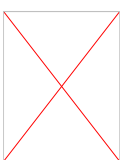


Circularity Needs Granularity Advanced Sorting to Unlock Feedstock

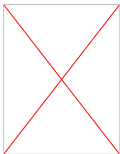
GO CIRCULAR 2026 – ERIC WESTERHOFF

PELENCST



Sensor Based Sorting Solutions for High Material Recovery





Little Circularity in Recycling Today

Only few truly Circular Packaging

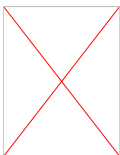


Contact sensitive plastic packaging



Mandatory recycled content

Regulation pushing for circularity (PPWR)

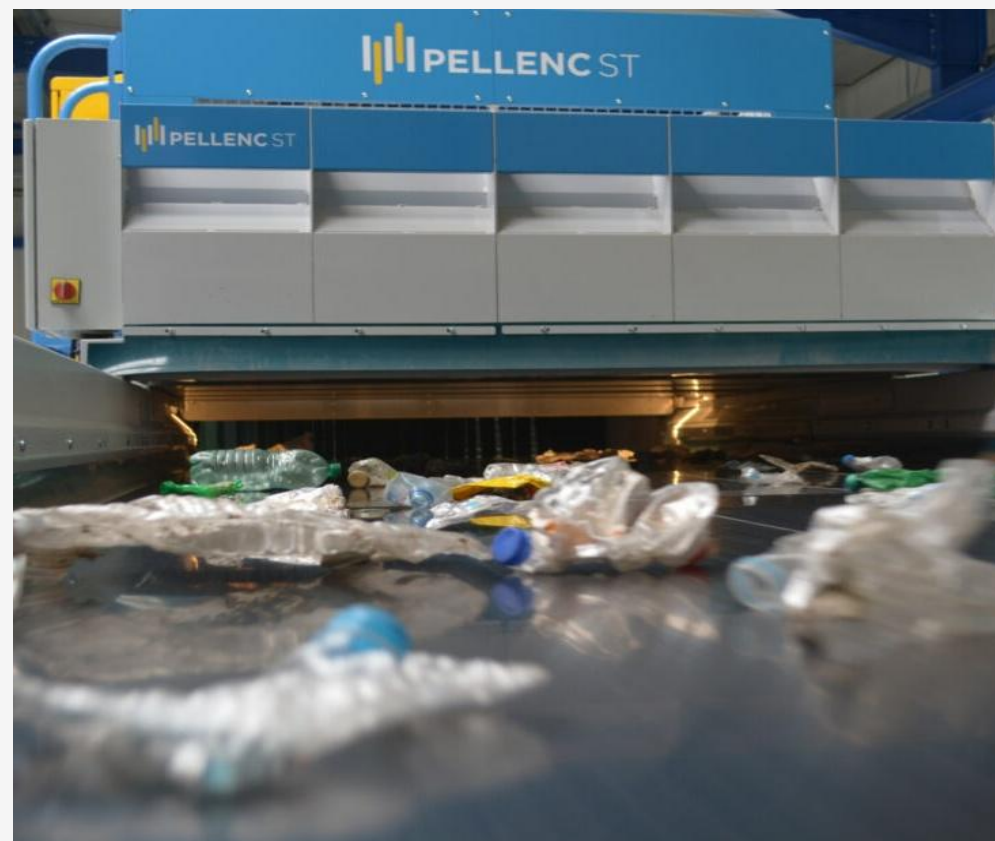


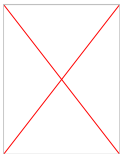
Increase PC Packaging Recovery & Recycling

- Route packaging to appropriate Recycling Technologies
- Dedicate Contact Sensitive Polymers for Food Contact Recyclates

Secondary sorting for more granularity:

- Food/ Cosmetic/ Detergent grade
- MFI Index
- Surface Printed...





