GLOBAL POUCH FORUM

Leading Innovation In Flexible Packaging

Joel Fischer, MOCON Laboratory Manager

MAY 29-31, 2024

GLOBAL MARKET TRENDS FOR PERMEATION TESTING

Biggest Trend in Packaging is Being Driven by the Growing Focus on the Environment

SUSTAINABLE PACKAGING

Europe

***UPDATE!** As of January 2023, the percentage for consumers that are demanding sustainable packaging has risen to 81%, another huge jump towards eliminating plastic waste. A clear message to businesses that sustainable packaging is the way forward!*

A recent report from Drapers shows a dramatic increase for UK Consumers demand for sustainable packaging. 64% more likely to buy from retailers that provide sustainable packaging. With 50% of the consumers willing to pay more for sustainable packaging and delivery.

United States

According to the latest sustainable packaging statistics, 66% of all United States consumers — and 80% of adults under 34 — willingly pay a premium for sustainable products.

Asia

Key points:

- More than 54% of consumers consider sustainable packaging when purchasing a product
- 67% of customers believe that brands must adopt sustainable packaging
- Using recycled and bio-based packaging lightens shipments and reduced cargo space

BOBST flexible packaging solutions

Targeting the three pillars of sustainable flexible packaging

The three pillars of sustainable flexible packaging

Mono

Mono-material polyolefin (PP/PE)

- CEFLEX consortium & guidelines
- PP/PE > 90%
- Coatings/Inks/adhesive max. 5% each
- Compatible with mechanical recycling

CEFLEX
A CIRCULAR ECONOMY FOR FLEXIBLE PACKAGING

Bio

Compostable, biodegradable & bio-based polymers

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

OK biobased | HOME OK compost | Compostable

Paper

Paper/fibre-based

- 4evergreen alliance & guidelines
- Compatible with paper recycling stream
- Challenging barrier and flexibility targets

4ever green

Post Consumer Recyclables (PCR) and Biofillers

*Slide courtesy of Carolin.Struller@bobst.com

BOBST

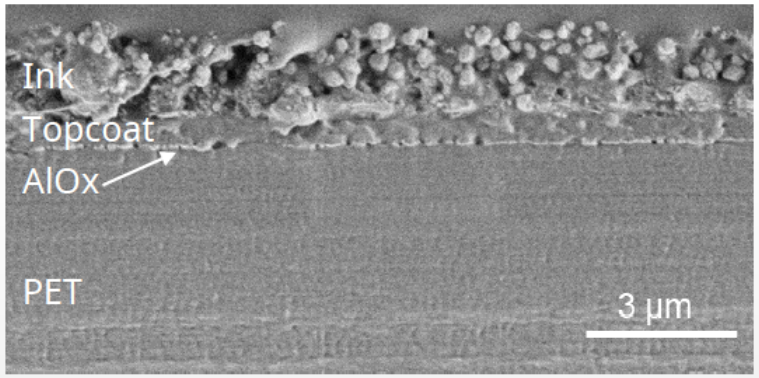
mocon AMETEK

GLOBAL POUCH FORUM

Metallizing paper for barrier applications
What are the challenges – Paper vs. film?

Conventional polymer substrates (PET/PP)

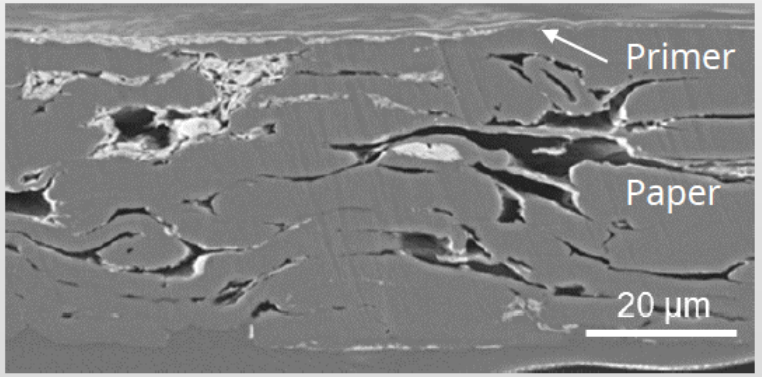
- Relatively high **smoothness** of polymer-based film substrates
- **Pinhole free** (typical flexible packaging film gauge)
- **Non-hygroscopic** nature



SEM cross section:
AlOx coated PET film + post conversion layers

Paper-based substrates – Challenges

- Surface **roughness** (smoothness variations)
- **Porous** nature (& **poor barrier**)
- **Hygroscopic** nature (variability in moisture content & outgassing)
- **Shrinkage/expansion** before and after metallization due to moisture variation

