



ZELLER + GMELIN

Electron Beam

Overview about the Technology, Products, Projects and Markets

ISC 2024

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Agenda

1. Chapter 1

+ EB Technology

2. Chapter 2

+ EB Products

3. Chapter 3

+ EB Projects

4. Chapter 4

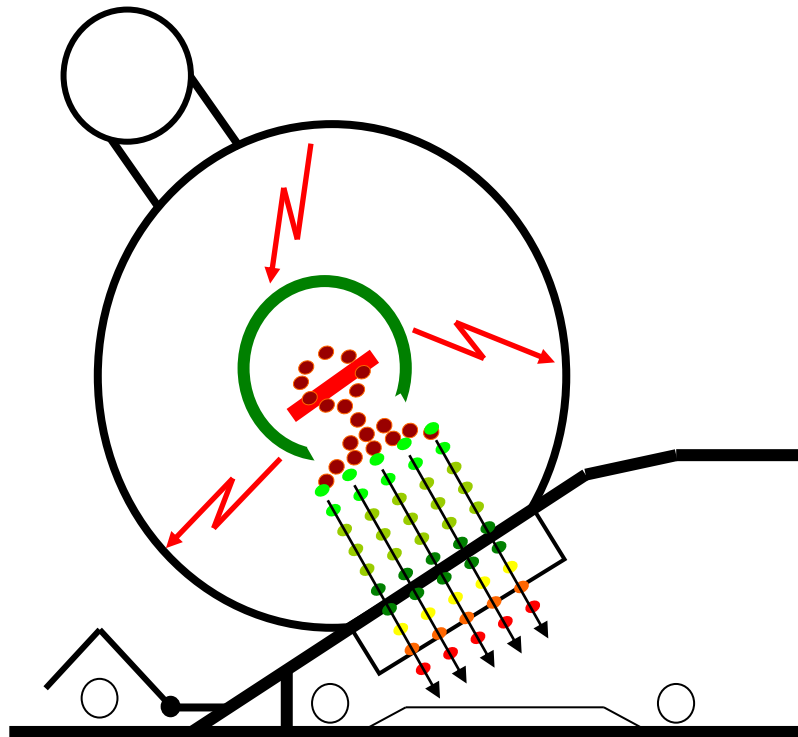
+ Markets



Chapter 1 EB Technology

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Electron Beam Technology



An electron beam is a beam of high energy electrons produced by a tungsten filament and accelerated using high voltages.

- + A heated wire emitted electrons
- + The electrons accelerate by high voltage
- + The „high-speed“ electrons cross through a thin titanium film to the substrate.

Advantages of EB-Curing

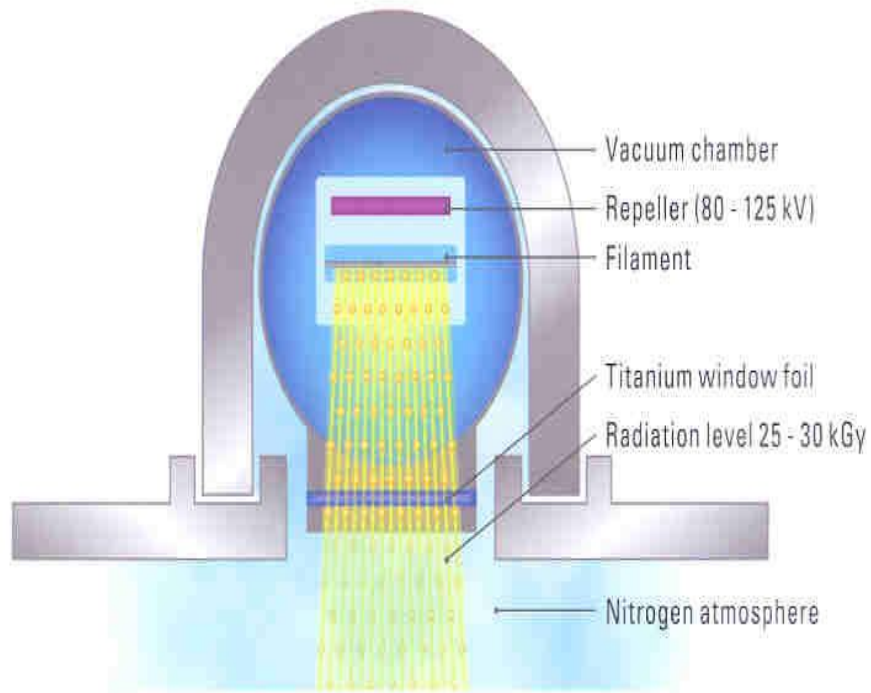


- + No photoinitiators
- + No odour
- + No after curing
- + EB is colour-blind
- + Constant curing power (independent of ink lay down or substrate)
- + EB is a cold system – low heat of the substrates
- + Low energy consumption (electrical, cooling water, inert gas)



