White paper



Digital Product Passport in the metal value chain

– from regulatory requirements to business value

SWERIM
We create benefit for industry

About Digital Metal Values

Digital Metal Values is a collaborative project aiming for an efficient and profitable implementation of Digital Product Passports (DPP) within the Swedish metal industry. The project brings together 26 partners from across the metal value chain, including mining, material producers, manufacturers, technology providers, industry organizations and research organizations. Through pilot studies the partners develop, test and evaluate practical solutions and guidelines for efficient DPP implementation. Its goal is to ensure fair and transparent information sharing, increase digital capabilities, and promote the manufacturing of sustainable products.

Digital Metal Values is part of Swedish Metals & Minerals – a joint initiative by the Swedish Energy Agency, Formas and Vinnova within the Impact Innovation framework.

About the organizations and authors

Swerim is a Swedish metals research institute that conducts needs-based industrial research and development concerning metals and their route from raw material to finished product. Through collaboration with companies and stakeholders across the metals value chain, Swerim develops knowledge and practical solutions for a sustainable and competitive industry.

ChainTraced works at the intersection of industry and policy, enabling verified data exchange for a more sustainable manufacturing industry. Through innovation projects with policy makers like the European Commission's JRC, research institutes and industrial partners they develop and test traceability in practice.



- **Tania Irebo Schwartz**
  BUSINESS AREA MANAGER PRODUCTION TECHNOLOGY
  Swerim
  tania.irebo@swerim.se

Tania Irebo Schwartz is Business Area Manager at Swerim and Project Manager of Digital Metal Values. She has a background in applied industrial research and experience in industrial digitalisation, traceability and innovation management within the metals industry. Through her work, she supports companies in implementing digital and measurement technologies, facilitates collaboration between industry and research, and helps build networks across the metal value chain.



- **Victor Andersson**
  CHIEF EXECUTIVE OFFICER
  ChainTraced
  victor@chaintraced.com

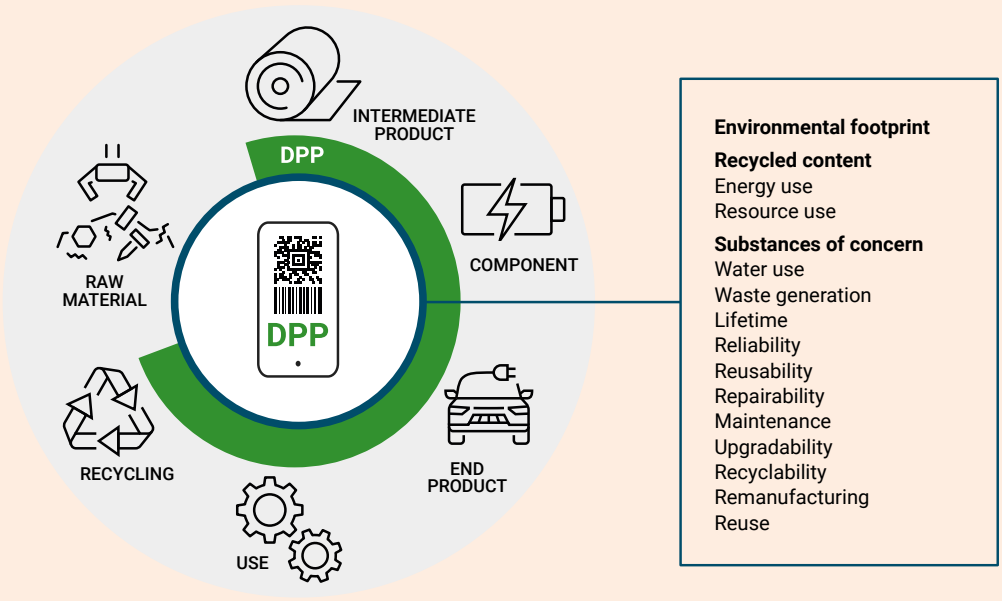
Victor Andersson is CEO and Founder of ChainTraced. He has extensive experience in supply chain traceability and verified data exchange, with a particular focus on the metal value chain. Victor works closely with industry, research organisations and policymakers to help translate requirements such as Digital Product Passports into practical solutions. He has a deep understanding of the data infrastructure needed to support transparent and resource-efficient value chains.



