EMPOWERMET

Electric & Mechanical Power for Metal Manufacturing

Establishing the Requirements Basis for Sustainable Titanium Manufacturing

Newsletter 1

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Establishing the Requirements Basis for Sustainable Titanium Manufacturing

The EMPowerMet project is reaching an important milestone with the completion of the Technical Requirements Catalogue (Deliverable D2.1). This document establishes the technical baseline for all upcoming development, validation and demonstration activities, ensuring that every partner works towards clearly defined objectives and performance targets.

The catalogue translates the project's vision of transforming recycled titanium feedstocks into high-value engineering products into a structured set of requirements covering materials, manufacturing processes and final demonstrators. By creating this common framework, the consortium has laid the foundation for the optimisation, validation and scale-up activities planned in the next project phases.

Enabling High-Performance Applications from Recycled Titanium

A key objective of EMPowerMet is to demonstrate that recycled titanium can meet the demanding requirements of high-performance industrial applications. The requirements catalogue therefore focuses on application areas where material quality, reliability and process stability are crucial.

Three key sectors are addressed within the project:

- **Aerospace**, requiring excellent mechanical properties, dimensional accuracy and strict quality control.
- **Space** applications, demanding lightweight structures, high strength and reliability under extreme operating conditions.
- **Safety** and **protective equipment**, where thermal resistance, durability and mechanical performance are essential.

For each application field, relevant requirements regarding material properties, manufacturing quality, testing procedures and validation criteria have been identified and consolidated into a common framework.

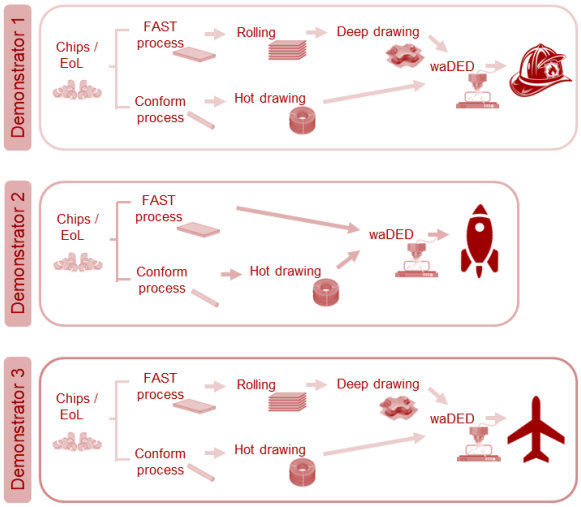
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Building Traceability Across the Entire Process Chain

One of the unique aspects of EMPowerMet is its holistic approach to manufacturing. Rather than focusing solely on the final components, the requirements catalogue addresses the complete value chain, starting with recycled feedstock and ending with validated demonstrator parts.

To ensure full traceability, requirements were grouped according to the main manufacturing routes:

- **Swarf**, covering recycled titanium feedstock quality and preparation.
- **Sheet**, covering consolidation, rolling and forming operations.
- **Wire**, covering rod production, wire drawing and additive manufacturing feedstock.



In addition, cross-cutting requirements were defined for heat treatment and residual stress management, recognising their importance for component quality and performance.

Preparing for the Next Phase

With the requirements baseline established, the consortium can proceed with process optimisation, material validation and demonstrator manufacturing activities.

The catalogue will serve as a reference throughout the project, enabling objective assessment of process improvements and ensuring alignment between all partners. As development progresses, the defined requirements will provide the basis for validating the EMPowerMet approach and demonstrating the feasibility of a circular titanium manufacturing ecosystem.

The next phase will focus on transforming these requirements into measurable results through experimental trials, material characterisation and demonstrator production, bringing EMPowerMet one step closer to sustainable, high-performance titanium manufacturing.

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