



WPA Meeting: Barrier Packaging

Tom Guerin: Guerin-T Packaging

Francesco Barbangelo: Taghleef Inds

Chris Cometa: Charter-NEX

AGENDA

- ***Tom: Barrier Markets, Shelf Life Testing***
- ***Francesco: OPP Barriers, Challenges and Solutions***
- ***Chris: Film Recycling and Barriers in Stand-Up Pouch Packaging***
- ***Questions***



HIGH BARRIER FILM MARKET

GLOBAL DEMAND FOR HIGH BARRIER FLEXIBLE FILMS FOR FOOD PACKAGING 2010-2020

source: AMI CONSULTING

					Growth rates
(K ton)	2010	2015	2016	2020	2015-2020
Metallized	287.0	419.0	454.1	633.7	8.6 %
EVOH	539.9	707.0	745.3	930.5	5.6 %
PVdC	252.0	270.6	273.7	285.9	1.1 %
AlOx/SiOx	14.4	17.9	18.7	22.2	4.4 %
Other	6.1	8.1	8.6	10.4	5.3 %
TOTAL	1099.3	1422.6	1500.4	1882.9	5.8 %

- ❑ **New market Opportunity**: Global demand for high barrier food packaging film is increasing.

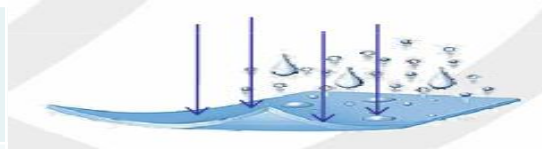


Raw Substrate Variability by Aspect

WATER BARRIER

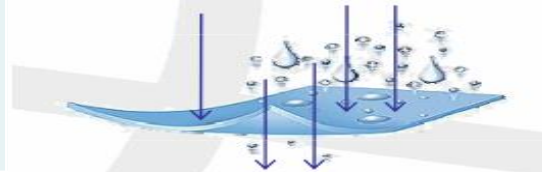
g/100in²/day

BOPP (100 Ga)



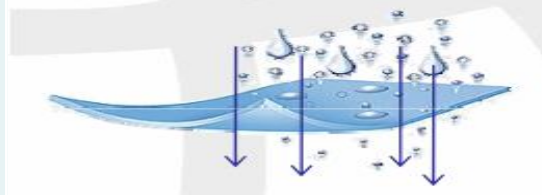
0.3

Polyethylene (1.0 Mil LDPE)



1.4

Polyester (48 Ga)



2.9

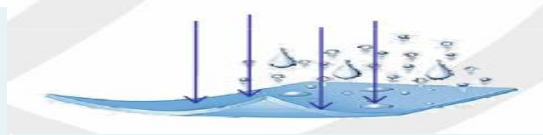


Raw Substrate Variability by Aspect

OXYGEN BARRIER

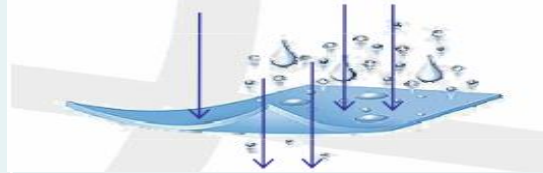
cc/100in²/day

Polyester (48 Ga)



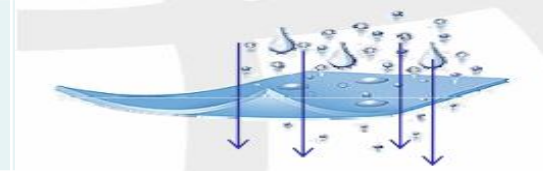
< 12

BOPP (100 Ga)



100

Polyethylene (1.0 Mil LDPE)



550

Choosing the Right Barrier

❑ **Produce**

- High Water Barrier
- Low Oxygen Barrier
 - OPP / PE Film Structure

❑ **Dried Fruit / Nuts / Snacks / Liquids**

- Enhanced Barrier Properties
Required



Choosing the Right Barrier

Perform Shelf Life Testing

- Use the Opportunity to Build the Relationship
- Opportunity for Converter and Brand Owner to Work Together to Maximize Product Life
- Brand Owners and Customers will be the SL Arbiters
- Establish a Testing Protocol;
 - Existing – Relatively Easy to Verify Barrier Numbers
 - New – Choose Starting Pt Based on Product Pkg History
 - ie ... for nut packaging .20 OTR / .20 WVTR
 - Package Enough Product to test every couple weeks for 12 - 40 weeks.
- BO / Conv Conversation Regarding Next Steps



HIGH BARRIER FILM MARKET: Requirements

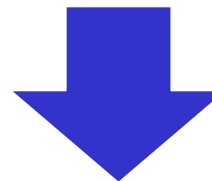


Taghleef Industries

Primary Requests from End users/Brand owners :