Source: <https://www.pctebi.com/ebeam-systems/core-100/>

Disadvantages of EB-Curing



- + Inertisation is a must (Nitrogen)
- + End of press curing (no inter station curing possible)
- + Wet in wet printing
- + Not every substrate applicable

EB-Technology



- + There are EB printers in Europe using COMEXI/OMET/Müller-Martini/DG Press /MANROLAND|GOSS web presses
- + Major European brand owners are keen to embrace EB curing, because of its reduced migration potential.
- + EB currently used to print plastic substrates, paper, board, metalized coated substrates
- + Technology is gaining momentum



Close cooperation with the Italian press manufacturer OMET

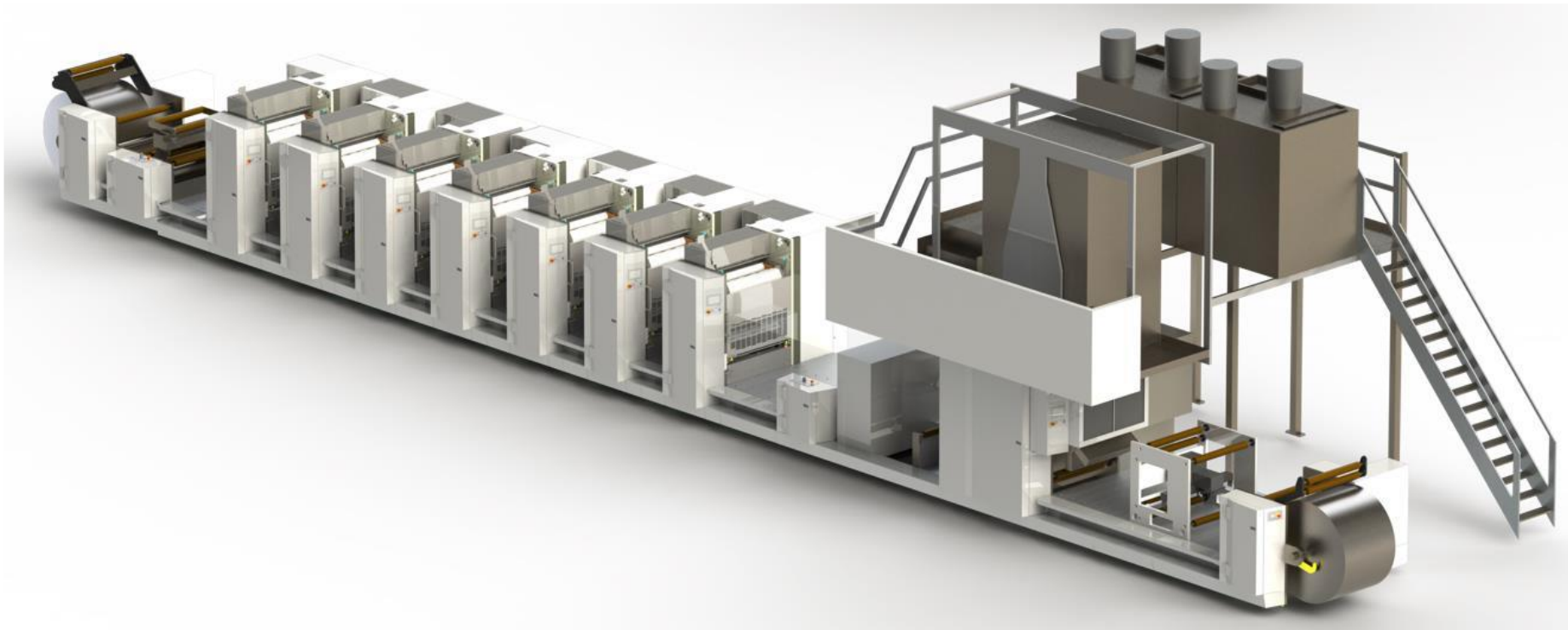
VARYFLEX V4 850mm press for EB-Curing





Close cooperation with the Dutch press manufacturer DG Press

DG AUXO 520 and 850 for EB-Curing





Cooperation with the Spanish press manufacturer Comexi

Central Drum Cylinder press CI8 Offset





VARIOMAN c:line
used for cardboard packaging



Thallo
used for packaging and labels





Chapter 2
EB Products
our answer to the market

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ESALUX® E4 Series



TECHNICAL DATA SHEET

ESALUX E4 Ink Series

Low-Migration Ink Series for EB Offset

CHARACTERISTICS

With the ESALUX E4 Ink Series we present a electron-beam curing (EB) offset inks, especially for printing of food packaging and odour-sensitive packaging on film or cartonboard. The ink series is formulated free from initiator and therefore shows least possible odour and migration properties.

TECHNICAL DATA

Drying/Curing	EB Electron Beam
Substrate	Film - Paper Plastic Coated - Paper Coated - Paper Uncoated
Printing Process	Offset Web-Fed
Formulation	Suitable for FCM applications - VOC-free
Surface Properties	Cured Ink Low Odour - Glossy
Further Processing	Overvarnishing - Hotfoiling - Coldfoil
Application	Folded Box - Flexible Packaging - Self Adhesive Labels
End Application	Food - Cosmetics - Pharmaceuticals

ESALUX E4 OFFSET

complete range available

- + Process inks – CMYK + (OGV)
- + Monopigmented base colour system
- + Brand colours / spot colours on customer demand
- + Metallic colours

ESALUX® E4 Series



Extended Color Gamut Printing (ECG)