Executive summary

The Swedish metals industry is facing two parallel developments: digitalization of industrial processes and material information, and growing regulatory requirements for product and sustainability data. A Digital Product Passport (DPP) provides a common way to manage and share information such as product origin, environmental footprint, recycled content or material specifications across the supply chain. The details of the DPP requirements are still evolving, but companies who start early may benefit.

This paper explains what DPP means for the metals industry, it describes the regulatory developments and the practical steps companies can take to prepare implementation and business opportunities.



Introduction

Digital product passports are built on a simple concept: that all materials and products remain linked to digital information throughout their entire life cycle. But the impact is much broader than it may first appear.

The metals production chain

The metals industry operates in long and interconnected production chains, from raw materials and metal production to components, final products, use and recycling. While metals are highly recyclable and can remain in circulation for decades, the industry is also undergoing significant investments in more resource-efficient processes and low-emission metal products.

Transparency for greener products

As these products reach the market, the ability to demonstrate and communicate their sustainability performance in a credible and reliable way becomes critical for customers, end users, and regulatory authorities.

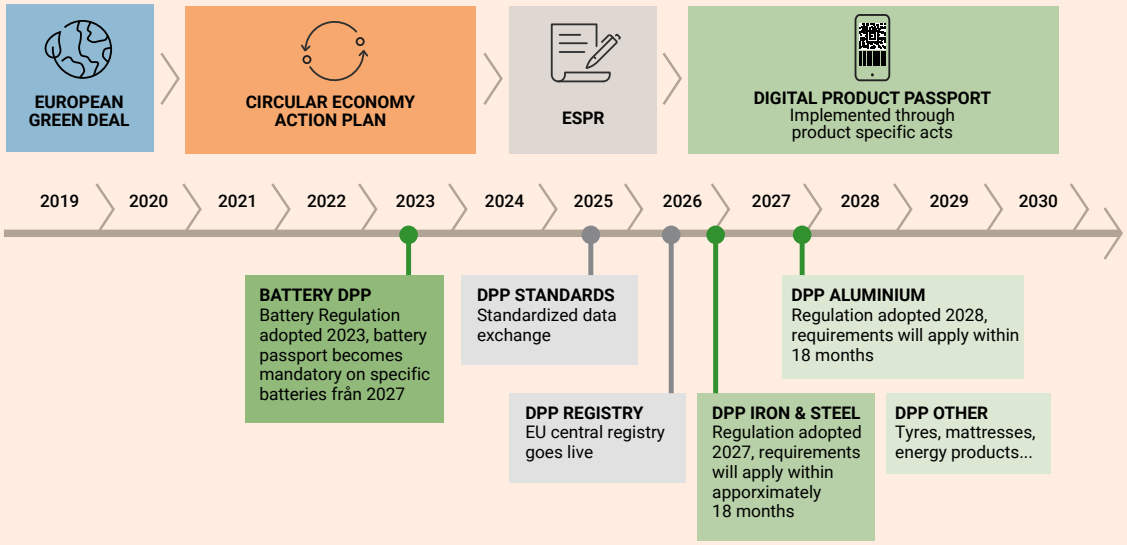
DPP at a glance

A Digital Product Passport (DPP) is a digital information record linked to a specific product or material. Information can be accessed through a QR code or exchanged automatically between IT systems using unique identifiers. While requirements will vary by product group, the Ecodesign for Sustainable Products Regulation (ESPR) identifies a common set of data categories to be considered. For metal intermediates, the proposed mandatory information includes environmental footprint, recycled content and substances of concern.

Start simple

Many of the data elements required in a DPP already exist within companies today. A practical first step is to map existing product information, identify gaps and start with a limited pilot before scaling further.

DPP TIME PLAN
from policy to implementation



From policy to implementation

Policy Foundation

The Digital Product Passport (DPP) originates in the European Green Deal[1] and the Circular Economy Action Plan (CEAP)[2]. This identified the need for more specific product information such as recycled content, energy efficiency and environmental footprint, to increase incentives for producers to make products more circular. These policy ambitions were translated into legislation through the Ecodesign for Sustainable Products Regulation (ESPR)[3], which entered into force in June 2024. In this legislation framework the European Commission can establish requirements on product-specific information. Moreover, it states that each industrial sector should develop specific requirements through delegated acts and it introduces DPP as a key tool for sharing material and product information across sectors and the value chain.

Steel among the first sectors

Iron, steel and aluminium have been identified as priority intermediate products under the ESPR working plan[4]. Given their importance for the European economy and their energy-intensive production and significant environmental footprint, they are among the first sectors to implement Digital Product Passport (DPP) requirements.

Timeline for implementation

The delegated act for iron and steel is indicatively expected to be adopted at the end of 2026, followed by aluminium approximately one year after. The requirement will apply ca 18 months after adoption. By this date, producers must ensure the required product information available in a digital format, is auditable and accurate information and that back-up copies are provided for each product placed on market.

A framework under development

The product specific regulation for iron and steel is still under development. However, a detailed framework has been proposed through the Joint Research Centre (JRC) preparatory study[5], supported by stakeholder consultation, which defines and justifies the data elements to be included in the steel DPP.

1 Strategy (EU), COM(2019) 640 final, european-green-deal-communication_en.pdf, published 2019
2 Action Plan (EU), COM (2020) 98 final A new Circular Economy Action Plan, published 2020
3 Regulation (EU) 2024/1781, published June 2024
4 ESPR Working plan (EU), COM (2025) 187 final, published 2025
5 JRC: https://susproc.jrc.ec.europa.eu/product-bureau/product-groups/642/documents

DPP in a broader regulatory context

Building on existing Regulations

For metals, much of the data content expected in the DPP, such as carbon footprint, recycled content, material origin and production route, overlap with the CBAM, EU ETS, and Construction Product Regulation (CPR). The aim is therefore not to introduce new data requirements, but to make information more accessible, structured and reusable across the value chain

One tool, multiple requirements

The DPP is intended to serve as a common, standardised digital tool for sharing product information. Same information can support compliance with multiple regulations while reducing duplication of reporting efforts.

Beyond the metal sector

Similar developments can be seen in other sectors. The Battery Passport was introduced under the Battery Regulation[6] as specific record of the battery's lifecycle, and with the aim to boost the recovery of materials, particularly critical and strategic raw materials. The recently adopted, End-of-Life (ELV) Directive[7] introduces a Digital Circularity Vehicle Passport to improve circular vehicle design, making vehicles easier to dismantle, repair and recycle. These regulations share the same ambition: to move from fragmented document based information to interoperable digital product data through the product lifecycle.

6 Regulation (EU), EU 2023/1542, Batteries - Environment - European Commission
7 ELV directive: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202601738

VOICE FROM THE INDUSTRY

Johan Anderson
Emission Elminiator
SSAB



PHOTO: KRISTIN LIDELL

> **DPPs offer many benefits. Customers can easily access product information, while we gain a clear way to share data and improve its structure and quality.''**

SSAB is a global company with operations and customers worldwide. They have spent several years preparing for Digital Product Passports (DPPs): helping shape standards, exploring technical and legal requirements, talking to customers and testing its own DPP pilot.

Challenges include mapping data and finding practical, cost-effective solutions. Many teams need to be involved, but someone must coordinate the work and keep sight of the whole picture.

> **Start now. Developing processes and solutions takes time. We already have enough information to begin, and the benefits for customers are there today.''**

Technical and environmental product data is already exchanged today



Material Certificate (MTC)
- Manufacturer
- Product no
- Steel grade
- Heat/Lot/Item id
- Chemical properties (FMD)
- Mechanical properties
- Country of origin Melt & Pour



Material Compliance Declaration
- Chemical properties (SoC/SVHC/DoC)



Product Carbon Footprint
- PCD (ISO 14067)
- EPD
- ...



Recycled content
- Recycled content
- Pre/Post consumer scrap

Why DPP matters for the metals value chain

Growing demands for traceability

For the metal value chain these developments have significant implications. Demand for traceability through the entire value chain is increasing, as is the focus on climate performance, resource efficiency and verifiable environmental footprint. Reliable information on material origin (melt and pour) and on recycled content is becoming both a commercial and a regulatory expectation.

