Contents

1. Construction of the Pressure Sensitive Label

2. Components of the Pressure Sensitive Label
   - Liners
   - Release Systems
   - Facestock
   - Adhesives

3. Selecting Pressure Sensitive Stock

4. Questions that need to be asked

5. The Global Venture Process
Chapter 1

1. Construction of the Pressure Sensitive Label
   Paper Making Process
   Parts of the Label
Paper Making Process - Simplified

- Removal of bark
- Chipping
- Pulp Production by adding chemicals
- Drying & Roller Press Process

Timber
Building a Laminate

- Start with a release liner
Applying Adhesive

- Apply Adhesive to Release Coated Liner

At The Back End

<table>
<thead>
<tr>
<th>Adhesive</th>
</tr>
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<tbody>
<tr>
<td>Release Coating</td>
</tr>
<tr>
<td>Release Liner</td>
</tr>
</tbody>
</table>
Why is adhesive coated on the liner?

- Minimize heat exposure to Facestock
- Reduces the web path that the facestock has to travel
- Improve consistency of adhesive / release bond
- Industry norm to transfer coat adhesive
Top Coat & Primer Coating

At The Front End

Topcoat or Print Receptive Coating

Facestock

Primer or Barrier Coating
Typical Coater

Silicone Coating Section
Liner Supply
Adhesive Coating Section
Completed Construction
Facestock
Top Coating Primer Coating

Dryer
Dryer
Moisturizer
Treater
Dryer
The Finished Pressure Sensitive Label

- Top Coat or Print Receptive Coating
- Facestock
- Primer or Barrier Coating
- Adhesive
- Release Coating
- Release Liner
Chapter 2

Components of the Pressure Sensitive Label

- Liners
- Release Systems
- Facestock
- Adhesives
Liner Requirements

- **Smooth**
  - Fiber & Contaminant Free
  - Consistent (Web is flat)

- **Robust**
  - Distortion Free (Curl)
  - Minimum Elongation
  - High Heat Resistance
  - High Tear Strength

- **Functional**
  - Good Release Coverage & Anchorage
  - Economical
  - Static Resistance
  - Die-Cut Resistance
  - Dimensionally Stable
  - Consistent Caliper

#1 Factor in Determining Release of Product
Liner Choices

- Natural or Brown Kraft (NK or BK)
- Super Calendered Kraft (SCK)
- Polycoated Kraft (44 PP or 44 PK)
- Glassine
- Polyester (PET)
- Specialty
<table>
<thead>
<tr>
<th>Properties</th>
<th>SCK Densified Kraft</th>
<th>Glassine</th>
<th>Polycoated Kraft (44 PP)</th>
<th>PET</th>
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<tbody>
<tr>
<td>Surface Smoothness</td>
<td>Fair</td>
<td>Very Good</td>
<td>Good</td>
<td>Excellent</td>
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<tr>
<td>Die Cut Resistance</td>
<td>Fair (Nicks)</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td>Moisture Curl Control</td>
<td>Fair</td>
<td>Poor to Fair</td>
<td>Poor</td>
<td>Excellent</td>
</tr>
<tr>
<td>Label Dispensing</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
<td>Excellent</td>
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<tr>
<td>Elongation</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>Heat Resistance</td>
<td>Very Good</td>
<td>Very Good</td>
<td>Good</td>
<td>Excellent</td>
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<td>Silicone Wet-Out</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Fair</td>
<td>Fair</td>
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<tr>
<td>Registration</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
<td>Fair</td>
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<tr>
<td>Static</td>
<td>Good</td>
<td>Good</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>Cost</td>
<td>Excellent</td>
<td>Good</td>
<td>Very Good</td>
<td>Fair</td>
</tr>
</tbody>
</table>
Specialty Liner Choices

- Machine Finish / Machine Calendered
  - Very “open” sheet – Good Lay Flat Qualities
- Coated 2-Side / White Kraft
  - Good Lay Flat & Printability
- Poly Kraft
  - Lay Flat & Rigidity for Films
Release Systems

- Silicone: Most common P/S system
- Quilon: Used in over laminating tapes, self-wound applications, and release coatings on the back side of the liner.
- Specific Designs (adhesive, release range, end use requirements)
Release Systems

High speed dispensing requires low Initiation and average release

Conformable face stocks such as Films need low release values

Hand application, multi-step Converting, and piggy back Construction tend to have higher Release values
Facestock Types

- Papers
- Laminated Foil / Metalized Papers
- Films
- Special Composites or Blends
Cellulose Fiber: **Basic Building Block**

- **Fillers:** Clay, TiO2, Silica, CaCO3
  - Increase Stiffness
  - Affects Porosity and Absorbency
  - Increases Brightness and Opacity