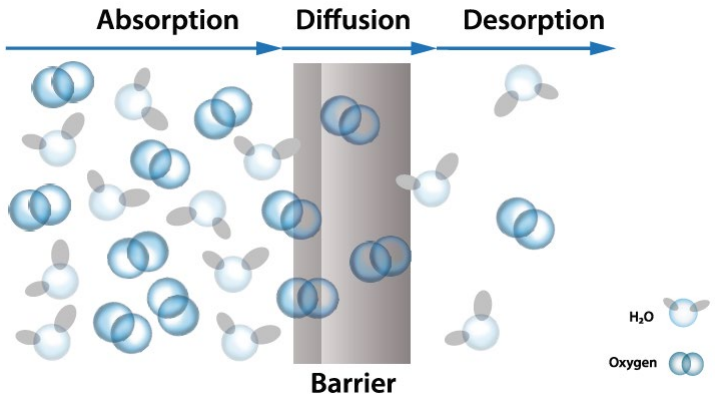


SEM cross section:
Coated paper (image courtesy of UPM)

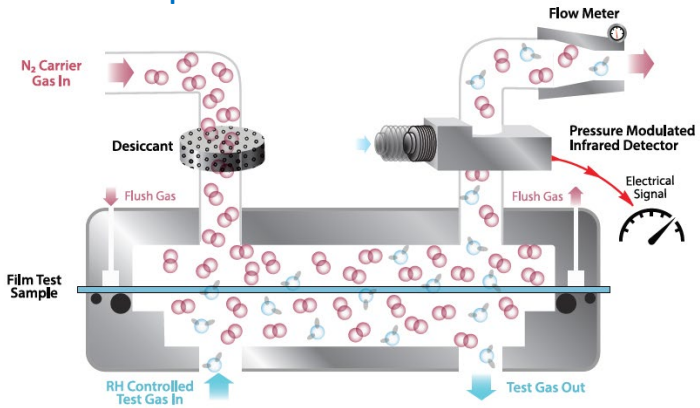
*Slide courtesy of Carolin.Struller@bobst.com

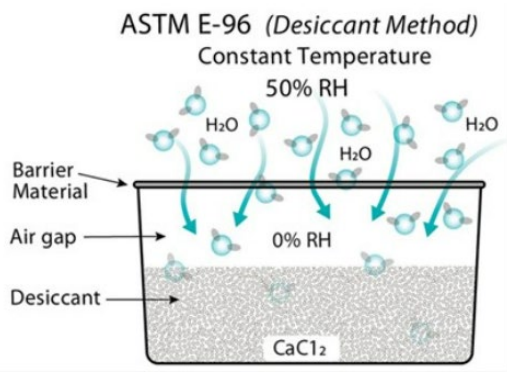
Permeation Challenges

- Porosity / Cracks with coatings on papers – may need alternative test methods

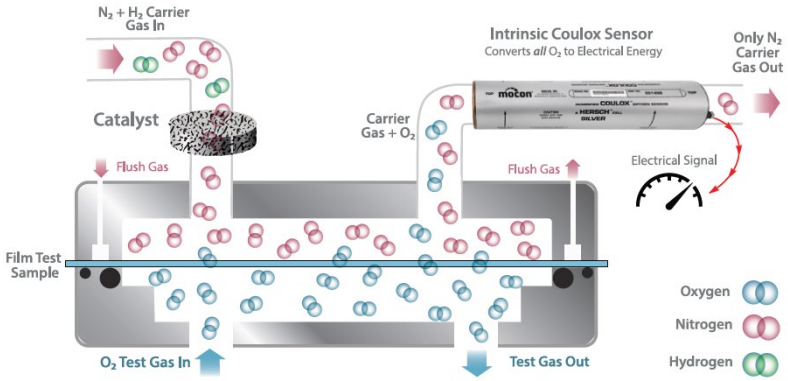


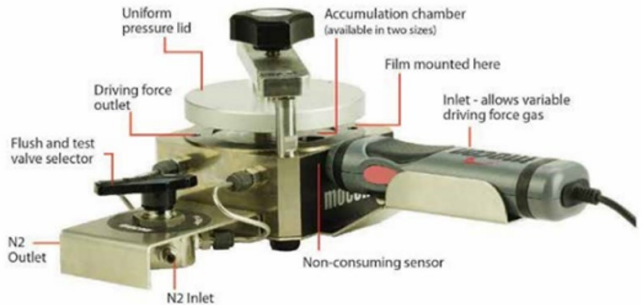
Water Vapor Transmission Rate – ASTM F1249