C	Esalux® Cyan	E4-S1301
M	Esalux® Magenta	E4-S1201
Y	Esalux® Yellow	E4-S1101
K	Esalux® Black	E4-S1401
O	Esalux® Orange	E4-Z2150
V	Esalux® Violet	E4-Z2251
G	Esalux® Green	E4-Z2350

Monopigmented base colour system Esalux E4-Z

- + Very intense base ink system, ready for printing
- + Every basic ink contains only one pigment
- + Ink mixtures are brighter and have more color strength
- + Ink laydown can be reduced
- + Metameric effects are reduced
- + Communication with ink supplier is simple and fast
- + Production of repeated print jobs are “problem-free”
- + Also Brand colors and company colors are easy to “reproduce”

ESALUX® E4 Series

Whites and Varnishes



TECHNICAL DATA

ESAFLEX
FCM Opaque V

CHARACTERISTICS

With the ESAFLEX Y with violet tint, especially silicone content it has wraparounds. YEB-X:

YEB-X55451 is formulated properties.

TECHNICAL DATA

Drying/Curing

Substrate

Printing Process

Formulation

Surface Properties

Further Processing

Application

TECHNICAL DATA SHEET

ESAFLEX YEB-X55401 Opaque White EB Flexo Printing, Violet Tint
FCM Opaque White EB Flexo Printing, Violet Tint

ESAFLEX EY-7G102 Lacquer
FCM High Gloss Lacquer for EB Flexo Printing

CHARACTERISTICS

With the ESAFLEX YEB-X55401 Opaque White we present a white with violet tint, especially for printing of food packaging and odour is well suited for flexible food packaging. YEB-X55401 is formulated with possible odour and migration properties.

TECHNICAL DATA

Drying/Curing EB Electron Beam

Substrate Film

Printing Process Flexo

Formulation Suitable for FCM applications - VOC-free

Surface Properties Cured Ink Low Odour - Adhesion Optimized

Further Processing Hotfoiling - Thermal Transfer - Overprinting

Application Flexible Packaging - Self Adhesive Labels

End Application Food - Cosmetics - Pharmaceuticals

Market Packaging - Labels

Application Flexible Packaging - Sleeve Sleeves - Wraparounds

CHARACTERISTICS

With the ESAFLEX EY-7G102 Lacquer we present an electron-beam curing (EB) gloss lacquer, especially for printing of food packaging and odour-sensitive packaging on film or cartonboard. It is formulated without initiator and therefore shows least possible odour and migration properties.

