Corrugated packaging:

food-safe digital printing

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HP today

Personal Systems

Printing

$48.2B revenue (FY'16[1]) | ~50,000 employees

18,000+ patents | 250,000+ channel partners

Reinventing printing

CORE | Best value

GROWTH | Most innovative

FUTURE | Disruptive innovation

[1] Total net revenue is based on non-GAAP segment reporting for fiscal year 2016.
Total net revenue is calculated based on total segment revenue, which does not include intercompany eliminations.

HP PageWide Industrial print solutions

High-quality digital print for corrugated packaging

Multi-pass
Piezo inkjet technology
UV inks

Single-pass
thermal inkjet technology
Water-based inks

Digital post-print

HP Scitex 15500
Corrugated Press

For secondary corrugated packaging
with primary absolute barrier

Digital pre-print

HP PageWide
T1100S Press

Digital pre-print lamination

HP PageWide
T400S Press

Digital post-print

HP PageWide
C500 Press

For both primary and secondary corrugated
packaging, requiring no additional barrier

Melinda cause marketing campaign combines social media, web-to-print, mass-customization

"The Melinda team is very pleased with what we have achieved by digitally printing our customers' quotes on fruit boxes. It's very important that our fruit boxes are food safe. Knowing that HP water-based ink is 100% food safe allowed us to concentrate on additional benefits Ghelfi could offer using the HP digital press to ensure a successful marketing campaign."

Andrea Fedrizzi | marketing specialist | Consorzio Melinda S.C.A.

Ghelfi printed boxes: using HP food-safe water-based ink on HP PageWide T1100S Press w/ **variable data** and color & font choices.

The Challenge

Melinda, a leading Italian fruit consortium, wanted to support Italian Greengrocers and fruit wholesalers affected by the 2017 earthquake whilst increasing Social Media activity.

The Strategy

Engage with customers via Social Media. Encourage customers to submit messages to be printed on their apple boxes and support a good cause.

The Results

- Customers bought apples to support those affected. The campaign had **substantial news media and social media** coverage.
- **Extra traffic driven** to stores by customers looking for their own printed messages, subsequently also shared on social media.

Food packaging safety compliance: the evolving global landscape

- Table summarizes key ink regulations and guidance
- Other country- or brand-specific requirements can also apply

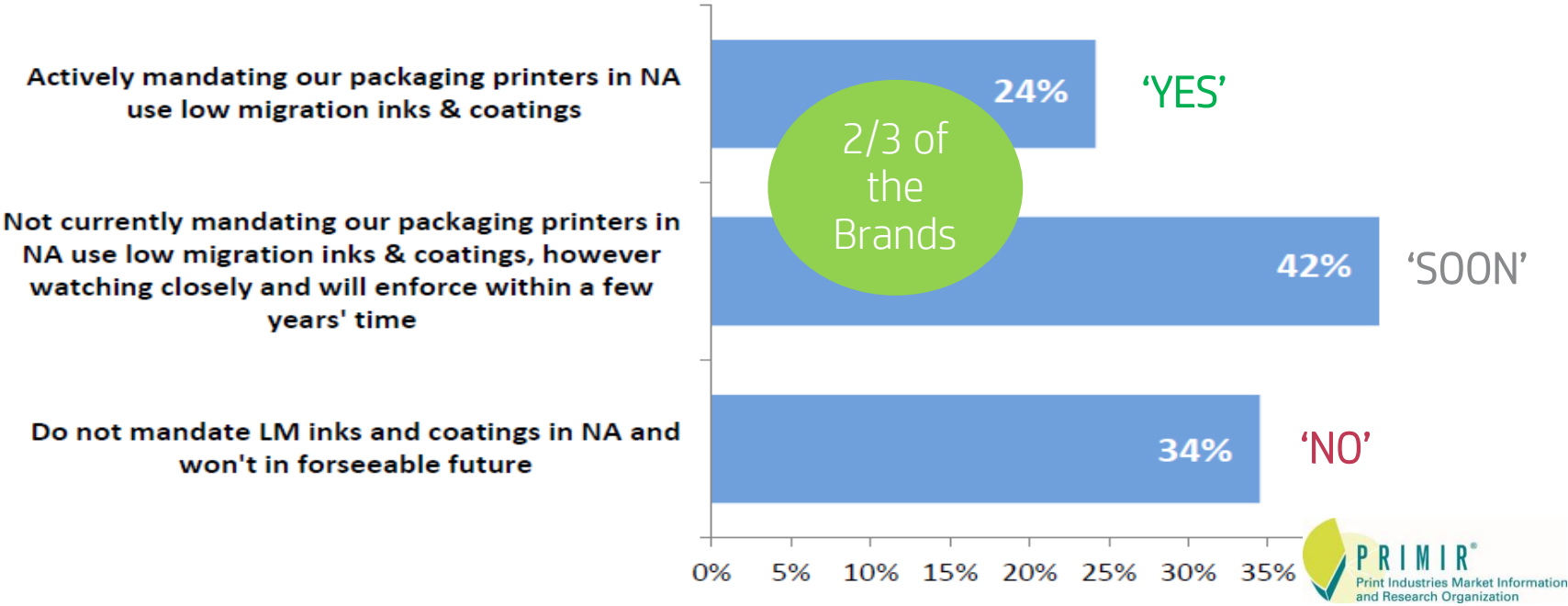
Regulation/Guidance	Scope or Status	Region
EU Framework: EC 1935/2004	Broad FCM Regulation	EU
EU Plastics Implementation Measure (PIM): EC 10/2011	Regulation for plastics (direct food contact), ~Guidelines for other use cases Ongoing updates	EU
Swiss Ordinance: RS 817.023.21, Annex 2 & 10	Printing Ink Regulation (2017)	Swiss Regulation: Guidance Worldwide
EU Printed Food Contact Material (pFCM)	Legislation In development. Anticipated in 2018	World is Watching
Nestle guidance documents	BRAND Guideline (2016) Recently amended	Guidance Worldwide for Many Brands
EUPIA guidance documents	Industry Association Guidance	Guidance Worldwide
US FDA 21 CFR (170-199)	Regulation FSMA phase 2 may have ink implications	US
China: GB9865	Regulation Commodity Standard (Printing Ink): in development	World is Watching
Japan Negative List	Printing Ink Makers Association – Guidance Recently amended (2017)	Asia Pacific