- **Surface Sizings/Coatings:** Starches, Binders
  - Improves Strength
  - Affects Wettability
  - Affects Holdout and Absorbency
  - Improves Smoothness
Laminated Foil / Metalized Papers Facestock

- Paper facestock base
  - Additional coatings applied to face and back side
    - Provides additional smoothness for less distortion of foil / metalization
- Thin foil laminated to face or aluminum applied via vaporization in vacuum
- Acrylic top coat to supply an adequate print surface
Film Facestock Ingredients

- **Monomer**: Basic Building Block typically derived from petroleum
  - Strength (Back-Bone)
  - Basic Properties of Film

- **Filler**: Clay, TiO$_2$, Silica, CaCO$_3$
  - Increase Stiffness, Brittleness, and Opacity
  - Affects Porosity, Gloss, and Absorbency

- **Coatings**, Co extrusion Layers (**Topcoats**, **Primers**, **Skin Layers**, **Tie Layers**)
  - Increase Wettability (Surface Energy)
  - Improves Smoothness
Special Composites or Blends Facestock

- Saturated Papers
  - Saturated with latex to improve strength and moisture resistance
- Synthetic Papers
  - Films that print or function like paper with film durability
- Multi-film/paper laminates
  - Paper/film/paper provides tear-resistance
Pressure Sensitive Adhesives

- Basic Building-Blocks
- Types Available
  - Rubber / Acrylic
- How They Get Coated
  - Solvent / Hot Melt / Emulsion
- How They Function
  - Permanent / Removable / Application
Basic Adhesive Components

- Polymers Elastomers
  - Backbone: What Gives it Strength
- Tackifying Resins
  - What makes it sticky
- Mineral Oil
  - Keeps it from Drying out
Practical Aspect of Adhesives

- Polymers (Rubber or Acrylic)
- Additives
  - Antioxidants (Shelf Life)
  - Plasticizers (Wet Out & Flexibility)
  - Surfactants (Coatability)
- Tackifiers (Bonding Strength)
- Dispersing Agents (gets it all together)
  - The oil & solvents
Backbone Alternatives for Adhesives

- Natural Rubbers
- Synthetic Rubbers
  - Styrene-Butadiene
  - Styrene-Isoprene
- Acrylic Polymers
  - Ethylhexyl Acrylate
  - Butyl Acrylate
Rubber Adhesives Pro’s / Con’s

**STRENGTHS**
- Economical
- Good Availability
- Good Quick Stick
- Good Moisture Resistance
- Well Established

**WEAKNESSES**
- Amber in Color
- Degrades When Exposed to UV Light
- Shorter Shelf Life
- Poor Solvent Resistance
- Narrower Temperature Range
Acrylic Adhesives Pro’s / Con’s

**STRENGTHS**
- Good UV Resistance
- Broad Temperature Performance
- Good Stripping Qualities
- Clear in Color
- Longer Shelf Life

**WEAKNESSES**
- Generally More Expensive than RB
- May Require Tackifiers
- May Turn White When Exposed to Moisture
# Adhesive Properties

<table>
<thead>
<tr>
<th>PROPERTIES</th>
<th>Rubber Based</th>
<th>Acrylic</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV Stability</td>
<td>Poor – Fair</td>
<td>Good - Excellent</td>
</tr>
<tr>
<td>Aging Stability</td>
<td>Fair - Good</td>
<td>Good - Excellent</td>
</tr>
<tr>
<td>Die Cutting</td>
<td>Fair - Good</td>
<td>Good - Excellent</td>
</tr>
<tr>
<td>Wide Web Converting</td>
<td>Fair - Good</td>
<td>Good - Excellent</td>
</tr>
<tr>
<td>Initial Adhesion</td>
<td>Medium - High</td>
<td>Low - Medium</td>
</tr>
<tr>
<td>Ult. Adhesion</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Quick-Tack</td>
<td>Medium - High</td>
<td>Low - Medium</td>
</tr>
<tr>
<td>Cohesive Strength</td>
<td>Fair - Good</td>
<td>Good - Excellent</td>
</tr>
<tr>
<td>Clarity</td>
<td>Poor - Fair</td>
<td>Good - Excellent</td>
</tr>
</tbody>
</table>

*Please note these are generalities, there is an extremely wide ranges of performance in rubber and acrylic adhesives.*
Adhesive Usage

Acrylic Vs. Rubber

ACRYLIC 69%

RUBBER 31%
Coating Method for Adhesives

1. SOLVENT
2. EMULSION
3. HOT MELT
Solvent Adhesive Advantages / Disadvantages

**ADVANTAGES**
- Allows Crosslinking for Strength
- High Temperature Resistance
- Good Water Resistance
- Well Established