From documents to digital data

Today much of this information already exists, but it is exchanged between companies in varying, often non-standardised and rarely machine-readable formats – typically as PDF documents. This makes data exchange manual, time-consuming and error-prone. A harmonised DPP can simplify these flows by turning scattered documents into structured, reusable digital data.

What is a Digital Product Passport?

A Digital Product Passport (DPP) is a digital information carrier linked to a specific product or component. The concept is introduced under the EU Ecodesign for Sustainable Products Regulation (ESPR) and aims to increase transparency, traceability and sustainability across the value chain by providing harmonised, structured and machine-readable information. By linking the information to a unique product identifier, the DPP follows the material through the entire manufacturing process and life cycle – information accumulates progressively, from raw material and production to the finished product, and becomes available to relevant actors along the value chain.



How it works

Unique identification
Each product gets a unique product identifier (UPI) linking it to the passport; for steel the heat number or product number is the proposed granularity, complemented with customs code (CN/HS) and steel grade. Unique identifiers can be implemented with an issuer or through a self-issuing method.

Data carrier
The UPI links to the physical product via a data carrier such as a QR code (GS1 Digital Link) or other AIDC technology, for steel often placed on documentation, packaging, labels, bundles or coils rather than directly on the product.

Interoperability and APIs
The system is built on open standards so data can be exchanged machine-readably without vendor lock-in, with access through standardised APIs covering the full passport lifecycle (developed within JTC 24).

Decentralised data storage
A hybrid model keeps only identifiers and metadata in the central EU DPP Registry, while the full content stays with the manufacturer or its service provider, mirroring current steel-industry practice and keeping the registry as the authoritative reference point.

Access levels and information sharing
Following the Battery Regulation precedent, a three-tier model is proposed: public; restricted to notified bodies, market surveillance, customs and the Commission; and legitimate interest access (e.g. recyclers), balancing transparency against protection of commercially sensitive data.



The JRC pre-study suggestion that DPP should cointain two levels of information: mandatory and voluntary.

Mandatory information

- **Product and manufacturer identification.** Unique product ID (UPI, e.g. product- or heat number), customs code, steel grade and manufacturing route, complemented by a unique operator and facility identifier, manufacturer details.
- **Material compliance.** Presence of substances of concern (SoC) under Article 2(27) of the ESPR.
- **Environmental footprint.** The product's carbon footprint (Product Carbon Footprint, PCF), calculated according to a harmonised method.
- **Recycled content.** Share of recycled material, split between pre- and post-consumer scrap.

Voluntary information

- **Technical properties.** Voluntary data from Mill Test Certificates (MTCs), such as mechanical properties (yield strength, tensile strength, elongation) and chemical composition.
- **Country of origin** and melt-and-pour location
- **Product performance.** Declarations of Performance.
- **Customer instructions.** Supplier-specific information that supports the customer's own production, quality control or further processing.

Batch level	UPI: per batch	Model level	
Origin & Chain of Custody Material Origin (Country of Origin & Melt & Pour)	MANDATORY	**Material Compliance** Material Declarations (Substance of concern)	MANDATORY
Material Data (MTC) Mill Test Certificate (EN 10204)	VOLUNTARY	**Environmental Performance** Environmental Performance Class & Carbon Footprint (Based on CBAM & ETS)	MANDATORY
		Environmental Performance Recycled Content (Pre & Post consumer)	MANDATORY

A hypothesis regarding the content of the Digital Product Passport (DPP) for iron and steel, based on the JRC readiness assessment and public input to the impact assessment.

VOICE FROM THE INDUSTRY

Jana Dundure
Process Professional
Sandvik Coromant



Sandvik Coromant supplies tooling solutions to the engineering industries and is part of the Sandvik Group. Their DPP preparations began with a pilot study to identify the potential business value of greater product traceability. After that they joined the Swerim project, where they are exploring how product data can be structured, shared and applied across the steel value chain.

