

Innovative **high barrier** **recycle-ready solutions**

VACUUM METALLIZING & COATING

oneBARRIER



Integrated sustainable solutions

The three pillars of sustainable flexible packaging

When looking at global market trends for sustainable flexible packaging, the trends can be grouped into three pillars of sustainability. BOBST along with dedicated ecosystems of partners has developed the oneBARRIER family of solutions which targets all three pillars with industrially viable alternatives to non-recyclable metallized polyester film.

oneBARRIER PrimeCycle to date comprises EVOH-free, top-coat-free recycle-ready solutions for full PE barrier, developed with industry partners including Dow, Michelman, Sun Chemical and Zermatt. PrimeCycle has been declared officially recyclable by Institute cyclos-HTO GmbH.



Mono-material polyolefin (PP/PE)

- Launched July 2020
- PP/PE: > 90%
- Coatings/Inks/adhesive: max. 5% each
- Compatible with current mechanical recycling



Paper/fibre-based

- Compatible with paper recycling stream
- Challenging barrier and flexibility targets



Compostable, biodegradable & bio-based polymers

- From natural and renewable resources
- PLA, PHA, PHB & PHV
- Cellophane
- Industrial & home composting



oneBARRIER FibreCycle is a high barrier, recycle-ready paper-based packaging solution, developed with industry partners, UPM and Michelman. FibreCycle has been declared officially recyclable by PTS (using CEPI Harmonised method), 4evergreen, Aticelca and Western Michigan University.

BOBST is also actively working on the third pillar of sustainable flexible packaging exploring options such as the development of a home compostable packaging option.

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Design criteria
in developing sustainable flexible packaging

There is a clear process behind the designing of new packaging structures at BOBST. In order to create sustainable and viable flexible packaging, different elements need to be considered including meeting design guidelines and achieving the required level of performance. BOBST also certifies our solutions and

have begun putting them through a Life Cycle Assessment (LCA). Of course, it is important that cost is taken into account throughout the design process to ensure that as well as being sustainable, the packaging can be produced at a acceptable cost.

D4R

- Guidelines
- Regulation (PPWR)

Performance

- Barrier/shelf life
- Adhesion/bond strength
- Processability
- CoF

Recyclability

- Assessment/tests
- Certification/ approval

Cost

- Cost neutral or
- Acceptable cost level

Material	Production cost (USD/kg)
Current material	~1.2
Alternative A	~1.0
Alternative B	~1.1

LCA

- Environmental impact (CO₂)
- Water usage
- Energy consumption

Image credit: SimaPro

Sustainable & viable flexible packaging

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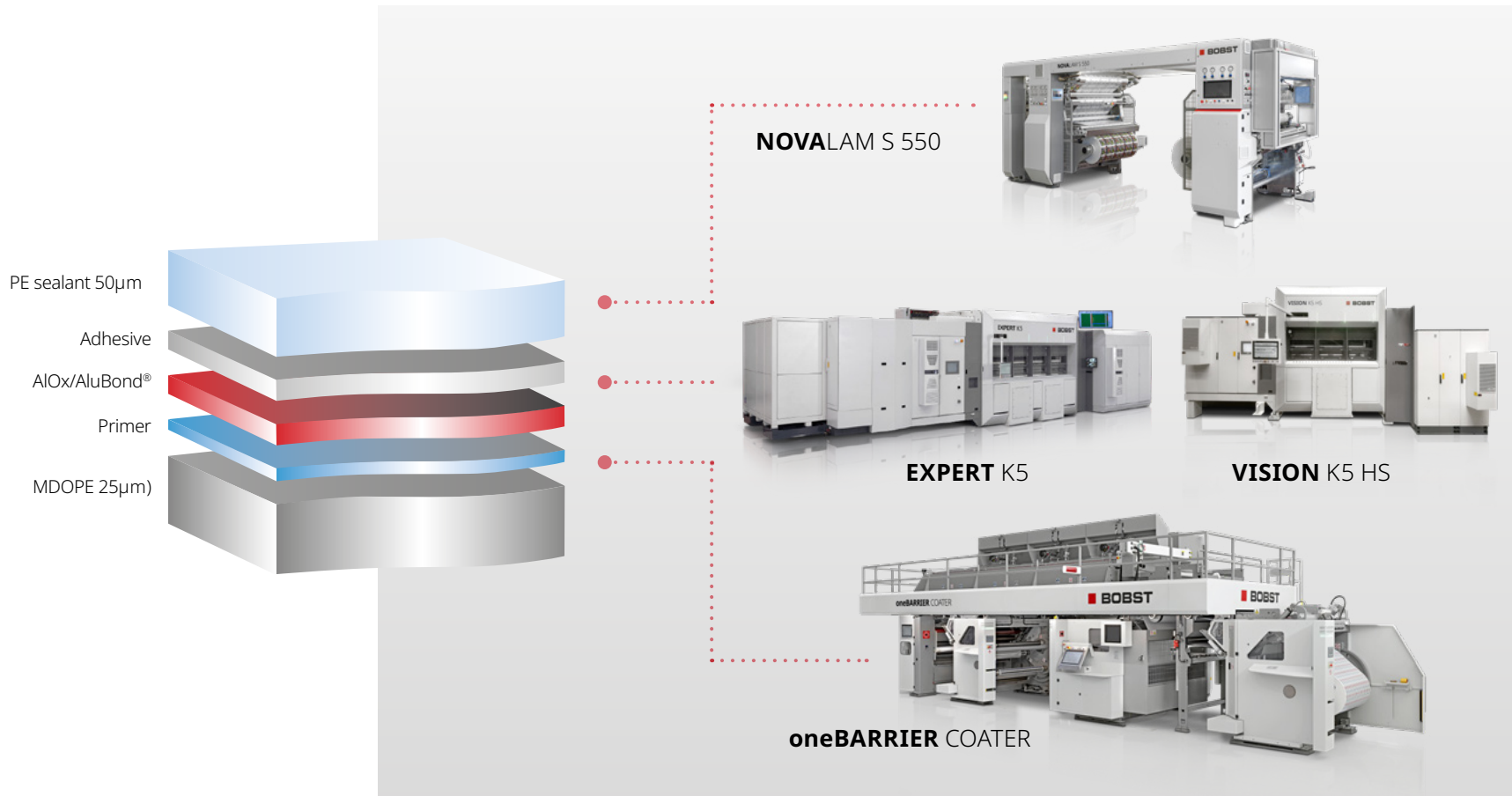
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oneBARRIER PrimeCycle

