) Project Partners



WP1 – Design & Validation of Scrap-Resistant Steel for 3D Printing

Computational impurity-tolerant die steel, recycled feedstock strategy

WP2 – Powder Reuse and Atomization Investigation

Quality criteria, reuse decision.

WP3 – Specimen Printing for Material analysis

Production of Specimens and AI-assisted printing

WP4 – Automated Die Insert Design and Printing In-situ Printing of Use

Case inserts, include geometrical life-time extension (crack-stop channels)

WP5 – Die Insert Sensor Integration

Ultrasonic measurements to identify crack initiation and propagation

WP6 – Validation under HPDC Conditions

Thermal fatigue, erosion, soldering resistance (Eurecat lead).

WP7 – Recycling Strategies

Insert → use → repair/recycle → re-deploy in HPDC machine.

WP8 – Business Model, LCA & Digital Passport, standardization

Equipment-as-a-Service model, CO₂ quantification, traceability.

WP9 – Communication & Project Management

Dissemination, exploitation, governance.



1. **Material Design and experimental validation:** Paderborn University, Kassel University, MIT, Addition
2. **Powder Atomization:** Indutherm Bluepower
3. **Test component printing DED & SLM:** Paderborn University, Kassel University
4. **Die Insert Printing and Machining:** Addition + **Tool Machining Expert (??)**
5. **Ultrasonic Measurement (for online monitoring of die insert lifetime to enable EaaS): ??**
6. **End User:** HPDC (VW) + **Injection molding (??)**
7. **Recycling Expert (how to crush, cut, etc printed die inserts):** Fenice
8. **Digital Passport:** Additive Marking
9. **Project Management and Business Model Development:** Amires, Addition

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