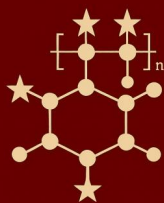


PROTECTED!

PASSPORT



Sensor  *Instruments*

The Digital Product
Passport (DPP)
with Material Authentication

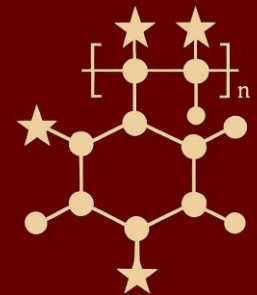
Digital Product Passport (DPP) in Plastics Processing

The **Digital Product Passport (DPP)** is set to become a game-changer for the plastics industry. It acts as a digital twin of any plastic product, carrying verified information across its entire life cycle – from raw material to processing, use and recycling.

- * **Full transparency** – clear traceability of polymers, additives and recycle content.
- * **Circular design** – enables smarter sorting, dismantling and closed-loop recycling.
- * **Proof of sustainability** – documentation of CO₂ footprint, energy demand and recycle content.
- * **Regulatory compliance** – aligns with EU ESPR and PPWR targets for 2030 and beyond.



PASSPORT





Load It in the Box & Keep It on the Radar

Plastic crates are typically used as storage containers or collection boxes for organizing and transporting items. By equipping each crate with a unique QR code, seamlessly fused into the surface during the injection molding process, every crate can be assigned a specific storage location.

If the plastic items placed inside the crate also carry a Digital Product Passport, both passports can be updated to record the item's new position – creating a smart, traceable link between product and container.

- * Invisible marker technology is embedded directly into the material.
- * Each unit is paired with a unique QR code, acting as the visible gateway to its Digital Product Passport (DPP).
- * Using cutting-edge marker detectors, authenticity can be verified at any stage – during production, at retail, in use and even after recycling.

What makes it extraordinary:

- * The marker withstands every process – shredding, washing, melting – and still remains detectable.
- * This ensures that even after the crates and the items placed inside have been recycled into flakes and, finally, into pellets, their origin remain traceable.
- * Combined with the DPP, it provides a tamper-proof chain of trust: Where the plastic comes from is clearly documented.



TAU Reader Technology – Cutting-Edge Sensor Intelligence

With TAU Readers – available as LUMI-TAU INLINE, MOBILE and LAB – marked objects can be securely detected and differentiated by marker type.

Mobile and Lab authentication:

- * Sensor data is transmitted over the air to a smartphone.
- * The TAU app compares the measured marker signature with the values stored in the cloud, which is queried using the OR code.
- * If the two match, the product is instantly verified as authentic.
- * MOBILE and LAB units enable fast authentication in the field, at retail or in quality control labs.

Inline verification in production:

- * INLINE systems ensure during manufacturing that each product contains the correct marker concentration.
- * Only then is the item marked with an individual QR code, binding the physical marker to its Digital Product Passport (DPP).

Smart recycling & closed loops:

- * During recycling, INLINE TAU Readers separate marked objects from mixed waste streams.
- * Even after shredding and extrusion, the marker remains detectable, enabling resorting and traceability.
- * When the recycle is reused, INLINE TAU Readers measure exact marker content in real time.
- * Integrated in dosing units, the required amount of marker-based master batch can be added automatically, ensuring that the new product achieves the precisely defined marker concentration.