The PrimeCycle structure comprises: a MDOPE outer layer, a primer coating applied to the substrate on a oneBARRIER COATER to prepare it for metallization; a barrier layer applied through metallization on an EXPERT K5 or VISION K5 HS with either AluBond® (opaque) or AlOx (transparent) technologies and a layer of adhesive for lamination to the PE sealant web on a NOVALAM S 550.

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PrimeCycle barrier performance

Following extensive trials and laboratory tests, BOBST has obtained barrier performance for metallized polyester film replacement with the PrimeCycle AIOx transparent solution and aluminium foil replacement with the PrimeCycle AluBond® solution.

The PrimeCycle project study also satisfies the market requirement of a minimum of 2-3 N/15 mm with the laminate bond strength.



oneBARRIER - AluBond® performance barrier and laminate bond strength

Structure	OTR cm ³ /(m ² d)	WVTR g/(m ² d)	Bond strength N/15 mm
MDOPE	4000 – 4200	4.5 – 7.5	-
MDOPE/primer	4.95 ± 0.01	6.66 ± 0.02	-
MDOPE/primer/AluBond®	0.73 ± 0.07	0.10 ± 0.01	-
MDOPE/primer/AluBond®/ad/PE	0.03 ± 0.01	0.03 ± 0.00	3.60 ± 0.12

Barrier: OTR 23 °C, 50 % RH | WVTR 37.8 °C, 90 % RH **Bond strength:** T-peel, 100 mm/min

Barrier performance for aluminium foil replacement
 (< 0.1 cm³/(m² d) & < 0.1 g/(m² d))
Laminate bond strength passes market requirement (2 – 3 N/15mm)

oneBARRIER - AIOx performance barrier and laminate bond strength

Structure	OTR cm ³ /(m ² d)	WVTR g/(m ² d)	Bond strength N/(15 mm)
MDOPE	4000 – 4200	4.5 – 7.5	-
MDOPE/primer	11.57 ± 0.75	5.01 ± 0.33	-
MDOPE/primer/AIOx GEN II	0.37 ± 0.01	2.17 ± 0.04	-
MDOPE/primer/AIOx GEN II/ad/PE	0.13 ± 0.01	0.48 ± 0.01	3.40 ± 0.32

Barrier: OTR 23 °C, 50 % RH | WVTR 37.8 °C, 90 % RH **Bond strength:** T-peel, 100 mm/min

Barrier performance for metallized polyester film replacement
 (< 1 cm³/(m² d) & < 1 g/(m² d))
Laminate bond strength passes market requirement (2 – 3 N/(15mm))