Artificial Intelligence - State of Play

Rigids



PET Food



PP Food



PE Food



PET non-Food

PP non-Food

PE non-Food

Flexibles



LDPE Food



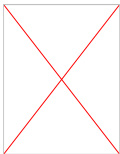
PP Food



ML Flex



ML PET Flex

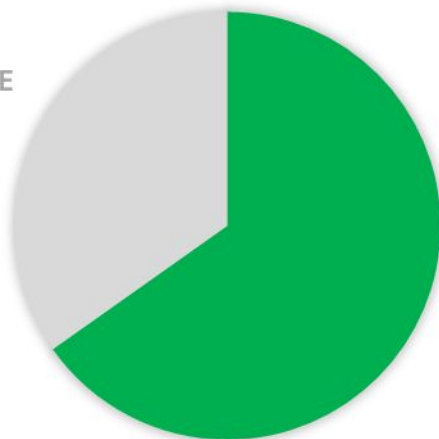


Flexibles Circularity - the Challenge

C&I Film 4,6 Mt



Colored C&I PE
1,6



Clear C&I PE
3

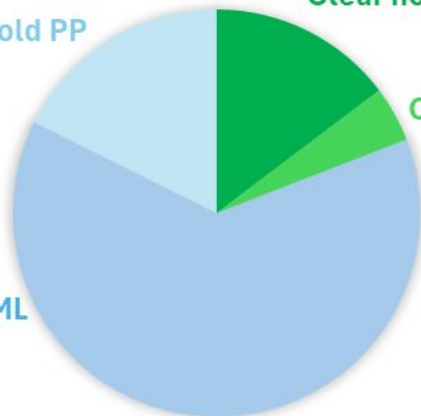
Flexible Film sold EU (27+3)

65%
can be circular

Household Film 6,8 Mt



Colored/ printed/
ML household PP
1,2

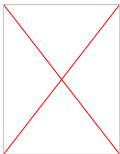


Clear household PE
1

Clear household PP
0,3

Colored/ printed/ ML
household PE
4,3

20%
circular (in theory)



Digital Watermarks to Power Circularity

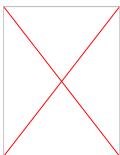


Invisible to consumers



Disruptive for **brands** & **recyclers**

Closing the data & value gap



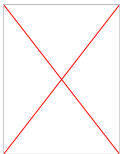
Digital Markers – State of Play

Holy Grail 2.0 Project delivered **outstanding technical results** (Purity/ Efficiency) at industrial scale.

🤔 **adoption challenges** due to **single technology** provider (Digimarc).

New UV Tag (data matrix) solution developed by Polytag & tested by Pellenc ST



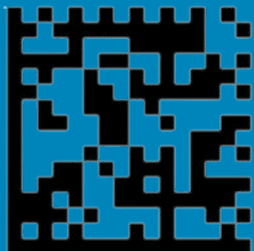


UV TAG, trace... and sort

UV fluorescent tag invisible to consumers

Tag format **standardized & open**: GS1 Data Matrix

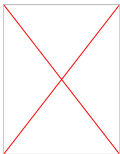
No monopoly on UV ink (multiple suppliers)