The ESAFLEX EY-7G102 Lacquer is formulated without free bisphenol A and without bisphenol A based raw materials (BPA-NI).

The ESAFLEX EY-7G102 Lacquer is formulated in accordance with the Nestlé Standard on Printing Inks for Food Packaging (St-80.001, 07/04/2022) and the Nestlé Guide to Packaging Inks (October 2018 edition).

TECHNICAL DATA

Viscosity 0,3-0,5 Pas/20°C

Drying/Curing EB Electron Beam

Substrate Film - Paper Plastic Coated - Paper Coated - Paper Uncoated

Printing Process Flexo - Lacquering Unit

Formulation Suitable for FCM applications - VOC-free - BPA-NI - Non-DFC

Surface Properties Glossy - Cured Ink Low Odour

Further Processing Grooving/Creasing

Application Folded Box - Flexible Packaging - Self Adhesive Labels

- + High slip OPW for sleeve application
- + Adhesion optimized OPW
- + Gloss varnish / matt varnish

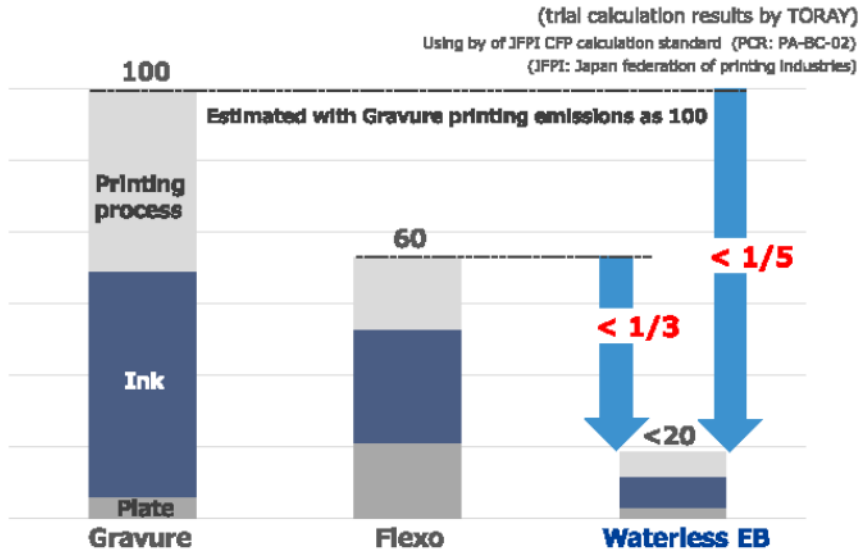


Chapter 3 EB Projects powered by Z+G

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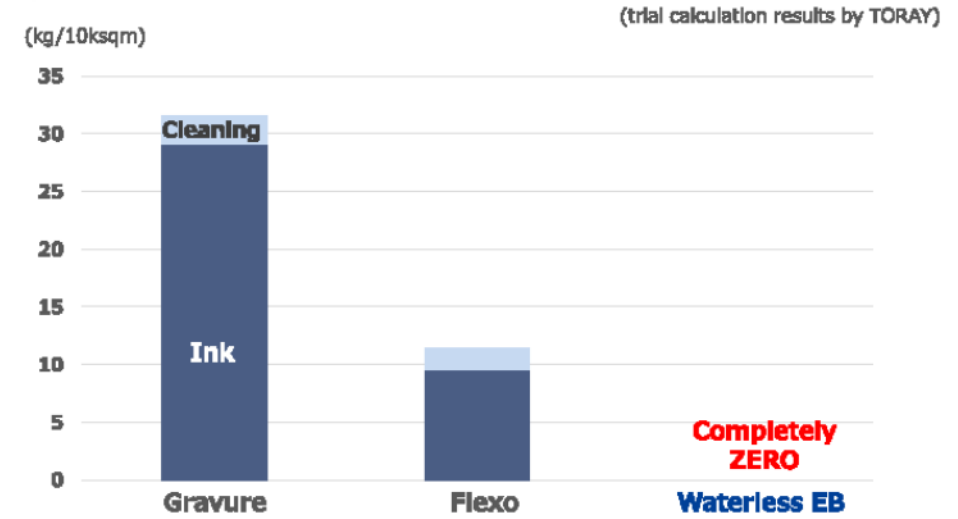
Comparison of CO₂ emission by printing method ^{TORAY}