**DISADVANTAGES**
- EPA Regulations
- Residual Solvents
- Potential Poor Solvent Resistance
- Rubber-Based are Amber Colored
- Potentially Dangerous
- High Cost
Emulsion Adhesive
Advantages / Disadvantages

EMULSION

ADVANTAGES
- Few EPA Concerns
- Excellent Converting
- Broad Temperature Range
- Good Clarity
- Many Formulations

DISADVANTAGES
- Initially Less Aggressive
- Limited Water Resistance
- Tackifiers needed for Quick Tack
- Moderate Cost
Hot Melt Adhesive
Advantages / Disadvantages

**ADVANTAGES**
- Few EPA Concerns
- High Quick Tack
- Economical
- Normally Good Adhesion to Most Plastics

**DISADVANTAGES**
- Poor Temperature Resistance
- Limited Adhesive Performance Range
- Fair Converting
- Amber Color if Rubber-Based
# Coating Method Comparisons

<table>
<thead>
<tr>
<th></th>
<th>Solvent</th>
<th>Emulsion</th>
<th>Hot Melt</th>
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<tbody>
<tr>
<td><strong>Formulating Latitude</strong></td>
<td>Excellent</td>
<td>Good</td>
<td>Limited</td>
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<tr>
<td><strong>Raw Material Cost</strong></td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Process Control</strong></td>
<td>Excellent</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Raw Label Converting</strong></td>
<td>Good</td>
<td>Good</td>
<td>Fair – Good</td>
</tr>
<tr>
<td><strong>Environmental Impact</strong></td>
<td>Poor</td>
<td>Good</td>
<td>Good</td>
</tr>
</tbody>
</table>
Basic Adhesive Performance

- Intended for Life-Cycle of end-use product. The adhesive is characterized by a relatively high ultimate adhesion to a wide variety of surfaces.
- Open Time: How long before it becomes permanent.
- Repositionability: How long you can remove and re-apply.
- Tamper Evident: Either facestock distorts or leaves adhesive residue (evidence).

- Intended for applications requiring removal of the label intact.
- No residue or ghosting when removed.
- Short expected life-cycle.
- The adhesive is characterized by low ultimate adhesion.
Adhesive Categories

- Cold Temperature Freezer
- Pharmaceutical
- Specialty
- All Temperature
- High Tack
- General Purpose
General Purpose & Cold Temperature Adhesives Applications

**General Purpose**
- Designed for Ordinary Applications
- Good Converting
- “House” Adhesive
- Balances Price Vs. Performance

**Cold Temperature (Freezer)**
- Applications Below 40° F
- Formulated for Adhesion at Low Temperatures
- Maintain Tack at Low Temperatures
- Tends to soften with Temperature rise
All Temperature & High Tack Adhesives Applications

- Designed to Cover Normal to Freezer Applications
- Descent Converting
- Sometimes the “House” Adhesive
- Higher Price for Wider Performance

HIGH TACK

- Soft Adhesive / Easy Flowing
- Heavy Coat Weight
- Ooze Converting / Shipping / Storage Issues

ALL TEMPERATURE
Chapter 3

Selecting Pressure Sensitive Stock
Considerations
Label Converters Criteria
Selecting a Pressure Sensitive Stock

What Type of Pressure Sensitive Laminate Do I Need?
Selecting a Pressure Sensitive Stock

**EDP VIP**
- Primary Consideration: Face
- Secondary Consideration: Liner
- Tertiary Consideration: Adhesive

Note: Different Markets have Different Drivers

**PRIME LABEL**
- Primary Consideration: Face
- Secondary Consideration: Adhesive
- Tertiary Consideration: Liner

**GENERAL LABELING**
- Primary Consideration: Liner
- Secondary Consideration: Adhesive
- Tertiary Consideration: Face
Label Converters Criteria

Finding the Sweet Spot

THE COMPROMISE

AESTHETICS

PRICE

FUNCTION & PERFORMANCE
Chapter 4

Questions that need to be asked
The Right Questions

- Describe the Application
- Is this a new application?
- Any previous problems with the application?
- Have samples of past or current labels?
- What does final label need to look like?
- What is the substrate - material, texture, shape?
- What is the expected label lifetime?
- Does the label need to be permanent or removable?
- What are the application conditions?
- How is the label applied?
- How will the labels be stored and how long?
- What should they cost?
- Any regulatory or OEM specs that apply?
- What are the typical order sizes and estimated yearly volume?
- What is inside the package to be labeled (possible migration issues)?
- How will the labels be supplied - rolls or sheets?
- Will the end-user be doing any printing - TT, Laser printer, etc.?
- Any demanding end-use conditions or operations - sheet fed printer, auto insert, closure label, etc.?
Chapter 5

The Global Venture Process
The Global Venture Process

Phase 1
Global Venture orders Material & Die

Phase 2
Customer’s Artwork is submitted To Graphics Department

Phase 3
Graphics Department Sends Customer Proofs For Approvals

Phase 4
Global Venture Designs Plates For Order

Phase 5
Orders submitted For Production

Phase 6
Order Shipped
Global Venture has an Extensive in-house inventory of Dies and Pressure Sensitive Stock

- If Stock is unavailable, Special Material and Dies are ordered
What is a Die?