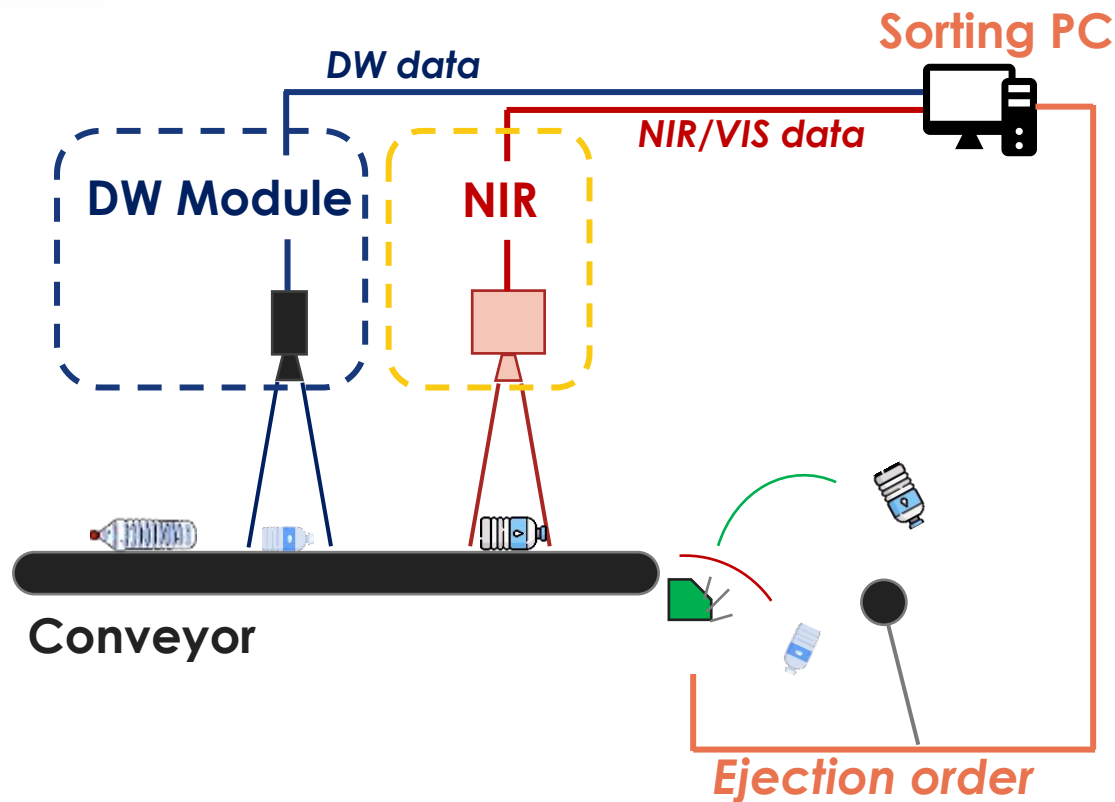
Data matrix contains a GTIN in the GS1 syntax
to be detected in secondary sorting facilities

GS1 BARCODE NUMBER



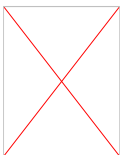


UV Tags & NIR Combination to Sort



What does a combination deliver?

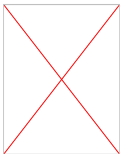
- **allow mixed sorting**
of marked & unmarked SKUs
- **detect the full object area**,
for dirty or damaged packaging



Adding Granularity to Allow Flexible Recycling

Routing different material grades, each optimized for one recycling route

Input	Sorting Attribute	Output: recycling paths
Flexible PP stream	Origin : food, cosmetic, detergent...	Recycling by application
	Surface printed	De-inking
	Reverse printed (multilayer)	Delamination + De-inking
	Colored (masterbatch)	Dissolution
	High Viscosity	Extrusion
	Low Viscosity	Injection



Advanced Recycling Examples

FYCH delamination process

Removes inks & metallization by perforation & friction
6,000 t/a plant in Alicante, summer 2026

INPUT



OUTPUT

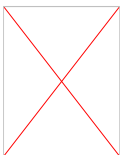


PureCycle dissolution process

Removes inks, color, contaminants ...
50,000 t/a plant in Ironton, OHIO, USA



PURECYCLE

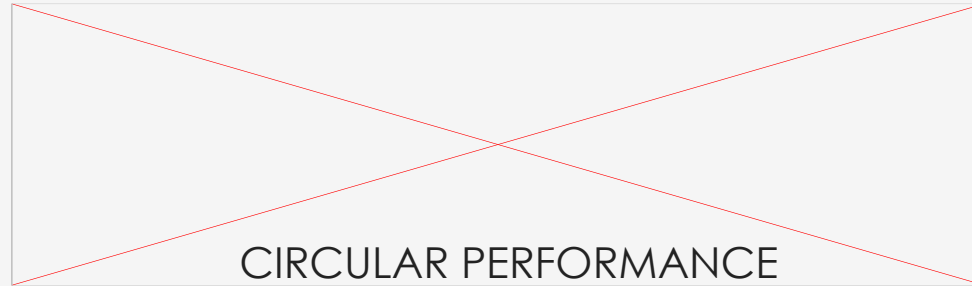


Takeaways

- **Granular sorting opens new circular recycling routes**
- Markers at **SKU level** enable both **granularity & traceability**
- **UV watermarks** are a cost-effective solution at SKU level
- **GS1 open standards enable** several suppliers to compete

Polytag & Pellenc ST non-exclusive cooperation agreement...

... to demonstrate **industrial solution.**



CIRCULAR PERFORMANCE
PARTNER



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