According to Sandvik Coromant, one of the biggest challenges is bringing together product information spread across departments, systems and suppliers. Sustainability, procurement, operations, compliance and IT functions all have a role in keeping that data accurate, consistent and accessible. This is especially hard when materials are traced through several stages of the supply chain. The company sees potential value beyond compliance, in carbon footprint reporting and in remanufacturing, second-life applications and recycling.

> **“Waiting for every regulatory detail to be finalised isn’t necessarily the best way forward. A more useful starting point is to look at what product data you already collect, where the gaps are and how information flows between departments and suppliers. Small-scale pilots let you test approaches before committing to wider implementation. The businesses that build these foundations early will be better placed to turn DPP requirements into long-term operational and commercial value.”**

VOICE FROM THE INDUSTRY

Joakim Ståhl
CEO
Byarums bruk



> **“For smaller companies like ours, the biggest challenge with new regulations is managing additional documentation and administration.”**

Byarums bruk is a small foundry company known for its cast aluminium products in parks, public spaces and in Swedish homes. For more than 75 years, the company has produced products designed to live long, and sustainability is a priority with continuous efforts to reduce climate impact, use of renewable energy and minimize material waste.

Over the past years, Byarums Bruk has actively worked with Life Cycle Assessments (LCA) and Environmental Product Declarations (EPD). This has required the collection and structuring of data on raw materials, manufacturing processes, energy consumption, and product life cycles.

> **“In the long term, we believe DPPs will strengthen our competitiveness by making it easier to compare product sustainability and quality. To realize this value, it is important to align environmental reporting and avoid duplicate work.”**

The business value – Digital Product Passport



Making sustainability visible
- Competitiveness
- Harmonized reporting
- Comparison and trust

Traceability Across Value Chain
- Efficient data exchange
- One way of sharing

Digitalising information flow
- Linking material – production data
- Structuring data
- Industrial digitalization

The business case for Digital Product Passports

In addition to supporting regulatory compliance, the DPP brings concrete business benefits throughout the metal value chain

Digitalising information flows

The DPP supports the broader digital transformation of production. Linking material, machine and production data improves internal traceability, helps identify root-cause relationships, and turns quality and process data into a structured digital asset rather than a static document.

Standardised data exchange between internal systems improves efficiency and reduces manual work. It also encourages companies to maintain structured, high-quality data creating a stronger foundation for decision-making and future digital initiatives.

Improved traceability across the value chain

Easy access to verified product information creates value for customers. Moving from PDF documents, email-based requests to seamless digital access reduces the manual handling, shortens the lead times and lowers administrative costs. A single digital format can replace the patchwork of Mill Test Certificates, Safety Data Sheets and Declarations of Conformity exchanged today. Structured and accessible data also makes it easier to integrate supplier information into own product development and internal systems. This supports collaboration across the value chain and helps build trust between business partners.

Sustainability as a competitive advantage

Many companies are investing in low-carbon production, resource efficient processes and in more sustainable raw materials. This improves the product environmental performance of their products. Making the product environmental data visible and demonstrating product origin can help suppliers differentiate themselves on the market. Verified information on provenance – such as steel made in Sweden or the EU – also helps meet customer due diligence requirements.

It makes it easier for downstream customers, such as automotive and construction industries, to make informed choices. Companies that offer more sustainable products can gain a competitive advantage when product information is visible, transparent, and comparable.

Challenges

Realising the benefits of the DPP depends on addressing several barriers.

Standardisation and harmonisation

Common standards and shared definitions are a precondition for success: they save time, ensure that concepts mean the same thing across companies, and allow data to flow between different value chains. A set of horizontal standards is being developed by CEN-CENELEC's Joint Technical Committee 24 (JTC 24), covering unique identifiers, data carriers, data exchange, interoperability, storage and access rights.

Regulatory uncertainty

Requirements are still under development, timelines are indicative, and details differ between product groups. The EU's ambition level – including, for example, how environmental performance classes (A–E) are set – remains to be finalised, which makes planning harder.

Data quality

Collecting, verifying and securing data is demanding. Information must be accurate, verifiable and protected, and responsibility for data quality and granularity must be clearly allocated along the chain.