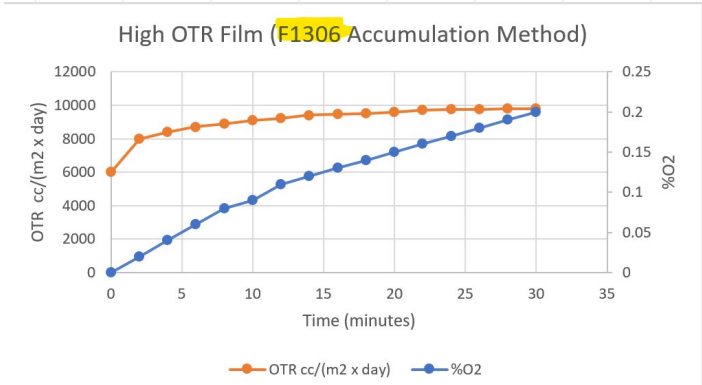




Oxygen Transmission Rate - ASTM D3985 and F2622



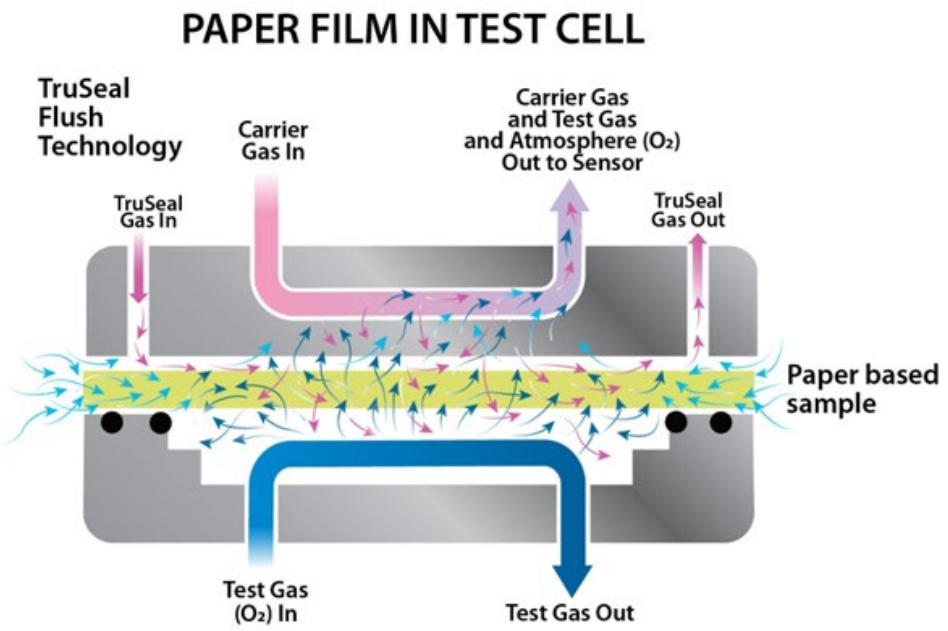




Permeation Challenges

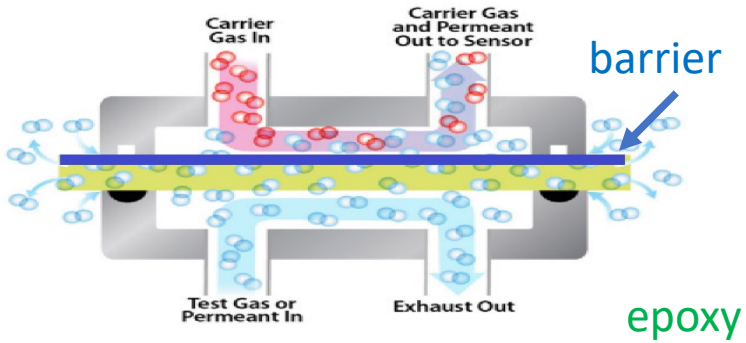
- Porosity with coatings on papers – may need alternative film preparation methods

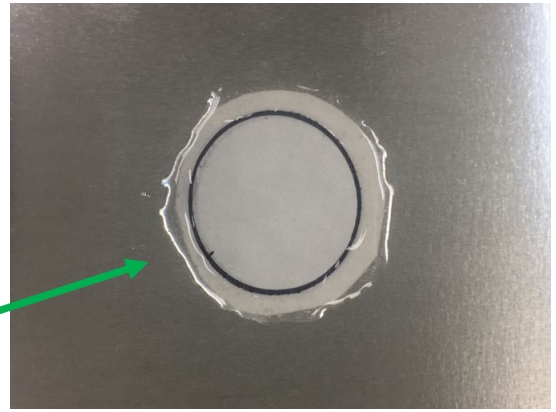
"Edge Effect" can occur with papers and porous layers / sealants

