VARIOMAN

Sustainability in packaging printing

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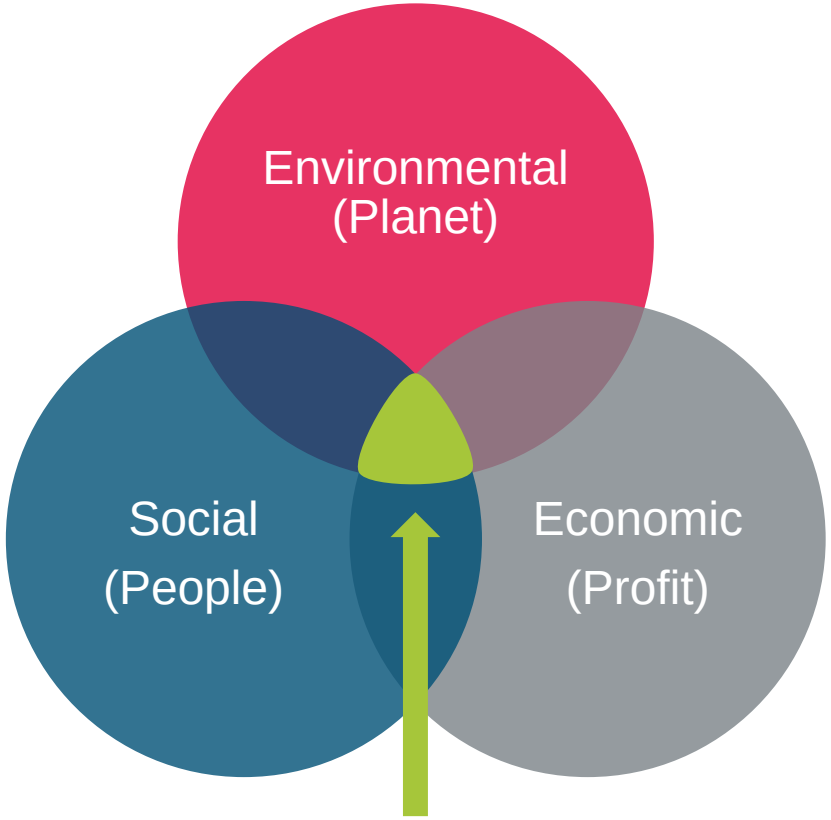
What is sustainability?



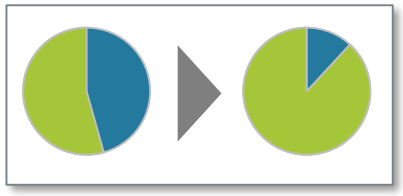
Sustainability

A common definition of sustainable development is that of the UN Brundtland Commission:

„Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.“

(Source: Brundtland Commission of the United Nations)

Sustainability in packaging printing



higher productivity – shorter make ready times

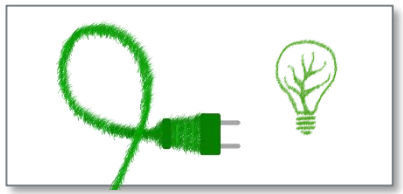
low waste due integrated PECOM automation features

environment friendly offset solution → future proved e.g. with EB curing

lower production costs at all – faster ROI

safe food contact*

less ink consumption*



energy saving

solvent free inks

recyclable & deinkable

*Icon made by **Freepik** from www.flaticon.com

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How does the VARIOMAN improve sustainability?