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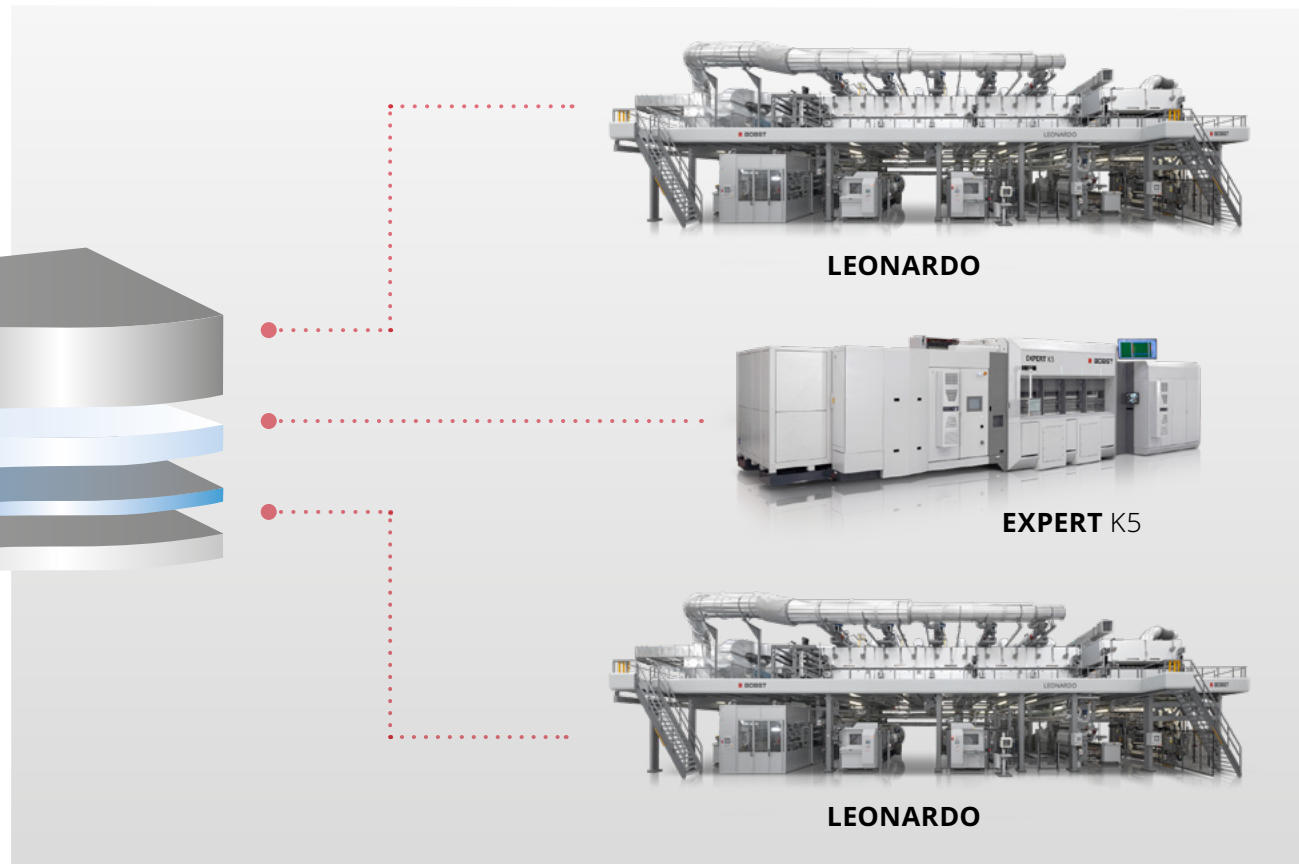
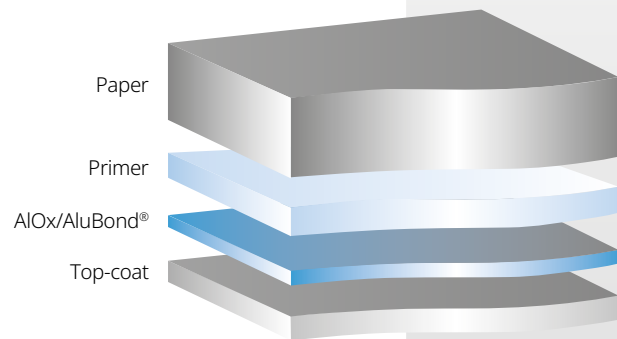
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oneBARRIER **FibreCycle**

The FibreCycle structure comprises: a paper outer layer (also the packaging printing surface); a primer coating applied to the paper on the LEONARDO pilot coater or oneBARRIER COATER to prepare it for metallization; a barrier layer applied through paper metallization on an EXPERT K5 with either the AluBond® (opaque) or the AlOx (transparent) technologies and a topcoat layer applied on the inner layer of the paper on the LEONARDO pilot coater or oneBARRIER COATER.

