Opportunities and Challenges in Developing Greener Materials

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November 6, 2019
Agenda

1. About 3M and 3M’s Journey into Graphic Films
2. Overview of Graphics Materials
3. Defining Sustainability
4. Challenges and Opportunities
About 3M
3M at a glance

- Founded in 1902
- Sales in nearly every country
- $32.8 billion in sales
- Four business groups
- 90,000 3Mers globally
- 117,000 patents
- 100+ straight years of dividends
- One of 30 companies on the Dow Jones Industrial Index
- Pollution Prevention Pays program began in 1975
3M’s journey into the wide format graphics industry

1902

1930

1950

1970
Overview of Traditional Graphic Films
Applications of traditional Graphic Films

- Signage
- Trailers
- Color Change Wrap
- Print Wrap
- Rail
- Electrocut Graphics
- Watercraft
Traditional Manufacturing Processes for PVC Films

Cast PVC Films

- Liquid Mixture
- Carrier Web
- Oven
- Windup

Calendered PVC Films

- Mixer
- Heated Calender Rolls
Anatomy of a traditional Printed Graphic Film

Overlaminate

Clear Protective Film
Adhesive
Release Liner

Print Media

Printable (White) Graphic Film
Adhesive
Release Liner
Anatomy of a traditional Printed Graphic Film

- **Overlaminate**
  - Clear Protective Film
  - Adhesive
  - Release Liner

- **Print Media**
  - Printable (White) Graphic Film
  - Adhesive
  - Release Liner

- **Finished Graphic**
  - Clear Protective Film
  - Adhesive
  - Printable (White) Graphic Film
  - Adhesive

- **Substrate**
Anatomy of a traditional Printed Graphic Film

- Provides Durability and Ink Protection
- May add aesthetic quality to the Graphic
- Contributes to Flexibility or Rigidity of Graphic

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- Contributes to Flexibility or Rigidity of Graphic
- Ensures Graphic Adheres to Substrate
- May contain features to ease installation
- Determines Ease of Removal at end of life
Defining Sustainability
Sustainability

Definition:

“Meeting the needs of the present without compromising the ability of future generations to meet their own needs.”


**Environmental**: Renewable Resource Harvest, Pollution Creation, and Non-renewable Resource depletion that can be sustained indefinitely.

**Social**: Includes Impacts to Health, Community, Human Rights, Social Responsibility, Culture, Adaptation.

**Economic**: Supporting long term economic growth without compromising Environmental and Social Sustainability.
Considerations in *more* Sustainable Product Development

Figure 1. Sustainability Attributes of Products

- Resource Base
- Life Cycle Impacts and benefits
- Technical performance – fit for purpose
- Human and ecological toxicity
- Attributes of more Sustainable product
- Total costs and life cycle costs
- Socio-economic impacts and benefits

Emphasis affected by:
- Strategy
- Product system
- Data availability
- Ability to influence
- Stakeholder expectations
- Competitive factors
- Origin of materials and location of manufacturing...

Source: https://www.greenbiz.com/article/what-makes-sustainable-product-0
Alternatives to traditional Graphic Films

**Printable Fabrics**
- Reusable
- Quick change out
- Recycled and recyclable options

**Direct to Substrate**
- Fewer materials – no film layer
- May be recyclable (cardboard)
- Less solvent in UV inks

**Digital Displays**
- Infinite messaging options
- Interactive medium

**Pros**
- Often PVC coated
- Framing system
- Transportation
- Outdoor durability

**Cons**
- Durability
- Requires new printer
- Permanent
- Substrates often plastic

- Limited applications
- Manufacturing process/inputs
- Energy source/consumption
- End of life disposal “e-waste”
More “Sustainable” traditional Graphic Films

* Non-PVC
* Phthalate free
* Bio-based inputs

* Recycled inputs
* Reusable Packaging

* Easier to Install
* Fewer Inputs

* Less Energy to Operate Facilities
* Less Solvent in Manufacturing
* Solvent Free Manufacturing

* More Durable, Longer Lasting

* End of Life – Waste to Energy
* Recyclable Products
Challenges and Opportunities
Obstacles to *More* Sustainable Graphic Films

• Materials and Technology
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• Volume and Cost Structure
Obstacles to *More* Sustainable Graphic Films

- Materials and Technology
- Volume and Cost Structure
- End of Life Supply Chain
Obstacles to More Sustainable Graphic Films

• Materials and Technology

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• End of Life Supply Chain

• Adoption and Switching Cost
Opportunities

• Understand your customers’ needs and sustainability objectives
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• Collaboration up and down the supply chain to enable capability
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• Education
Thank You