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Comparison of VOC content by printing method ^{TORAY}

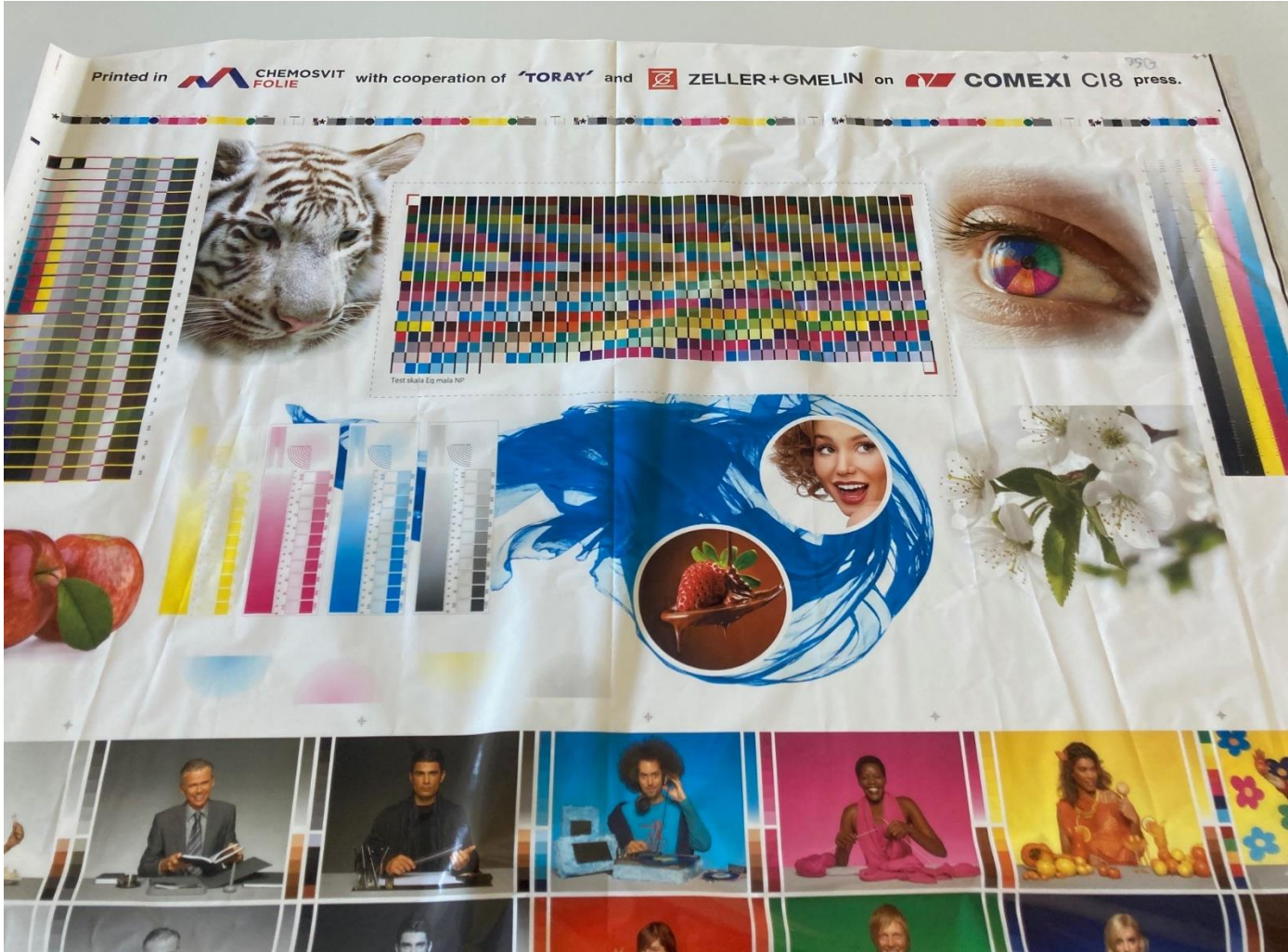


Waterless EB printing achieves completely ZERO VOC content/emissions in printing process

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Projects



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Projects



WEB OFFSET PRINTING | 400 M/MIN



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Chapter 4 Markets present / outlook

Customer Base present



Available on request at n.wuensch@zeller-gmelin.de

**Questions?
Thank you!**