

Agenda



SunBeam [™] EB Offset
printing and
sustainability

WetFlex® EB Flexo
A Revolution in
Flexible Packaging
printing

Complimentary
EB Products
and Barrier
Coatings

EB Printing
Sustainabilty
Aspects





Global Sustainability Trends





Complimentary
EB Products and
Barrier Coatings

Sustainabilty
Aspects
of EB Printing

Sun Chemical News

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NEWSPAPER

Canada Bans Single Serve Plastic Bottles

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Microplastics Contaminating the Oceans

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California Bans **Plastic Straws**

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Kroger Stops Production of Plastic Bags

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Loop Store to Recycle all Rigid Plastic **Packaging**

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Sun Chemical & Sustainability

Along with our parent company, DIC, Sun Chemical is constantly working to promote sustainable solutions. Our approach to sustainability guides the way we develop, manufacture & distribute products, as well as how we work with our customers and suppliers.

Working with industry leaders, we are reducing global CO₂ emissions by increasing the use of bio-renewable and recyclable materials, while promoting the value of these activities throughout the supply chain.

Our emphasis on sustainability continues to be fundamental to our innovation and product development and is gaining broad support from our customers.





Sun Chemical President & CEO, Myron Petruch



Why Electron Beam Curing for Printing?

- No VOC WetFlex® and SunBeam™ Advance 100% VOC Free
- Energy Efficient "drying" Technology CO₂ Reduction
- Low odour and very low migration potential for Compliant Packaging
- Highly Resistant cross-linked coatings and ink layer Light-weight Packaging
- Fast Curing, not affected by colour or print density (400m/min on conv. EB)
- No Photoinitiator
- "Cold" Process, limited heating of substrate
- High Solids Colour Efficient EB Inks plus EB Curing Process:

Sustainable, Cost Efficient Value Proposition

Notes

- Nitrogen Inerting is essential for good EB curing, but also reduces odour potential
- Some Grades of Substrates can be affected by EB radiation



SunBeam[™] - EB Offset printing and sustainability



Complimentary
EB Products and
Barrier Coatings



Sustainabilty
Aspects
of EB Printing

Electron Beam curing offset Inks for packaging – **Bio Renewable Content**

Reduce

SunBeam® Advance 5

Class leading adhesion / lamination properties on various substrates

Biobased Carbon Content (as a fraction of Organic Carbon) average 30%

- No Photoinitiators
- Low odour
- Exceptional low migration properties for food packaging applications
- New "60°C development" has similar or slightly higher BRC







SunBeam inks offer very low migration and higher renewable raw material content for flexible packaging

Next Generation Developments for New Film Structures

SunBeam Advance designed for

- Migration Compliance low barrier packaging testing at 40°C*
- Capable at 60°C* in flexible packaging structures w/ functional barriers

Next gen EB Offset Products

- Compliance in non or partial barrier packaging and mono-film structures at 60°C
 - E.g. OPP, PE, PE-MDO, PET/PE, OPP/cPP
- Further improved Lithographic Performance

In validation, available from Q3 2021

* Plastic regulation 10/2011 amendment Aug 2016

Test conditions define 10 days at 60°C for storage times above 6 months at room temperature



Developing the next generation of EB products for mono-material structures

EB Offset for Folding Carton Applications

SunBeam Advance II EB inks & coatings designed for **high-speed folding carton** serving >30 presses in NA

- Was built to run continuously at 350 m/min+
- Very low in misting at high speeds
- Very fast get to colour and high colour stability, increasing cost efficiency and minimizing substrate waste!
- Meets American Soybean Association requirements for Soybean Oil Content
- Primary use Nestle compliant Food Packaging Applications
- Excellent lithographic performance on all types of EB offset presses
- Excellent press performance with very low VOC founts

















WetFlex® - EB Flexo A Revolution in Printing Technology



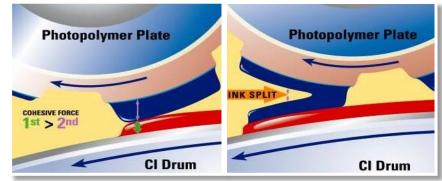
WetFlex® EB Flexo Inks for Flexible Packaging

Solvent/VOC free alternative Technology

Class leading VOC free, wet-on-wet EB Flexo technology

WetFlex® UQ1604 EB Flexo Inks - High Solids System designed for Compliant Surface and Reverse Print Packaging Applications

- No Solvents or Photoinitiator, outstanding Organoleptic and Migration Compliance (60°C)
- Exceptional Adhesion and Flexibility
- High Lamination Bond Strength of most standard Substrate Combinations, supporting
 Mono-Film-Chemistry Lamination Applications
- Great Potential for Light-weight Packaging, Monolayer Surface Print and Lamination
 Displacement Applications
- High temperature sealing and qualified retort capability for surface print using new developed WBEB white and sterilization EB coating
- Excellent Graphic Quality and On-press Stability and improved press side handling
- Improved Flexo Whites opacity and printability, reduced back trapping, last and first down









Complimentary - EB Flexo Products and Barrier Coatings

Sustainabilty
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of EB Printing

Market leading Complimentary EB Flexo Products for EB Offset and EB Flexo

New!

 UniQure[™] W2694 EB Lamination Flexo White (best lamination; 2N+ LBS, lowest migration) W2774 EB Flexo Lam White printability and opacity!