Natural, fresh products without added preservatives

- Oxygen** plays a major role in sustaining food's appearance
- Moisture** can lead to rapid spoilage or mold
- Overexposure to **light** can cause deterioration of nutritional content and appearance
- Migration of **mineral oil** components from the cardboard packaging materials into various foodstuffs
- product flavor and **aroma retention**



EXTENDED SHELF LIFE



HIGH BARRIER FILM

Driving Forces



Taghleef Industries

✓ Marketing

- **Product Visibility**
- **Consumer Appeal**
- **Product Identification**

✓ Manufacturing

- **Consistency & resistance to handling/converting**
- **Product Inspection**
 - *Visual*
 - *Metal inspection*

✓ Technologies

- **AlOx**
- **Al Metallized**
- **Al Foil**
- **Surface Coating**



HIGH BARRIER is a MEGATREND

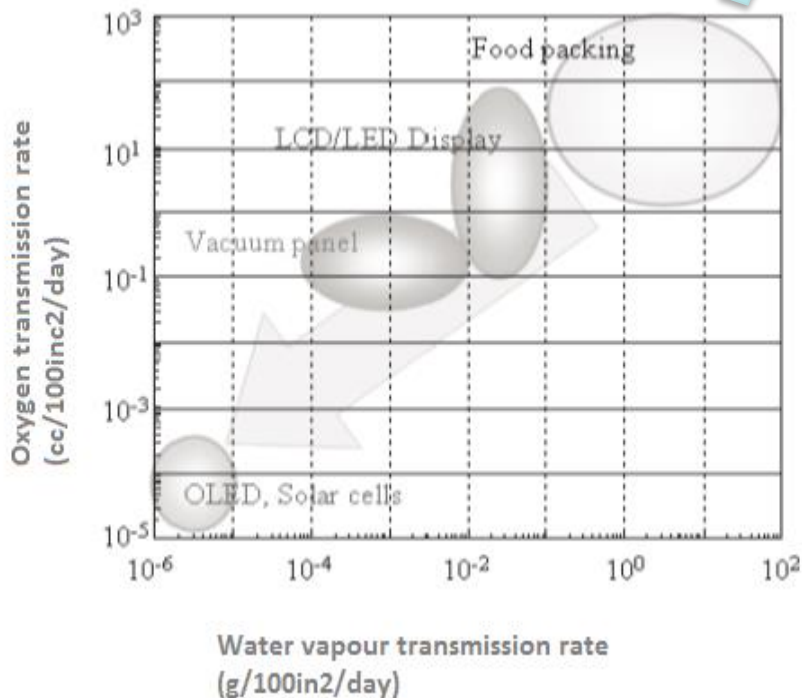


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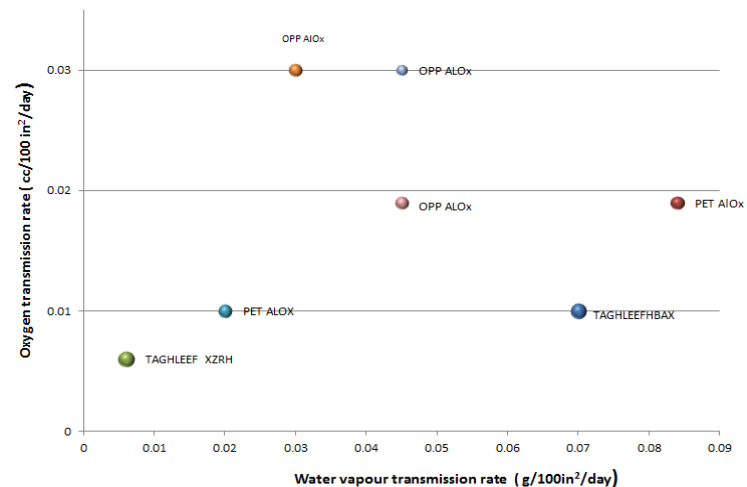
It's for more than just food there :



There are a plethora of non-food products that are being affected by environmental factors just as much as food – and their packaging is changing as a result. Barrier has to be customized.



