

RFID TRACEABILITY AND TEXTILE CIRCULARITY: INSIGHTS FROM THE CIRCULAR WORKWEAR PROJECT

Datamars Textile ID participated in a two-year research initiative conducted in partnership with Lucerne University of Applied Sciences and Arts, exploring how RFID-enabled traceability can support the transition from linear to circular workwear lifecycles.



Applied experiments as a key component of the research project, such as sorting work clothes. Photo: © HSLU CC P&T (2023)



Part of the sorted workwear made of polycotton and flat linen made of cotton. Photo: © HSLU CC P&T (2023)

THE CHALLENGE

Workwear has long operated within a linear economy: garments are produced, used and then incinerated or downcycled at end-of-life, with limited recovery of materials or lifecycle data.

According to the "Fashion on Climate" report (McKinsey and Global Fashion Agenda, 2020), achieving the 1.5-degree target set by the Paris Climate Agreement requires new consumption patterns, circular business models and a significant reduction in production-related emissions. **Today, less than 1% of textiles are recycled in closed material cycles.** In Switzerland, around 3,200 tons of workwear are put on the market every year, of which **around 40% is currently thermally recycled due to the lack of closed material cycles.**

At the same time, the regulatory environment is shifting fast. **EU Digital Product Passports and Extended Producer Responsibility frameworks are set to require greater transparency around product lifecycle data.** The textile industry is under growing pressure to reduce greenhouse gas emissions and demonstrate meaningful progress toward circular economy principles.

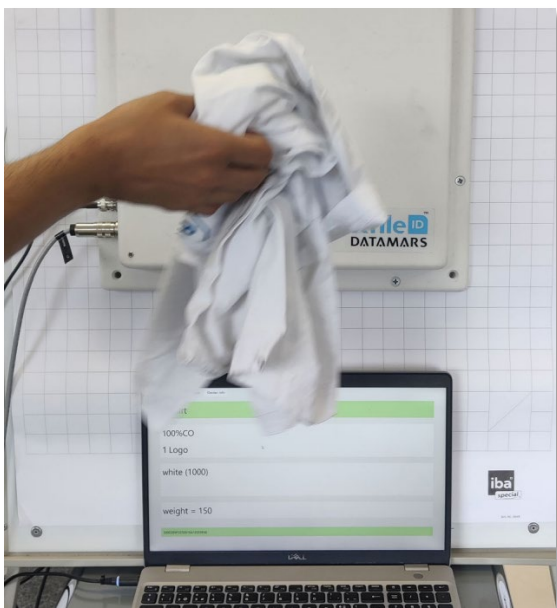
This Research Summary presents the key findings and outcomes of a research initiative exploring how RFID-enabled traceability can support the transition from linear to circular workwear lifecycles.



Workshop on future scenarios during a joint project sprint. Photo: © HSLU CC P&T (2024)



Physical and digital meetings, sprints and workshops were held at irregular intervals. Photo: © HSLU CC P&T (2023)



Insight into the sorting of old clothes with the support of tags, scanners and a digital database. Photo: © HSLU CC P&T (2025)

THE RESEARCH

Between January 2023 and November 2025, Datamars Textile ID participated in the CWW - Circular Workwear research project, a **CHF 955,000 initiative run by Lucerne University of Applied Sciences and Arts and co-funded by Innosuisse, the Swiss Innovation Agency**. The project examined how technology and structured data exchange across the value chain can make circular workwear systems viable in practice, not just in principle. Project partners included CWS Workwear, Texaid and Hüsler AG.

"The fundamental goal of this project was to demonstrate a viable path from a linear economy to a circular one for workwear, and to understand what that transformation actually requires in practice," said Umar Farooque, Product Manager, Software Services, Datamars Textile ID.