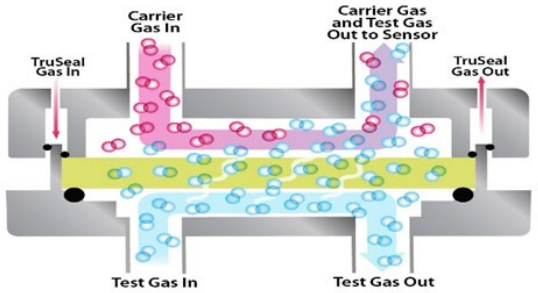


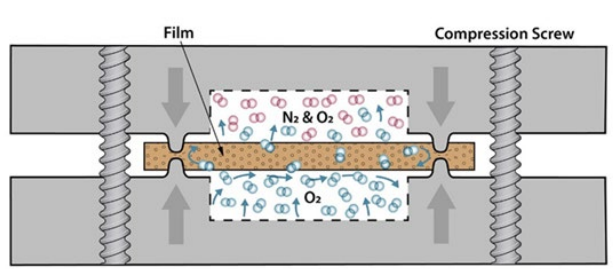
For best results:

- Orientate "barrier to the carrier"
- Utilize additional sample prep methods that minimize edge permeation (encapsulate edge and mechanically seal edges)









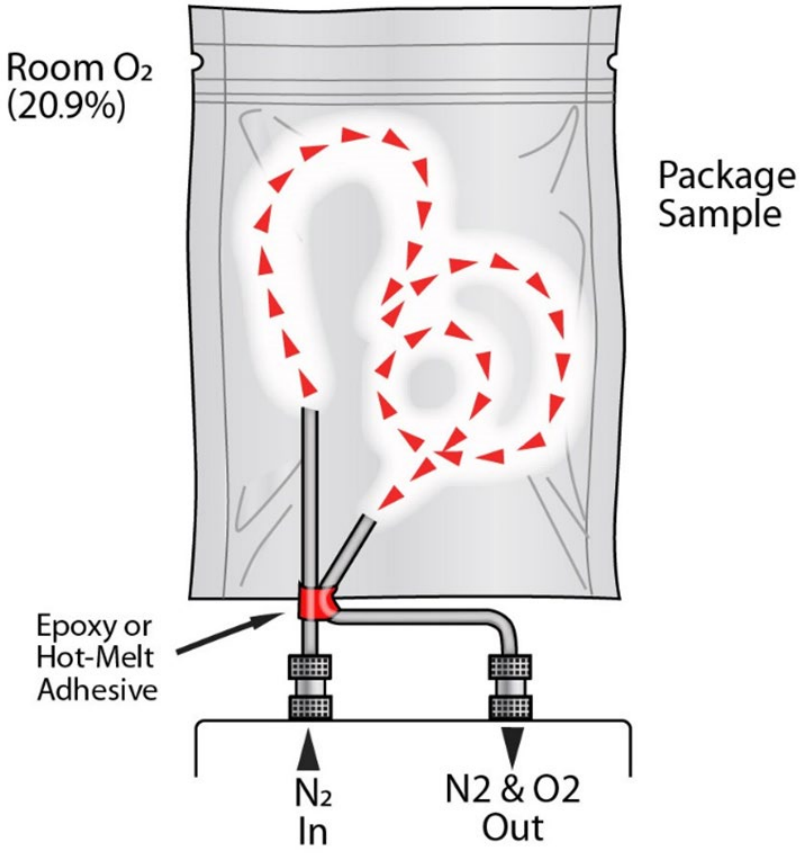
Edge Effect and Compression Cartridges*

*MOCON Patented

Permeation Challenges

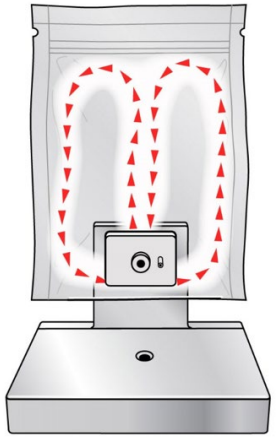
- Full Pouch Testing– may need alternative mounting methods

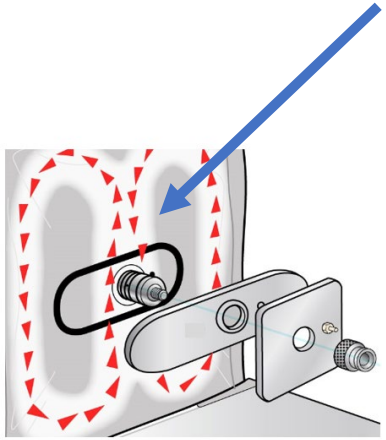
ASTM F1307 – OTR Package



If the exterior surface of the pouch is paper, water vapor and oxygen can migrate *under the epoxy*.

Need to ensure good Interior seal





Mechanical method for sealing against the interior pouch face

As a world leading permeation lab, we support hundreds of companies with their sustainable packaging initiatives.

Thank You,

Joel Fischer
MOCON Laboratory Manager