OPP Films

A Truly Flexible Alternative

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AET Films

Substrates – What are my Options?

- **Porous**
  - **Board Stock**
  - **Paper**
- **Non-Porous**
  - **Foils**
  - **Films**

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Flexible Substrates – Paper vs. Films

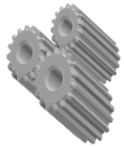
	Paper	Films
Ink receptive	★	⚙
Heat resistance	★	⚙
Shelf Appeal		★
Water Resistance		★
Barrier Properties		★

Film Substrates

- Polyethylene (PE)
- Polyester (PET)
- Oriented Polypropylene (OPP)

Film Substrates

	PE	PET	OPP
Ease to Print		★	★
Heat resistance		★	
Shelf Appeal			★
Water Resistance			★
Barrier Properties		★	★



Film Substrates – Typical Applications

- **PE**
  - Inside sealant webs
- **PET**
  - Medical & Food Packages (Pouches)
  - Capacitor Films
  - Industrial and other applications (Balloons, etc.)
- **OPP**
  - Food Packages
  - Overwrapping and Bundling
  - Container Decoration (Labeling)

Why OPP? – Why PET?

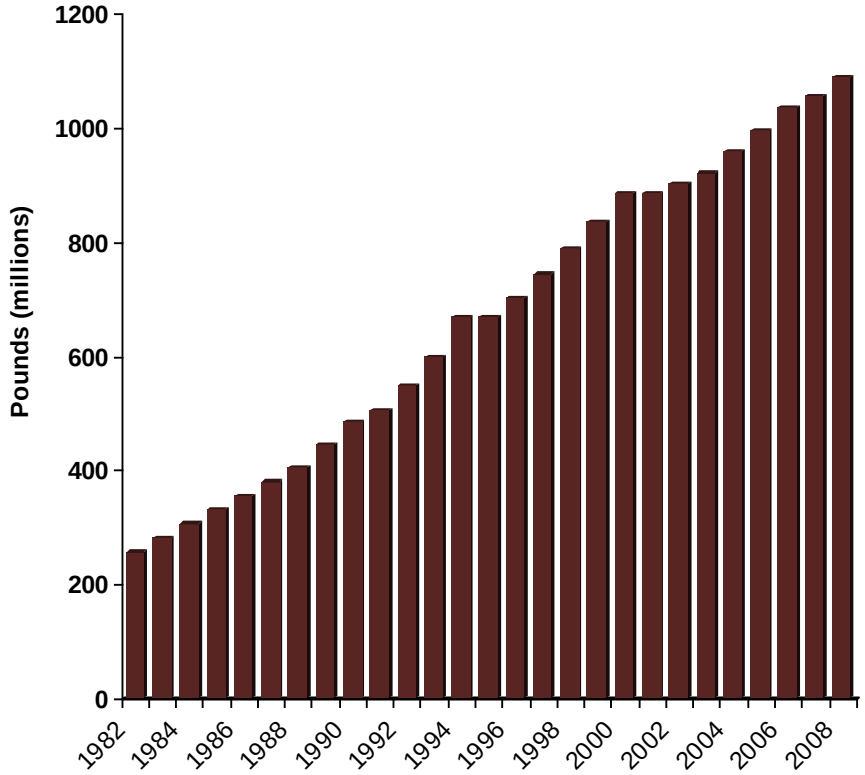
	PET	OPP
Density (g/cc)	1.4	0.905
Yield (sq in/lb)	19,800	30,600
Oxygen TR (1)	5	110
Water Vapor TR (2)	1.3	0.3
Melting Point (F deg)	475	320
Haze (%)	4	3

(100 ga. Films)

(1) cc/100 sq in/24 hr @ 77 deg. F / 0% RH

(2) cc/100 sq in/24 hr @ 100 deg. F / 90% RH

OPP Film Industry – North America



Historically driven by:

1. Growth of consumer products
2. Substitution

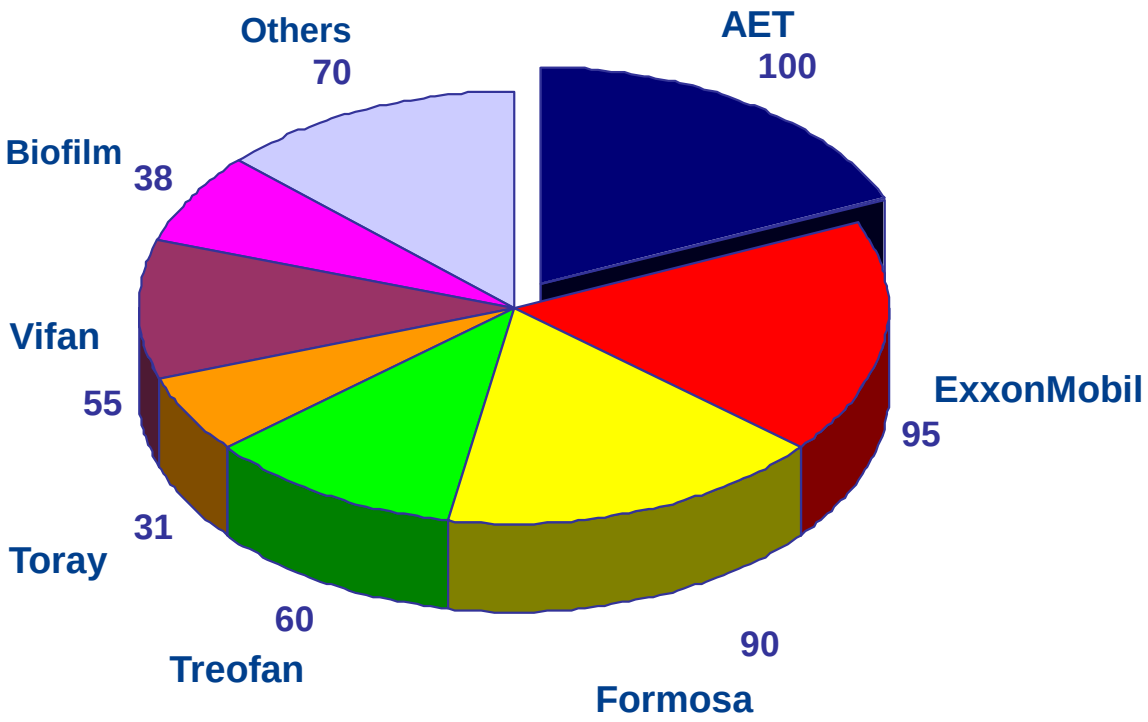
   Cellophane / Polyester /Paper
3. Lower density provides greater coverage and lower barrier at lower cost

Historical growth rate – 6%

Forward growth rate – 2-3%

OPP Film Industry – North America

North American Capacity



Capacity: 539,000 mt (Est.) – 2Q 2009

OPP Film Industry – North America

Raw Materials

- **100% of the mass of OPP Film comes from PP Resin**
  - There are no other materials in the composition
  - Think of Aluminum Foil
- **100% of PP Resin comes from NGL or Crude Oil**
  - There are alternative values and uses for these molecules
- **PP Resin is a HUGE market dominated by Multi-national Petrochemical Companies**
  - ExxonMobil, Basell, Dow, etc.
- **Film Resin Segment is only a small segment of the North American Market**

OPP Films - Markets

- AET Portfolio includes more than 80 products
- Key Markets

  Label – beverage, consumer goods

  Snack Foods – salty snacks, nuts, popcorn, etc.

  Candy & Confectionary – chocolate, granola & health bars,

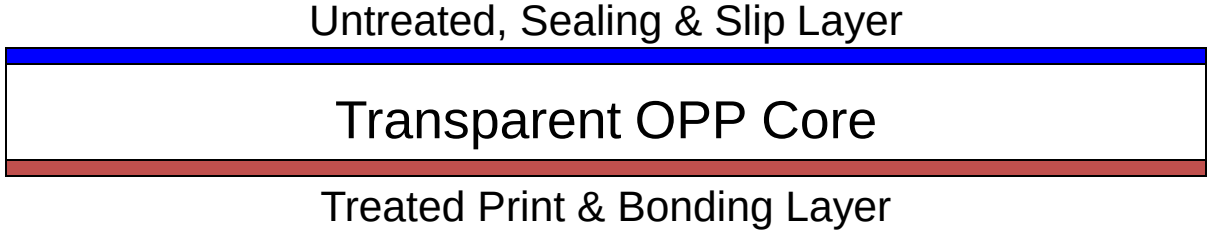
  Overwrap/other Food – cheese, condiments, tobacco, media, tea