- A cutting tool which is cylindrical in nature. Sharpened steel blades are bent and formed around the outer surface of the cylinder to the pattern to be cut.
- Blades are held in position with high density plywood.
- Blade thickness typically runs between .056 and .112 inches.
- Fold lines, scores, and perf cuts can all be made.
Submitting Artwork

- State-of-the-art, graphic software is utilized to ensure labels print exactly as requested.
- Utilize one of our many die layouts to design your artwork.
Preparing your Artwork

- **Bleed**
  - Determined by adding 0.125" to the width and length dimensions (2" x 3" label would need to have the art board set at 2.125" x 3.125"). This is important because there can be slight shifts in alignment when the labels are die cut. Shifts of up to 1/16" may occur and are within acceptable industry standards.

- **Borders**
  - Borders bleeding off of a label need to be at least 0.1875" in thickness and meet the bleed edge.
Preparing your Artwork

Fonts
- Submitting a file that is not flattened (files other than jpeg, tiff, bmp), change all text to outlines or embed the fonts into the file.
  - The minimum printable font size for black text on a light background is 5pt and for color is 7 pt.

File Format
- Preferred format is PDF.
  - Use the "Press Quality" preset, convert your text to outlines, make sure there is no color conversion, and make sure that there is no down sampling of the images (unless above 800dpi).
  - Formats we accept are: .eps, .ps, .ai, .psd, .jpg, .tiff, & .pdf
Preparing your Artwork

- **Colors**
  - Assign Pantone or Process color(s) to your artwork.
    - Ensures accurate representation of your logo/art when matched at the press.
    - Please note: The color you see on your computer screen isn't necessarily what color will print because monitors can adjust the color contrasts.

- **Resolution**
  - Minimum resolution is 300 dpi & Maximum resolution is 800 dpi. We encourage our customers to submit files that have a higher resolution. This makes dramatic improvements in quality especially when there is text on the label.
Communication is vital to achieve Success in Final Proof of Label.
The Global Venture Process

Phase 4

Designing Plates Process

- Laser engraved Photopolymer plates
  - Direct laser engraving of Flexo Photopolymer plates (which fit over a cylinder).
  - Utilized in wide array of presses, including narrow and wide (up to 61.5 inches wide), and mid-web flexo presses (up to 20-24 inches wide).
- Fully Digital Process - Filmless.
- No integral ablation mask.
- High-powered carbon dioxide laser head burns away, or ablates, unwanted material. The aim is to form sharp, relief images with steep, smooth edges to give a high standard of process color reproduction.
- A short water wash and dry cycle follows.
The Global Venture Process

Production

- Technologically advanced flexographic presses—the most cost-effective method of manufacturing and printing high-quality, pressure-sensitive labels.
- Flexographically designs in up to ten colors
- Exceptional photographic quality, using water-based, UV flexo, or a combination of UV flexo and UV rotary screen printing.
- Presses accommodate all of standard and specialty label materials, including papers, films, foils, and vinyl's.
The Global Venture Process

How does the Flexographic Press Work?

- Flexo-Plate - Creating a positive mirrored master of the required image as a 3D Relief in a rubber or polymer material
- Measured amount of ink is deposited upon the surface of the printing plate (or printing cylinder) using an engraved anilox roll whose texture holds a specific amount of ink.
- Print surface then rotates, contacting the print material which transfers the ink.
- Large Dryers are utilized to dry the ink onto the paper
- Perforation, Slits, etc…stage
- Relief is removed, outcome is the Matrix and Final Label
- Final Labels are rolled for rewinding
The Global Venture Process

Slitting & Rewinding

- **Purpose:**
  - Rewinding: Customer requests for direction of labels for their manufacturing plants.
  - Slitting: Utilizing sharp blades to cut larger quantities of rolled labels to smaller rolled quantity rolled labels.

- **Variations:**
  - Rewind Direction
  - Quantity of Labels
  - Core size
The Global Venture Process

Rewinding Directions & Standard Core Sizes

- Standard Label Core Inside Diameters:

- Lengths range from .25” to 12”
The Global Venture Process

Phase 6  Order Shipped

- Excellent Vendor relations, enabling cost-effective shipping methods
Thank You!

www.globalventurelabels.com