Evolving regulatory and brand requirements

Why ink is receiving more scrutiny

- **Food Brands**
  - Protecting brand value & business
- **EU Regulatory stakeholders:**
  - Joint Research Center: *(2016 Baseline Study: (SANTE/2014/E6/SI2.684014)*
- **NGO's**
  - raising concerns about certain chemistries
- **Improving analytical capability**
  - lower amounts can be detected

NA Brand Owners increasingly asking vendors to use 'Low Migration' inks & coatings



Source: PRIMIR 2016 Study, "North American Food Packaging Compliance: Impact on the Printing Industry", by LPC, Inc.

*"Intertek Health, Environmental, & Regulatory Services has seen an **10-fold increase** on a monthly basis in inquiries **related to printing inks** and colors over the past 18 months. **Industry is now paying much closer attention to this then they ever have before.**" Nick Jermstad, Intertek, US*

Responsible innovation starts with choosing the right technology platform

HP Water-Based inks for PageWide package printing – keeping Corrugated Food Packaging safety in mind

HP has a choice of vertically integrated inkjet ink technology options:

Monomer-based UV Curable

- PQ Supports applications similar to WB flexo post-print
- Monomer and Photoinitiator chemistries can migrate into food => creating ingestion safety concerns, especially for Primary Packaging
- Demonstrated suitability for wide range of sign & display applications

HP HDR230 and HDR245 UV curable Inks for HP Scitex presses

Water-based UV Curable

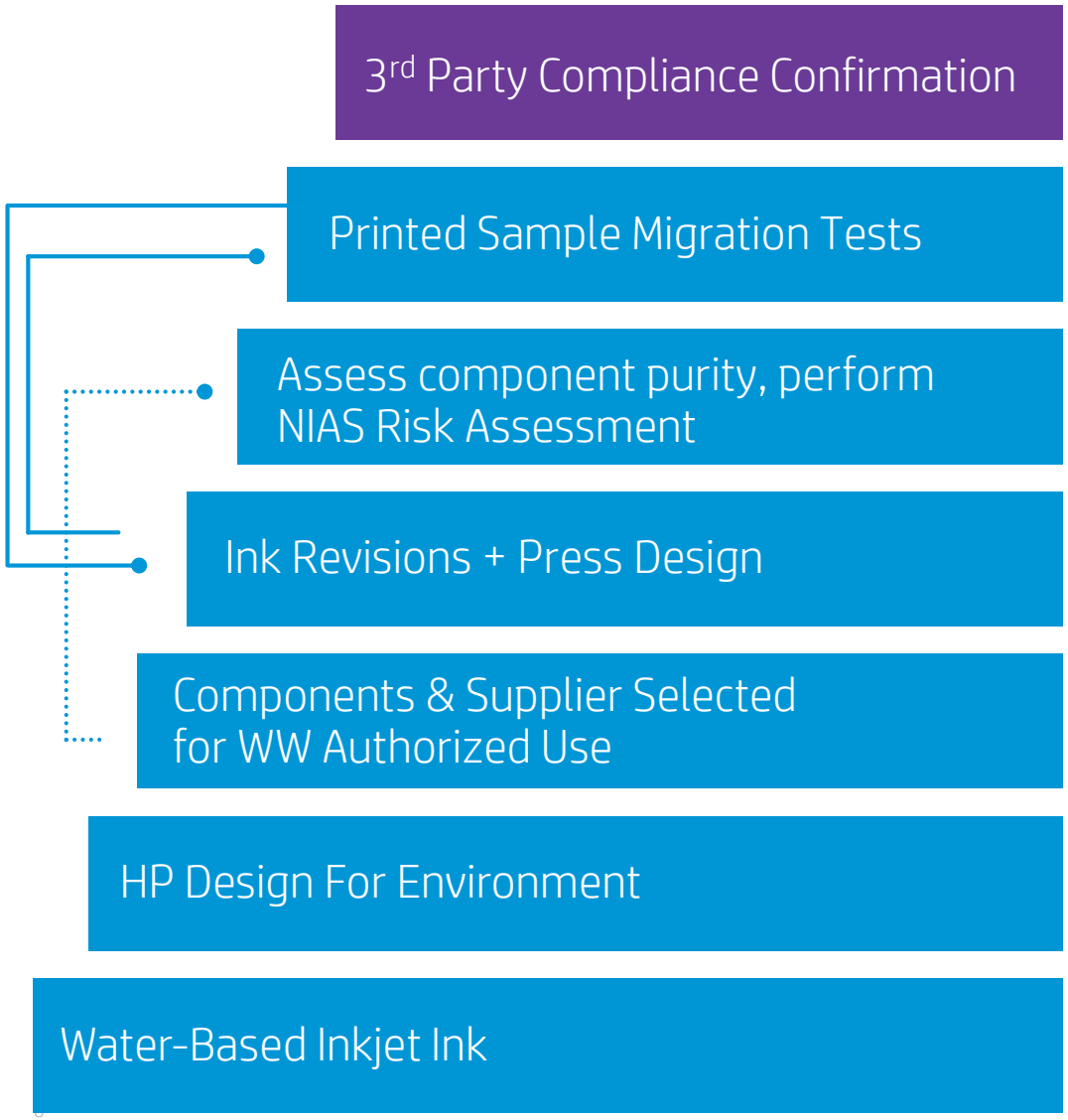
- Newer, hybrid technology potentially suitable for sign & display applications
- Monomer issue potentially mitigated, but…
- Photoinitiator chemistries can present food migration => ingestion safety concerns especially for Primary Packaging