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FibreCycle barrier performance

Following extensive trials and laboratory tests, oneBARRIER FibreCycle delivers a high barrier paper-based solution with barrier performance of OTR < 1 cm³/(m² d) & WVTR < 1 g/(m² d). The barrier performance of this solution that can be recycled via existing paper waste streams is equivalent to non-recyclable metallized polyester film.

Barrier performance

Structure	OTR cm ³ /(m ² d)	WVTR g/(m ² d)
Paper	> 400 000	600 – 750
Paper/primer	≤ 0.1	130 – 180
Paper/primer/AluBond®	≤ 0.1	< 1
Paper/primer/AluBond®/Heat seal	≤ 0.1	< 1
Paper/primer/AlOx	≤ 0.1	1 – 4
Paper/primer/AlOx/Heat seal	≤ 0.1	1 – 4

Barrier: OTR 23 °C, 50 % RH | WVTR 37.8 °C, **75 % RH**



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Exceptional web handling capabilities

BOBST precise, reliable and consistent web tension control throughout the line from infeed to output is of paramount importance for the quality of the final product. BOBST web handling technology is world-renowned, benefiting from over **60** years combined know-how and experience in handling a very wide range of flexible, paper and paperboard substrates with different physical properties for its comprehensive range of different printing and converting equipment.



AIOx vacuum deposition process

The **BOBST AIOx vacuum deposition process** for single layer application onto clear films has been well-established in the market for many years. High barrier transparent films are produced at low cost in comparison to equivalent atmospheric coatings.



AluBond® vacuum deposition process

The **BOBST AluBond® process** provides high metal adhesion with values up to 5N/15mm and improves surface energy levels through metallization, eliminating the need for chemically treated films.

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oneBARRIER Solutions: commercial product

The following equipment is involved in the production of oneBARRIER PrimeCycle and FibreCycle. For more information on each machine, please click the link below the image.



EXPERT K5



VISION K5 HS



oneBARRIER COATER

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Driving the industry transformation

BOBST offers the ability to view, understand and test solutions in its Competence Centers and laboratories. Physical or virtual visits with our experts are completely tailored to client's requirements and needs.

The BOBST Competence Center for High Barrier in Manchester, UK presents the latest substrate processing technologies that are shaping the future of the world of flexible materials. The installed vacuum metallizing machine helps flexible materials stakeholders to provide adapted solutions and optimize their production. Experts are available to discuss the latest developments in particular with an emphasis on sustainability, demonstrate machines, analyze challenging packaging requirements and to share their knowledge and expertise.



Manchester, UK



The BOBST Competence Center in San Giorgio Monferrato, Italy presents the latest substrate processing and printing technologies. The coating, laminating and gravure printing machines help all stakeholders to define the best production means. The installed production lines with multiple inking, coating, drying and in-line configurations enable visitors to develop, test, enhance and verify various product applications and processes in real time.



San Giorgio, Italy



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Collaboration is key, BOBST works with partners throughout the value chain to develop innovative, sustainable solutions.



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Maintaining excellence

Expert services for all your equipment. Improve your processes, boost your productivity and enhance your expertise with a complete range of services from BOBST.



Maintain your investment

- Scheduled maintenance with BOBST certified technicians
- Preventative intervention, maximizing machine uptime
- Optimum performance over the equipment lifetime

[> WATCH VIDEO](#)

Approved parts and logistics

- BOBST Original and Certified parts, and consumables
- Quality assurance, and extended maintenance intervals
- Worldwide distribution, and full availability where and when you need it

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Machine upgrades

- Additional features, configured for your machine
- Enhanced functionality, connectivity and capability
- Future-proofing your investment, maintaining competitive advantage

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Digital age manufacturing happening with BOBST Connect

BOBST Connect is an end-to-end, user-centric digital platform that enhances and increases your packaging productivity. It's designed to help you make the most of the data your machine generates, improving efficiency across your value chain.

As well as exceptional data insights, BOBST Connect helps to orchestrate and improve your whole production process, from your PDF to the finished product and quality report. It brings data and digital services together in one fully connected platform, with machine insights and expertise built in.

All of this is available to you as part of BOBST Connect Essential, the first subscription level that you receive when you purchase a new BOBST machine.



Performance analysis

- Production insights, including interaction of OEE components
- Identify and eliminate performance gaps

Accurate reporting

- Meaningful insights on OEE and downtime
- Accurately measure target speed and quality losses
- Trend analysis over time

Progress indicator

- Highlights extensive production deviations
- Empowers timely interventions

Remote assistance

- Priority access to technical specialists
- Video with Augmented Reality expert support based on real-time data
- Available 24/7 (optional)

Shift management

- Optimize planning time
- Deliver overall resource efficiency

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