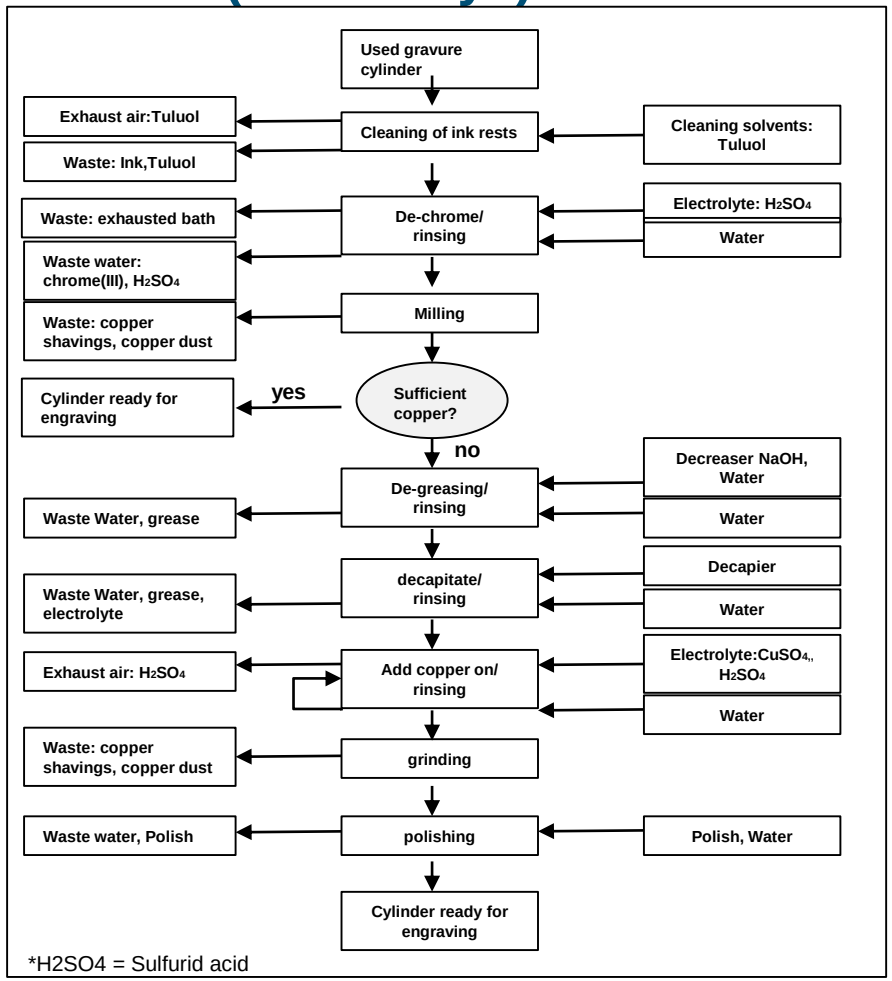
- Savings in material (production waste, ink consumption, water)
- Savings in air condition power (no major generation of heat into the room)
- Savings in water consumption (imaging, no water cooling after hot air dryers)
- Savings in pollution (no hot air drying required, pollution of solvents)
- Reduced health risk (solvents, photo initiators)
- Small CO^2 footprint (less taxes)
- Easy to operate (no major human power required, no explosion danger area)

VARIOMAN has the highest degree of industrialization, because it has the most developed work flow, it allows intelligent production & maintenance and, all in all, it is the most sustainable printing press.

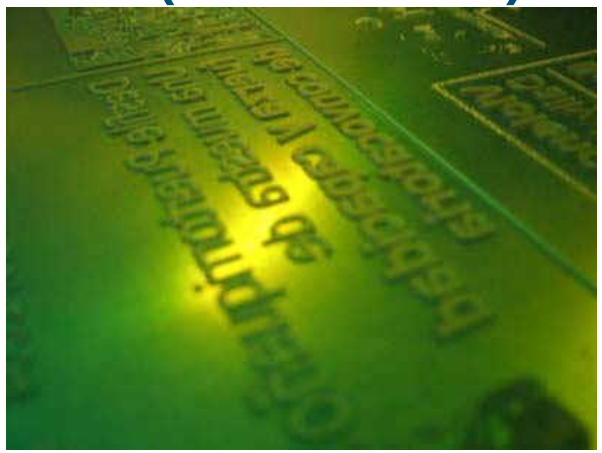
How environmental friendly is Offset today?

Printform making – different complexity

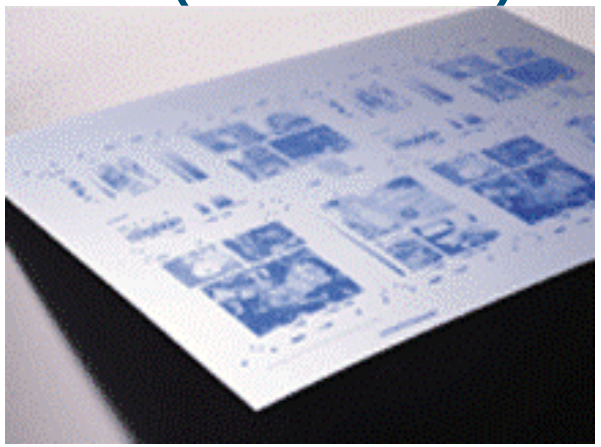
Gravure (1 to 7 days)