  Industrial – tape, construction, wire & cable

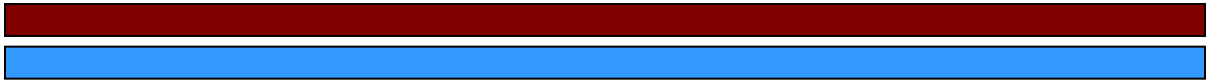
Typical Structures

Metalized Barrier - Salty Snack (VFFS) or Cigars (C-100)

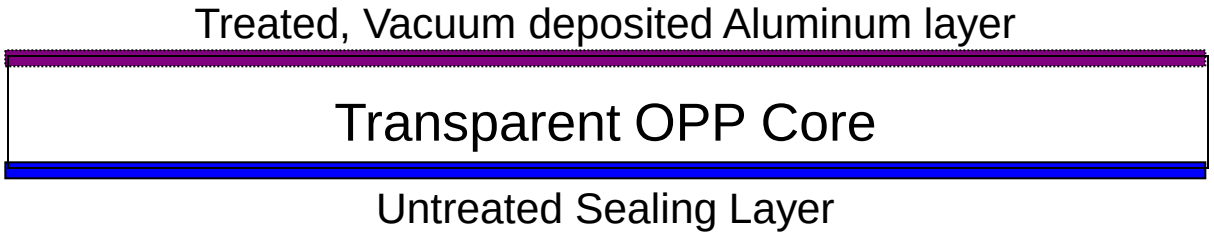
70 PST-2



Ink
Adhesive



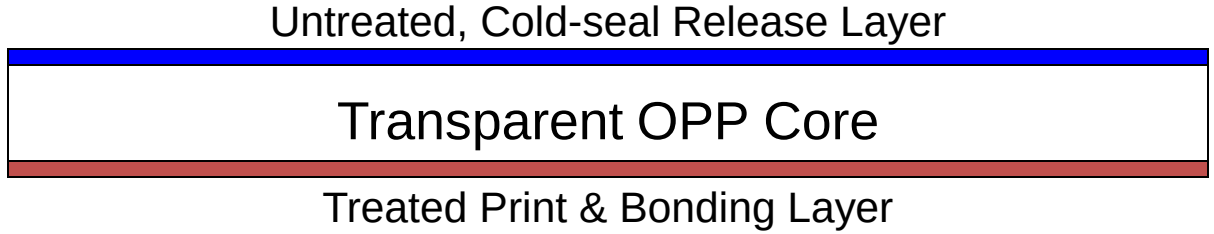
70 MT



Typical Structures

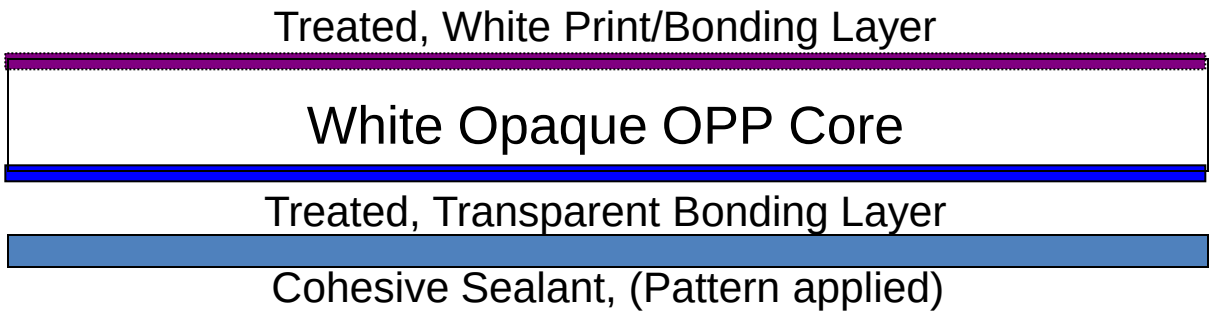
Cold Seal – Chocolate Bar or Granola Bar (HFFS with cohesive)

60 or 75 RLS



Ink
Adhesive

400 WT503/2B



Summary

- **Understanding Flexible Substrates is Vital**
  - Life beyond Paper
  - Broader market reach demands broader substrate use
- **Non-porous Substrate Converting Implications**
  - Equipment and Technique
  - Product Design and Substrate Selection
- **Supplier Portfolio**
  - Solid suppliers are a valuable resource