The Journey to Digital Flexible Packaging

2015 TAGA conference
Raia Slivniak-Zozin, PhD
March 22, 2015
Outline

• Introduction to HP Indigo
• Flexible packaging and the demand for digital printing
• Flexible packaging challenges
• HP Indigo LEP technology
• Lamination with LEP with HP
• HP Indigo 20000 Digital Press
HP Indigo product portfolio

Existing Platform Improvements

- HP Indigo WS6800
- HP Indigo W7250
- HP Indigo 1000
- HP Indigo 5600

Breakthrough Next Generation

- HP Indigo 10000
- HP Indigo 20000
- HP Indigo 30000
Digital is targeting high value pages

Digital accounts for ~41% of $52.5B graphics hardware and Ink value

2013 Graphics industry value by application ($ billions)¹

- Design: $2.3
- Photos: $1.1
- Sign & Display: $4.4
- Direct Mail: $1.4
- Info Prints: $5.0
- Marketing Collateral: $7.4
- Labels & Packaging: $15.6
- Publishing: $9.2

Flexible Packaging: 0.7% Digital

Source: PPS MAP 2013 Q4 application market sizing for GSB
¹ Value = 2013 Hardware and ink revenues (analog and digital)
The Sheep and Flexible Packaging
Drives for digital transformation in Flexible Packaging

- SKU proliferation
- Micro-segmentation
- Faster time to market
- Supply chain efficiencies
Flexible Packaging

Technical demands

• Mid-web and wide web formats
• Regulatory
• Ability to print on challenging plastic materials
• Complex post printing processes as lamination
Few words about Flexible Packaging post print processes

Reverse print
Traditionally, construction components defined by the final product

Understand the final products
- Content
- Post treatment
- Storage conditions
- Shelf Life

Define media & construction
- Oxygen barrier
- Light barrier
- Look & Feel

Define Adhesives
- Solvent Based
- Solvent Less
- Water based
- …

Define conventional ink set
- Based on the adhesives and substrates used
LEP Technology

Liquid Electro Photography (LEP)

Electro photography –

“a process in which light is used to discharge electrically charged areas and to create a latent image that can be developed by Electro Ink”.
Electro Ink

Unlike analogue inks, which can be replaced easily, HP Indigo ElectroInk is a core component which is challenging to re-design based on the media / adhesive selection.
1. **Primer** is a must to adhere ink to the relevant substrates

2. **Adhesive** has to fit HP Indigo electro ink and has to be selected carefully for laminated applications
Adhesives matrix

Technology
- Solvent Based
- Solvent Less
- Water Based

Variety of manufacturers
- Asian based
- American based
- Europeans

Performance
- General
- Medium
- High (Retort)

High
- Retort
- Microwavable
- Aqueous foods

Medium
- Meat & Cheese
- Coffee
- Snack & Confection

General
- Dry Foods
- Wrap around Labels
Validation flow

- **Lamination**
  - Lamination bond strength and failure mode analysis

- **Folding**
  - Folding stress test

- **Sealing**
  - Sealing stress test
  - Flat jaws + Teflon
  - Grooved jaws
  - Sealing bond strength
Major improvements using Corona treatment

Corona Treatment – Increasing adhesion

- Removes contamination
- Modify the polarity of surface
- Enhance chemical functionality
- Improves wetting
Mechanical Properties Evaluation

As lower the elastic modulus the better lamination performance it has with electro-ink.

![Elastic modulus (3%)](chart.png)

- **Elastic modulus (3%), (MPa)**
  - High Elastic modulus adhesive: 1.5
  - Mid elastic modulus adhesive: 0.6
  - Low elastic modulus adhesive: 0.3
  - Very low elastic modulus adhesive: 0.0

Good and increasing performance
Mechanism

Stress distribution

- **Large stress on primer-ink interface, leading to primer-ink failure**
- **Medium stress falls on primer-ink interface, may cause a failure**
- **Equal stress distribution → Soft Adhesive absorbed most of stress, the rest falls on ink, leading to good lamination bond strength**

- **Soft Adhesive**
- **Flexible Adhesive**
- **Rigid Adhesive**
Printing HP Indigo Electro Ink on thin plastic materials is possible when using a primer which enables good adhesion of the ink to the substrate.
Achievements

- Mid-web format
- Ability to print on challenging plastic materials
- Complex post printing processes as lamination
- Regulatory
Thank you
What is digital printing?

Advantage

Digital printing eliminates many analog steps associated with conventional printing

• Reducing total environmental impact
• Increases throughput speed
Digital printing time to market (TTM) Advantage

Conventional analog vs. digital

HP Indigo

Make Ready
Registration

Minor
Prepress

Proof on
Actual
Substrate

Step & Repeat

Artwork

Make Ready
Color
(in minutes)

Print &
Lamination

Finishing
(Slitting & Special converting)

Form, Fill
and Seal

Make Ready
Color
(in minutes)

Print &
Lamination

Finishing
(Slitting & Special converting)

Form, Fill
and Seal

Retails/
Consumers

Storage/
Distribution

Post
Treatment

Digital Printing created a breakthrough in flexible packaging printing

-40% set-up time
Lamination performance tree and Indigo 20000 application fit

Target up to medium level lamination performance applications.

- **High**
  - Retort
  - Microwavable
  - Aqueous foods

- **Medium**
  - Meat & Cheese
  - Coffee
  - Snack & Confection
  - Dry Foods
  - Wrap around Labels

- **General**

Indigo 20000

Current application fit

Target up to medium level lamination performance applications.
Digital

Create new incremental business

Order From 50 bags

Order From 100 bags

Order From 500 bags

GET PRICING
Choose a category:

COFFEE    FOOD & SPECIALTY    PET

FREE ONLINE DESIGN SOFTWARE!

START YOUR DESIGN

GUSSETED BAGS

STAND-UP POUCHES

FLAT POUCH

© Copyright 2014 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice.
What’s Next?
Flexible packaging segment

>100 Active install base before Drupa’16

>20 FP & labels success story with major Brands

Enable **High-End FP application**

Introduce real disruptive **E2E solution**

Build facts of advantage that clearly distinguish competition

- Field proven mature product [Happy customers]
- Brand preferred product [Happy Brands]
- No limit of Application [ink is no longer weakness]
- Real disruptive E2E that opens new opportunity [beyond printing]

© Copyright 2014 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice.