

# Electron-Beam Curing Inks and Coatings Technologies

## Sustainability Solutions for Printed Packaging



**SunChemical®**

a member of the DIC group



Color & Comfort

# Agenda

**Global  
Sustainability  
Trends**



**SunBeam™ -**  
EB Offset  
printing and  
sustainability



**WetFlex® -**  
EB Flexo  
A Revolution in  
Flexible Packaging  
printing

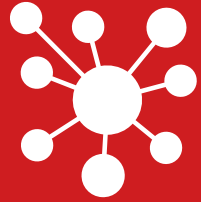


**Complimentary**  
EB Products  
and Barrier  
Coatings



**EB Printing  
Sustainability  
Aspects**





# Global Sustainability Trends

**SunBeam™** -  
EB Offset  
printing and  
sustainability



**WetFlex®** -  
EB Flexo  
A Revolution in  
Printing  
Technology



**Complimentary**  
EB Products and  
Barrier Coatings



**Sustainability  
Aspects**  
of EB Printing



# Sun Chemical News

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## Microplastics Contaminating the Oceans

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## California Bans Plastic Straws

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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 CO<sub>2</sub> 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 - **CO<sub>2</sub> 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

**WetFlex® -**  
EB Flexo  
A Revolution in  
Printing  
Technology



**Complimentary**  
EB Products and  
Barrier Coatings



**Sustainability  
Aspects**  
of EB Printing



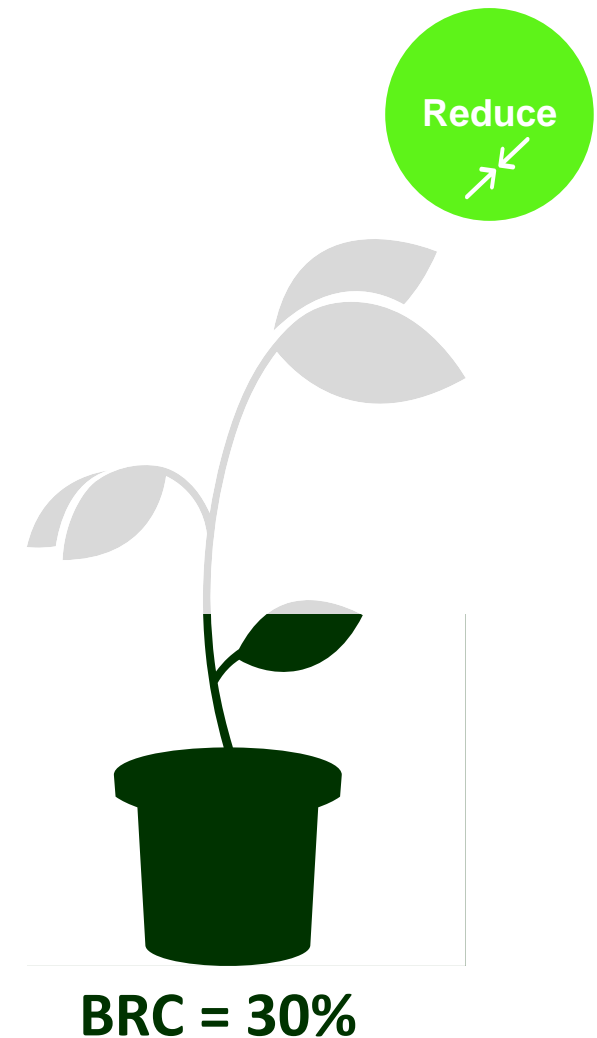
# Electron Beam curing offset Inks for packaging – Bio Renewable Content

## 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



**BRC = 30%**

**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

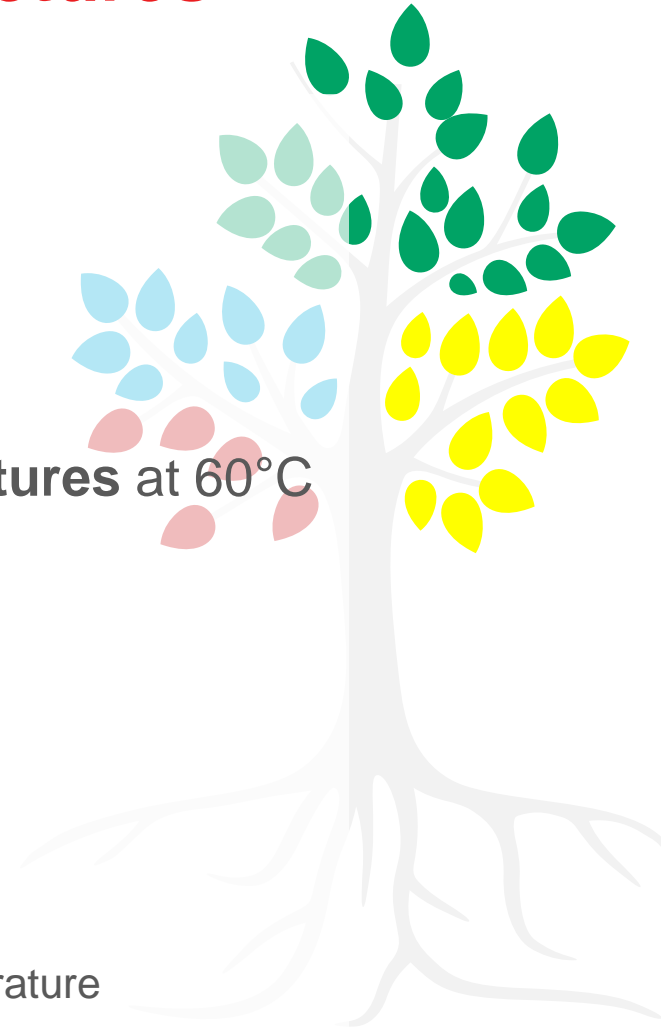
- Compliance in **non or partial barrier packaging and mono-film structures** at 60°C
  - E.g. OPP, PE, PE-MDO, PET/PE, OPP/cPP
- Further improved Lithographic Performance

**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

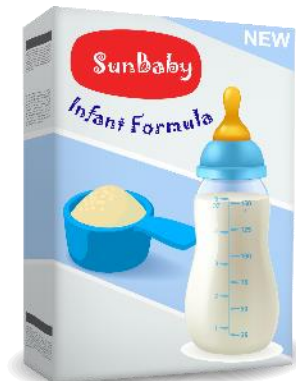
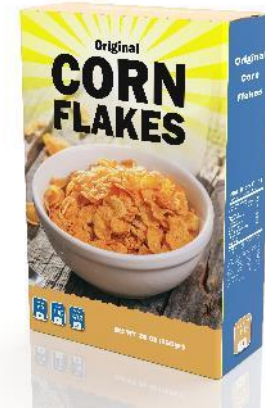
**Developing the next generation of EB products for mono-material structures**



# 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<sup>®</sup> - EB Flexo

## A Revolution in Printing Technology

**Complimentary**  
EB Products and  
Barrier Coatings



**Sustainability**  
**Aspects**  
of EB Printing

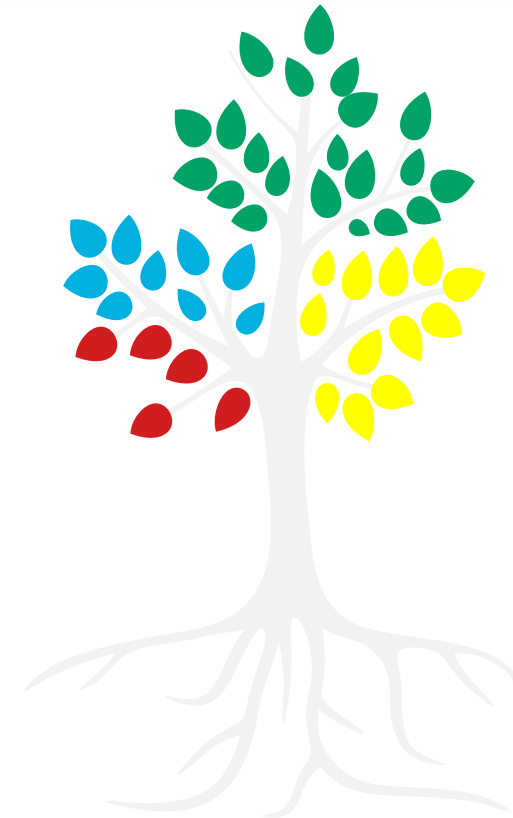
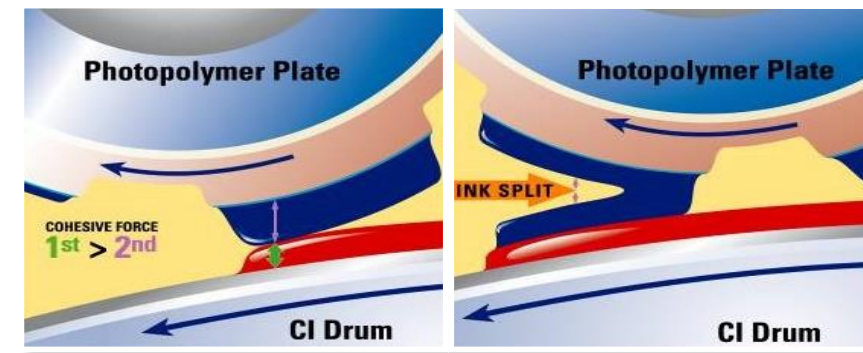


# WetFlex® EB Flexo Inks for Flexible Packaging – Solvent/VOC free alternative Technology

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**



WetFlex® EB Flexo – VOC free alternative for sustainable  
Flexible Packaging Flexo Printing



# Complimentary - EB Flexo Products and Barrier Coatings

Sustainability  
Aspects  
of EB Printing



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

New !