Climate data and allocation

Carbon-footprint reporting raises allocation challenges, a risk of double counting and questions of comparability. A harmonised methodology and clear system boundaries are needed so that figures from different actors and frameworks (ESPR, CBAM, EU ETS, EPD) can be compared fairly.

Transparency versus business-critical information

A central tension is deciding what must be shared and what must be protected. Detailed composition, process and sourcing data may reveal commercially sensitive know-how, and there are concerns about aggregated data being exploited through external analysis. A role-based, tiered access model is intended to balance transparency and regulatory oversight against the protection of confidential information.

What will be required in the DPP initially, and what are the implications?

To make the implications of the DPP tangible, two contrasting scenarios can be drawn.

A low-requirement scenario

The delegated act sets a minimal mandatory scope – essentially product-level identification and a limited set of environmental indicators. The administrative burden is low and implementation is quick, but the DPP delivers limited additional value: data remains coarse, comparability is weak, and much of today's document-based exchange continues in parallel.

A high-requirement scenario

The delegated act sets an ambitious scope – including finer granularity (heat or lot level), verified environmental performance, performance classes, and possible carry-forward of requirements to final products that incorporate steel. This creates a more level playing field and unlocks the full business case – comparable low-carbon steel, streamlined data exchange and strong traceability – but at a higher implementation cost and with greater demands on data quality and confidentiality safeguards.

Analysis and comparison

The likely outcome lies between these extremes, and the scope for downstream products is being considered through options ranging from intermediate products only to intermediate products plus all steel-rich final goods. The key message for industry is that the direction of travel is clear regardless of where the final requirements land: companies that prepare their data now will be able to comply at low marginal cost and to capture the upside under either scenario.

How to get started with DPP

The following concrete, step-by-step recommendations apply regardless of the final shape of the regulation:

1. **Map existing data.** Inventory the product data you already generate and exchange. This is valuable in its own right and is the foundation for any DPP, whatever the final requirements.
2. **Identify data gaps.** Assess where data, responsibility, quality or granularity are missing, and clarify who owns each data element along the chain.
3. **Prioritise business value.** Do not focus on compliance alone – engage customers, understand their information needs, and use the DPP to strengthen the commercial relationship.
4. **Start small.** Run a pilot on a selected product and a selected customer before scaling across the portfolio.
5. **Learn from others.** Use industry examples, dialogue meetings and collaboration to accelerate learning and avoid duplicated effort.

VOICE FROM THE INDUSTRY

Amanda Oliveira
Legal Advisor and Sustainability Compliance leader
Seco Tools



Seco Tools is a global supplier and manufacturer of tools and solutions for metal cutting. They have started their DPP work with a pilot on a selected product from the Perfomax® family. The ongoing pilot uses real product data to test DPP concepts, build internal engagement and explore how sustainability and product information can be connected, managed and shared across the product lifecycle. According to Seco Tools, the pilot has helped them identify data gaps, improve cross-functional collaboration and understand how DPP information can enable business opportunities in addition to meeting regulatory requirements.

The main challenges they have identified are aligning internal systems, functions and external partners, and moving from sustainability questionnaires to structured, consistent data throughout the value chain. The company considers data governance, ownership and quality as important as the technology itself.

> **“Working with real product data makes DPP tangible from the start. It gives people across functions something concrete to work on together, and that is what builds engagement internally. Bringing customers in early to understand which information they value most is just as important. If you treat DPP only as a compliance task, you miss what it can do for your business decisions, communication and customer relationships.”**

Conclusion

The Digital Product Passport marks a shift from fragmented, document-based product information towards structured, machine-readable and interoperable data – and iron and steel is leading the way as the first ESPR product category. For the metal value chain the DPP is both a compliance requirement and a strategic opportunity: it can streamline data exchange that is largely manual today, make environmental performance comparable, and strengthen traceability and competitiveness.

The requirements are not yet final, but the direction is clear. Companies that begin now – mapping their data, closing gaps, securing reliable environmental information and piloting at small scale – will be best placed to comply efficiently and to turn the DPP into a source of business value rather than a regulatory cost. Early preparation, collaboration across the value chain and a focus on customer needs are the keys to making the transition a success.

Project partners

SSAB

Lyrestads Gjuteri AB

VÄDERSTAD

Byarums Bruk

OVAKO

AGES

ChainTraced

Seco

SANDVIK coromant

ERASTEEL

Hydro

Höganäs
POWDER THAT EMPOWERS

P.Ragnarsson
CONSULTING

TIBNOR

BRYNE
IMMERSED ENGINEERING

HYDAL
COMPONENTS

lundbergs
PRESSGJUTERI

LKAB

NORRLANDS GJUTERIET

RI. SE

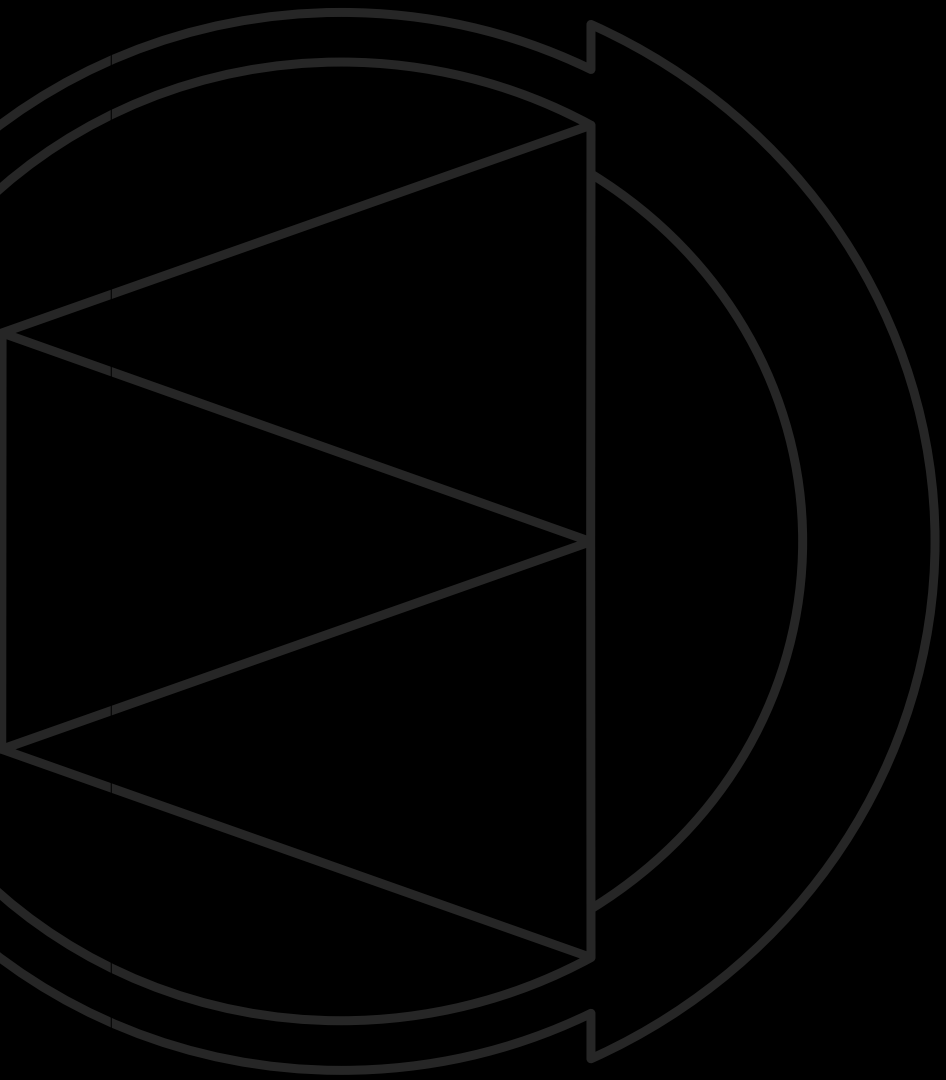
ACU

SBI Stålbyggnadsinstitutet
The Swedish Institute of Steel Construction

MÖLLTORPS GJUTERI & MEKANISKA VERKSTAD

OC ORIGINAL CREATION

SWERIM



www.swerim.se/en/digital-metal-values

SWERIM
We create benefit for industry