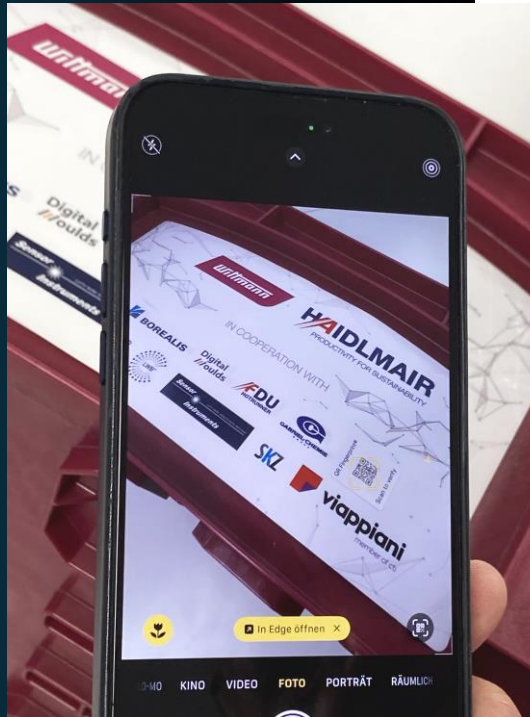


Seamless Synergy of Sensors, Marker Technology, Smartphone Apps and the Cloud

Together, TAU Readers + Marker + QR code + Digital Product Passport create a tamper-proof chain of trust:

- * **Secure authentication at any stage of the lifecycle.**
- * **Process control from production to recycling.**
- * **Guaranteed traceability across multiple cycles.**

This is sensor technology at its finest – merging cutting-edge optoelectronics, digital intelligence, and circular economy design into one seamless system.



Digital Product Passport

Crate

✓ active



ID 6jmS8SX9xUF

Product information

Producer of material	Borealis GmbH
Material description	PCR (PP-PCR) - Polypropylen, post-consumer recycled
Amount of raw material	980 g
Additive	Gabriel-Chemie GmbH

Production

Machine	Wittmann MacroPower 500/3400 B8X
Place of Production	Duesseldorf (GER)
Date of Production	October 08th 2025, 10:32am (CET)

Distribution

Collection point yes

Scan history



Product status



Number of Scans: 22

Realized Together with Strong Partners

The **Digital Product Passport (DPP)** is the result of a shared vision and close collaboration among dedicated partners.

We extend our sincere thanks to all contributors whose expertise, commitment, and teamwork made the realization of this groundbreaking innovation possible.



Digital Product Passport (DPP)
with Material Authentication



all4labels.com/brands/#integritag



Leuchtstoffwerk Breitung

leuchtstoffwerk.com



wittmann-group.com



haidlmair.at



gabriel-chemie.com



viappiani.it



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INTEGRITAG stands for the future of labeling from a single source.

We increase efficiency in the supply chain, protect brands, secure identities, and strengthen consumer engagement.

Our portfolio ranges from secure labeling solutions with holograms and contactless technologies such as QR codes, RFID, the more sustainable eRFID and NFC to intelligent digital solutions and cloud services that seamlessly connect physical products with the digital world. This results in applications such as digital product passport, supply chain tracking, product authentication, and consumer engagement — for greater transparency, compliance, and data-driven added value.



✉ integritag@all4labels.com

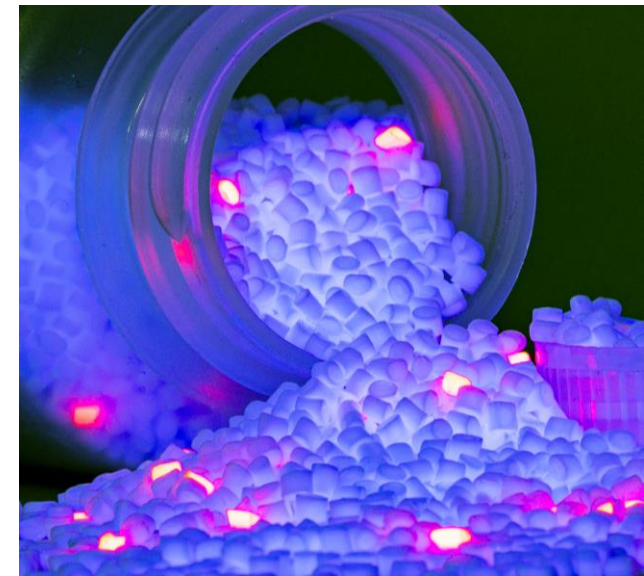


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Clarity about the Authenticity of a Product

The Digital Product Passport (DPP) with Material Authentication

Always keep an eye on the authenticity of the products

Our specialists are happy to tell you more about it

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