**W2774** EB Flexo Lam White  
printability and opacity !

- **UniQure™ W2694** EB Lamination Flexo White (best lamination; 2N+ LBS, lowest migration)
- **UniQure™ 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™** laminating adhesives

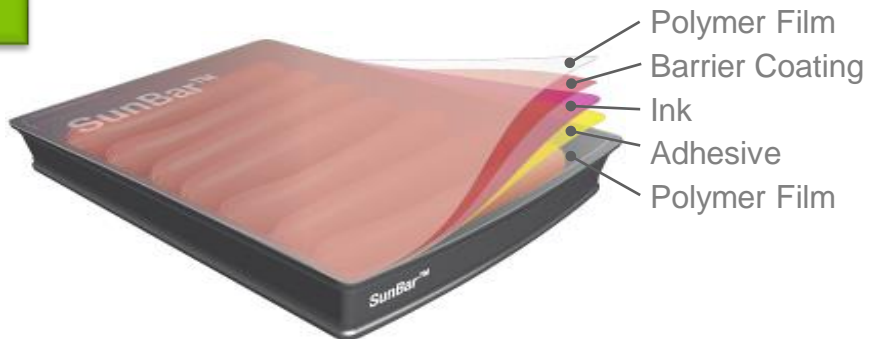
Products with robust and proven performance in  
EB Offset and EB Flexo printing

# 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**

Commercial

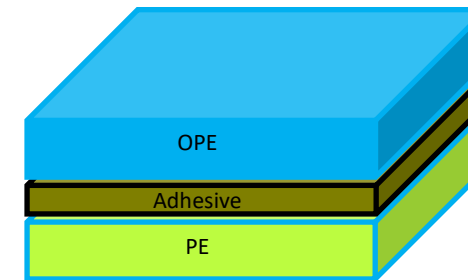


OTR – Oxygen transmission rate  
MVTR – moisture transmission rate

## Paslim™ Oxygen Barrier Adhesive

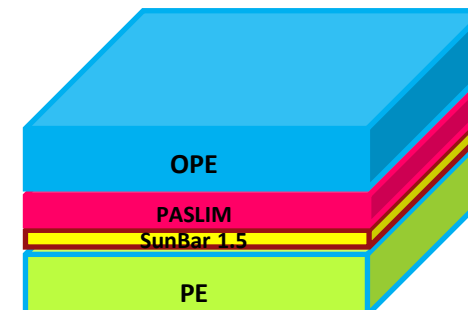
- **A Solvent-free Laminating Adhesive** used in combination with metalized films to greatly increase the barrier
- **PASLIM and SunBar – Working well Together**

OPE/adh/PE



OTR	101 cc
MVTR	5 g

OPE/PASLIM/SunBar/PE



OTR	5.8 cc
MVTR	4 g

Available



# Sustainability Aspects of EB Printing

# Reduce – Light-weighting and Lamination Displacement

Reduce

- **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**



Lightweighting,  
Monomaterials



Mono-web

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

# Plastic Deinking and Re-extrusion of Deinked Films

Recycle



- 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 assess 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**



Energy curing inks can meet compostability criteria  
for compostable / Biodegradable Packaging

# 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 Ink use (~50% - EB Offset even more!)
  - Less Cleaning – Substantial **Increase of Uptime, less Waste** (e.g. vs WB on Film)
  - Multi Colour Process Printing (MCP) – **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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# Walmart Goes Beyond Sustainability

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# Chemical Recycling Debate Continues

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For more information, visit us online at [www.pearsoned.com](http://www.pearsoned.com)

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# US Plastics Pact Launches to Ignite Change Towards Circularity



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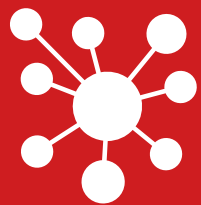
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# Plastic is Not the Enemy

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**Thank you for your attention!**

**QUESTIONS?**

[volker.linzer@sunchemical.com](mailto:volker.linzer@sunchemical.com)

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