Water-based w/ no UV Curable chemistries

- PQ supports applications similar to WB flexo post-print AND offset pre-print = more Primary Packaging print jobs
- No monomer or photoinitiator chemistries – inherent advantage for food packaging applications
- Coated & uncoated media versatility (& no associated concerns w/ insufficient UV cure)

HP A30 and CV150 Water-Based Inks for PageWide packaging presses

Designing HP water-based inks for food packaging safety



- **Confirms** migration & organoleptic performance
- Substantiates **HP's Statement of Composition**

Customer Support Process

- HP Migration Test Lab provides rapid, accurate feedback & robust understanding of best analytical methods
- HP Analytical Lab and HP Toxicologists consult with 3rd party toxicologist to perform NIAS Risk Assessment, as needed
- A Integrated Solution emerges (print quality, ink coverage, drytime, durability, …)
- HP toxicologists are part of the ink development team
- HP's forward-looking criteria – addresses world wide concerns re: heavy metals, aromatic hydrocarbons, acute toxics, skin sensitizers, etc.…
- The foundation → high purity ink in Thermal Ink Jet Technology

The Challenge:
complex worldwide supply chains and endless packaging options

- HP is a worldwide leader of supply chains – HP understands the importance of our role in this information/assessment stream
- HP is a vertically integrated solution provider – HP understands the design, operational capability and manufacturing of the press and the inks
- Transparency is key: HP is committed to providing meaningful Statements of Composition, regulatory assessments, migration reports, and support of additional customer testing (as needed)

- Substrate(s)
- Food types
- Storage

Pre-treat Process

Printing Process

Over Print Varnishes? (and Process)

Laminates? (and Process)

Adhesives? (and Process)

HP's PageWide Water-Based Inks comply with leading food safety standards

Specific claims, 3rd party certifications

HP PageWide Water-Based Inks are 100% free of UV-reactive chemistries. Thus, these inks enable robust and trusted food-safe printing for both primary and secondary corrugated packaging, requiring no additional barriers.*

Complies with:

- US FDA 21CFR parts 170-199
- EU Framework Regulation 1935/2004/EC
  - Organoleptic Result: No detectable odor or taste introduced to chocolate per ISO 4120 / DIN EN 1230-2
- EuPIA Guidance
- Swiss Ordinance 817.023.21 (2017)
- Nestle guidelines (2016)
- … + other standards (please contact HP)

sqts swiss quality testing services — General Statement of Migration and Organoleptic Assessment

Intertek — Worldwide Statement of Regulatory Listing for HP inks

hp — HP Statements of Composition (US & EU) – w/ compliance details

*Refers to A30 Water-Based inks (and P36 Priming Agent), and CV150 Water-Based inks. Representative Use Cases include E-Flute packaging printed on external side. US terminology 'packaging materials in direct contact with food' analogous to 'primary packaging'. Contact HP for additional information. Information contained herein subject to change without notice.

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Thank you

keep reinventing