DATAMARS' ROLE

Datamars Textile ID contributed LaundryChipTM RFID tags, reading stations, software and consulting expertise to the research. **Crucially, Datamars was the only partner with working knowledge of the full workwear value chain, from embedded tag to software platform**, and played a central role in designing a data and technology architecture capable of functioning end-to-end.

"Our technology enables 360-degree visibility across the entire RFID technology chain, from the LaundryChipsTM embedded in garments to the reading systems and software platforms that transform RFID data into actionable insights," said Riccardo Mazzolini, VP Textile, Datamars.

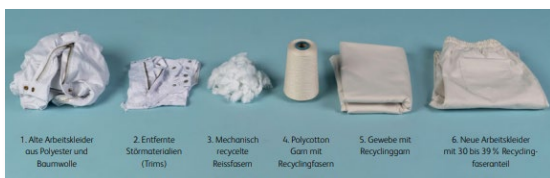
For circularity to function at scale, data must flow reliably between manufacturers, laundries, users, sorters and recyclers. RFID provides the item-level identification layer that makes this exchange possible. The project demonstrated this directly: in sorting experiments on 271 post-consumer workwear items, sorters estimating cotton content manually were on average 15% to 24% off the mark — and a misjudged garment ends up in the wrong stream, wasting recoverable material.



Prototypes of workwear with RFID Laundrychip. Photo: © HSLU CC P&T (2025)



Prototypes of workwear made from recycled fibres: smock, pull-on trousers, jacket and polo shirt. Photo: © HSLU CC P&T (2025)



The process from old workwear to mechanical recycling to new workwear. Photo: © HSLU CC P&T (2025)



Recycled fibre content of 30% and 39% was processed & tested in the prototypes. Photo: © HSLU CC P&T (2025)

With RFID, the same data is available instantly and accurately, and because tags can be read in bulk, sorting can be automated and scaled — enabling better decisions and higher recycling quality.

KEY OUTPUTS

The project delivered five concrete, practical results:

49 recommendations to support circular resource flows across the workwear value chain, from development and production to laundry, return and product data use

A **Circular Workwear Indicator Tool** to help organisations assess and compare workwear products in terms of circularity, usable at the product development and procurement stage

Four textile prototypes for the nursing sector, produced from post-consumer workwear and flat linen, containing up to **39% recycled content**

A **process diagram** developed through 36 expert interviews, illustrating the complex challenges across the workwear value chain and mapping a future scenario for circular value creation involving all stakeholders

Practical **sorting experiments with RFID-chipped workwear**, testing digital interfaces, data exchange along the value chain and the impact of product data on sorting quality and end-of-life decision-making

Several findings have already been incorporated into Twinify, Datamars' cloud-based platform for digital textile identity management — including customizable data attributes, support for different hardware stations (cabin, tabletop, etc.), built-in process and data validation, integration APIs, simple UI designed for operators, etc.

Datamars' participation in initiatives like this reflects a broader commitment to working alongside the organisations and institutions shaping the future of the sectors we serve. As circularity moves from aspiration to regulatory requirement, the ability to track, identify and exchange textile data across the full lifecycle will be central to how the industry adapts.



The project knowledge gained in the form of recommendations for stakeholders in the workwear industry. Graphic: © HSLU CC P&T (2025)



Project team with the white workwear prototypes. Photo: © HSLU CC P&T (2025)

IMPLICATIONS FOR THE SECTOR

The project identified the key gaps and opportunities in making textile circularity work in practice, across both workwear and the wider apparel sector. Those findings are directly relevant to textile producers, laundries, rental companies and recyclers preparing to operate within an increasingly data-intensive, regulation-driven environment.

"It enabled us to clearly pinpoint what RFID-enabled solutions must provide to support manufacturers, sorters and recyclers as circular systems scale," said Umar Farooque.

The research confirms that circular solutions cannot be achieved through product design alone. They require reliable data flowing across the entire value chain, and RFID is the technology that makes this possible at item level, at scale, and in the harsh conditions of industrial workwear management.