Food packaging



BUILDING THE BARRIER



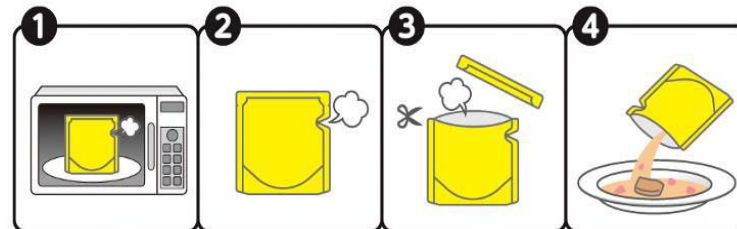
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- **Metallized Film:** Market is driven by availability of the technology, relative cost, and growth in snack food



- **AlOx Coated Film:** Market is driven by product visibility, microwave-ability and easier metal detection



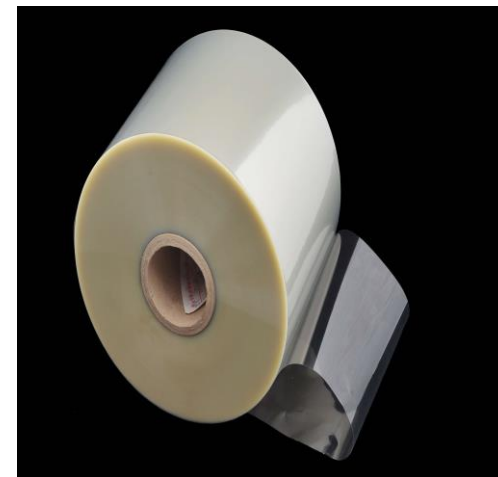
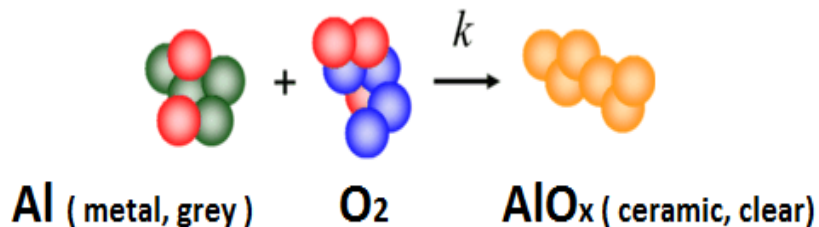
✓ Vacuum Aluminum metallizing

process: Aluminum is melted @ 2730° F and forms a vapor cloud above the boat. As the substrate passes over this active area a thin Al layer is deposited onto the film.



✓ Reactive AlOx evaporation

process: Aluminum oxide is formed upon chemical reaction between Al and oxygen inside the chamber.

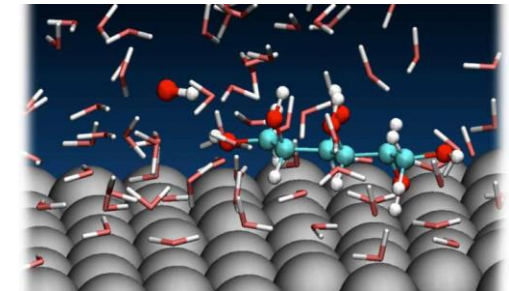


CHALLENGE & SOLUTION (AI)



Taghleef Industries

- ✓ AI is easily removed after handling/converting, barrier decrease
- ✓ Substrate chemistry influences AI deposition and barrier performance



Category	Film Type	WVTR g/100in ²	O2TR cc/100in ²
AI BOPP	MT	0.01	< 6
AI Extendo®	HMT	0.006	0.95
	ZUA	0.006	0.6
Metallized- High energy polymer OPP	HZRH	0.006	0.006

TAGHLEEF Metallized -High energy polymer:

- ☐ Outstanding water, oxygen , aroma and mineral oil barrier



CHALLENGES & SOLUTIONS (Clear barrier)



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AIOx layer can be damaged upon two mechanisms:

- ✓ Elongation: Standard AIOx loses barrier above 1% elongation
- ✓ Abrasion: Direct contact with guide rollers resulting in scratches, i.e. loss of barrier.




Category	Film Type	WVTR g/100in ²	O2TR cc/100in ²
OPP Clear barrier	UHX	0.2	0.2
	HBTX	0.16	N/A
	HBAX	0.06	0.006



CHALLENGES & SOLUTIONS (Clear barrier)



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SUBSTRATE	BARRIER VALUE		BARRIER VALUE after 10x Gelbo		Post Gelbo % barrier variation	
	WVTR g/100in ²	OTR cc/100in ²	WVTR g/100in ²	OTR cc/100in ²	WVTR	OTR
EXTENDO® HBAX	0.11	0.02	0.12	0.03	13	8
Film A	0.06	0.03	0.08	0.67	23	96
Film B	0.10	0.03	0.13	0.14	23	79

TAGHLEEF EXTENDO® HBAX

- ❑ Outstanding and durable barrier retention through processing and handling, **HBAX can stand the abuse.**



Right chemistry for the right solution



- ✓ **Surface** A substrate surface should be smooth with preferred chemical entities, surface characteristics dominate coating nucleation.



- ✓ **Coating** One way of further enhancing the barrier properties of ceramic coated films (e.g. AlOx) is to deposit an additional organic topcoat onto the AlOx layer.