- UniQureTM W2735 Waterbased-EB First Down Flexo White (qualified for sterilization applications)
- UniQure[™] W2539 EB High Slip Flexo White (Sleeves)
- UniQure[™] EB Flexo Coatings
 (gloss, matt, sterilization, high slip, blockable, anti-stat, writable......)
- SunBeam® EB Offset Whites (first down for surface and last down for reverse)
- Press consumables; SunFount 27H
 - **SunLam**TM laminating adhesives



Barrier coatings and adhesive

SunBar™ Aerobloc Oxygen Barrier Coatings

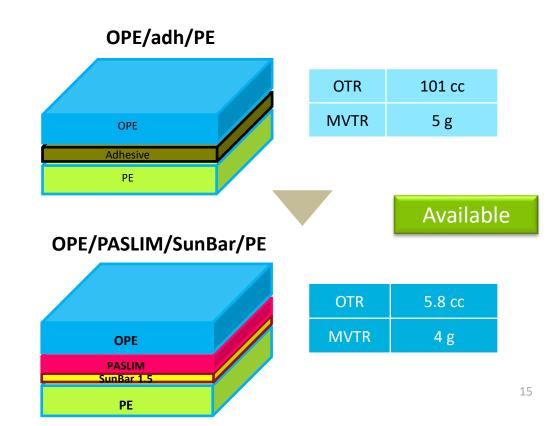
- Adds Oxygen Barrier to a film, PET, OPP, AlOx-PET, VM-PET
- Enhances or Maintains Shelf-life of the products
- Allow for Mono-Chemistry-Film or Mono-Web Structures and Down-gauging



OTR – Oxygen transmission rate
MVTR – moisture transmission rate

Paslim™ Oxygen Barrier Adhesive

- A Solvent-free Laminating Adhesive used in combination with metalized films to greatly increase the barrier
- PASLIM and SunBar Working well Together





Reduce – Light-weighting and Lamination Displacement



- Protective Cross-linked EB Coatings
 - replace laminate or extruded film layers
 - down-gauging of flexible packaging (e.g. bundle-wrap, labels,...)
- EB Coatings allow Higher Sealing Temperatures protecting low sealing temperature Substrates or Primer
- EB coatings can replace existing 2 Pack Systems
- EB Sterilization Coatings allow surface printed Retort Packaging
- New Water Based EB first down Flexo white provides 100% VOC Free surface print, maintaining High Heat Seal Resistance and Retortability
- Barrier Coatings and Adhesives Reduction of Substrate Layers and
 Conversion of Mixed to Mono-material Structures







Protective EB Coatings, Barrier Coatings and Adhesives allow Reduction of Film Layers and Types of Materials

Plastic Deinking and Re-extrusion of Deinked Films





- Sun Chemical developed Testing
 Methodology for Plastic Substrates
- Work Program on Deinking of EB
 Printed Filmic Substrates
- SunBeam Advance and WetFlex Inks
 Excellent Initial Deinking results
- Work Program for Re-extrusion of deinked mono-Material (OPE, OPP) films in Progress



EB Flexo and Offset Ink Technologies show promising results in Plastic Deinking Tests

Deinking from Paper and Carton



Deinking of Energy Cured Inks from Paper

- Sun Chemical has developed Internal Testing Capability
- Ingede 11 Methodology for Deinking of Paper
- Initial indications are that EB Offset inks is deinkable
- Following internal tests, External Certification will be being sought for deinking EB offset products on paper





Active Programs to asses and improve the Deinkability of Materials printed with Energy Curing Inks and Coatings

OK Compost – Certification Status for Energy Curing Inks



Status for energy curing UV and EB Inks

- EC Inks must follow same Rules
 - 1% of packaging weight or lower limit for each ink layer (max 5),
 - Dried/Cured Inks must not inhibit plant growth
- Plant Toxicity Tests have been conducted on range of EC Products
- Preliminary Plant Growth Tests w/ Standard EC Systems suggest Capability to Pass Compostability Testing
- Further Testing planned of wide range of EC Systems followed by Certification
- SunBeam Advance 5 and WetFlex successfully printed on Bio-renewable
 Substrate









Sustainable EB Printing – a Value Proposition!

- No VOC can significantly reduce the carbon footprint
 - Environmental considerations Avoid possible environmental taxes
 - Avoiding additional CAPEX (no Incineration)
 - Avoidance of solvent risk (ExProof, Insurance Cost)
- Energy Efficient "drying" Technology
 - Drying on demand can reduce the Energy Consumption
- The Value of Light-weight Packaging replace extra Film Layer
 - Highly Cross-linked Coatings/Inks and Barrier Coatings
 - Eliminate Lamination Step no Adhesive, no Storage, no Secondary Substrate, avoid Waste
- Total Cost of Ownership Other Process Cost Considerations
 - High Solids Colour Efficiency reduce lnk use (~50% EB Offset even more!)
 - Less Cleaning Substantial Increase of Uptime, less Waste (e.g. vs WB on Film)
 - Multi Colour Process Printing (MCPP) reduce/avoid Change-over Times
 - Low Plate Cost for short runs (vs Gravure, especially EB Offset)
 - Short Run Gravure Level Print Quality

Sun Chemical News

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NEWSPAPER

Walmart Goes Beyond Sustainability

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Chemical Recycling **Debate Continues**

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US Plastics Pact Launches to Ignite Change **Towards Circularity**

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Plastic is Not the **Enemy**

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Thank you for your attention!

QUESTIONS?

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Global Sustainability Trends SunBeam™ EB Offset
printing and
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