EMPOWERMET

Electric & Mechanical Power for Metal Manufacturing

One QR code, the whole story

Newsletter 1

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One QR code, the whole story

A Digital Product Passport for recycled titanium

Redlink GmbH

Why a passport for titanium?

EMPowerMet turns titanium swarf and end-of-life parts into sheets and wires through solid-state recycling, and then into finished components. On the way, the material passes through many processing steps and several companies. To trust and reuse recycled titanium, each of them needs to know where the material comes from, how it was processed and what it is made of. That means data has to be collected and shared along the whole chain.

A Digital Product Passport (DPP) makes this information reachable from the product itself. It is not only relevant for finished parts: semi-finished products such as sheets and wires, and even inputs like titanium swarf, can carry a passport too.

The EU is introducing passports one product group at a time. Batteries come first: from February 2027, electric vehicle batteries and industrial batteries above 2 kWh need one. Iron and steel are among the next groups under the Ecodesign Regulation (ESPR). Titanium is not on the list yet. Within EMPowerMet we will develop a DPP for titanium and show that titanium products can carry their history with them.

Why GS1, and where Catena-X comes in

We support GS1 standards because global trade already runs on them: GS1 barcodes are scanned more than 10 billion times a day, and GS1 has more than 100 member organisations worldwide. Three of its standards do the work for us:

- **GS1 Digital Link** puts the product number, plus a batch or serial number, into a normal web address and prints it as a QR code. Any phone camera can read it.
- **A resolver** receives the scan and forwards it to the right place: a product page for a customer, the passport for a recycler, structured data for a machine. The data stays with the company that owns it.
- **EPCIS** records events along the supply chain, such as swarf becoming sheet or wire. These events provide the evidence for origin and recycled content.

GS1 is best suited for public information. Within the supply chain, however, private information needs to be shared on the basis of contractual rights and obligations. For these scenarios, Catena-X is the preferred technology: data remains with its owner and is only shared under agreed rules.

One code on the product, and the right answer for whoever scans it.

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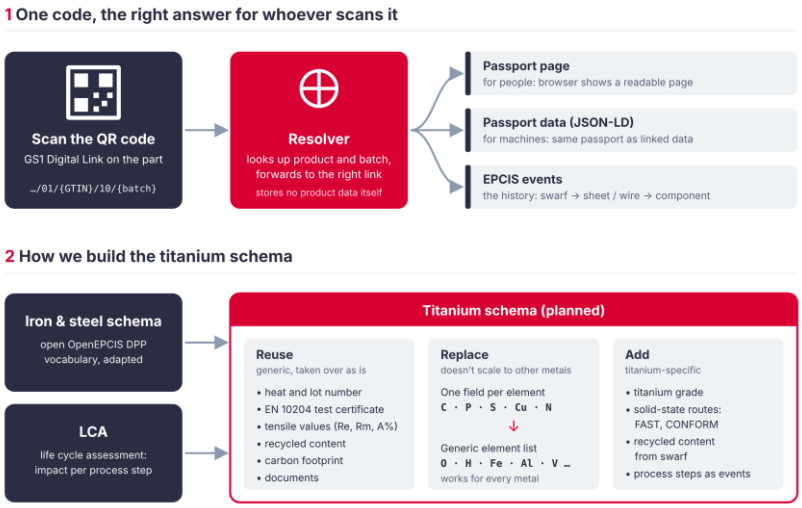


Figure 1: How a scan finds the passport (top) and how we build the titanium schema (bottom). Source: Redlink GmbH

Our approach

- **Linking life cycle assessment to the Digital Product Passport.** A life cycle assessment (LCA) calculates the environmental impact of a product across its entire life cycle — from raw-material extraction and processing through manufacturing, use, and end-of-life. Many of the values a Digital Product Passport is required to display, such as the carbon footprint, originate from an LCA. EMPowerMet aims to map these LCA results to the corresponding DPP properties. GS1 standards make the data more precise: EPCIS events record which batch was processed at which location and under which conditions. This allows the footprint to be calculated for the specific batch rather than relying on a generic industry average.
- **Adapt an existing schema.** We adapt the iron and steel DPP schema to titanium: what applies to any metal stays, titanium-specific parts are added.
- **Describe the processes.** We describe selected EMPowerMet process steps with EPCIS events to check that they deliver the evidence a passport needs.

To validate and demonstrate results as we go, we have set up a testbed for the GS1 infrastructure, based on the open-source GS1 Digital Link Resolver Community Edition. The aim: scan the code on a recycled titanium part and see what it is made of, where it comes from and how it was made, with every claim backed by data along the chain.

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