Flexo (2 to 12 hours)



Offset (few minutes)



Flexo printing plates

- Manufacturing in 2 -12 hours
- Light weight
- Relatively high costs
- Can be used several times
- Storage needs limited amount of space

- No recycling possible
- Adhesive tapes are not re-usable

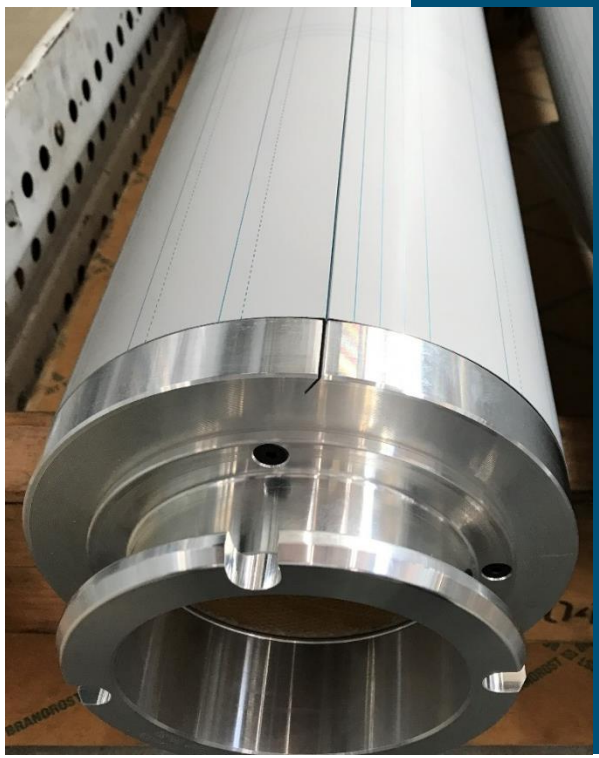
Photopolymer-Plates will be fixed onto the printing cylinder or sleeve with 2-sided foam tapes.

Offset printing plates

- Manufactured by a laser imaging system in a couple of minutes
- Light weight
- Low costs

- Recycling of the used plates possible
- Used plates getting not stored

0,3 mm thin aluminum plate getting clamped onto the printing sleeve.



EB curing

- Runs under an inert atmosphere - flushing with nitrogen necessary

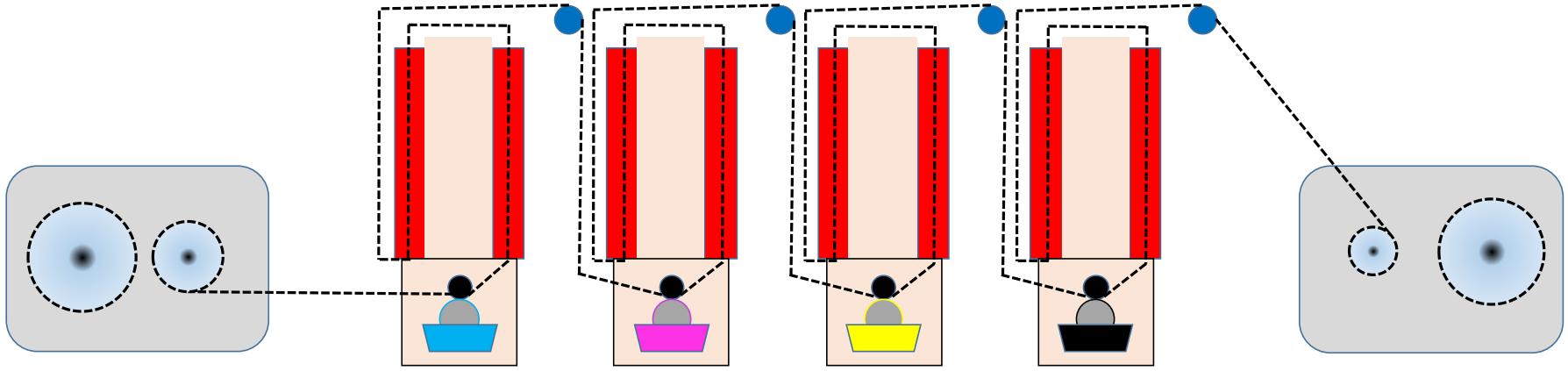
  High energy density, X-rays - radiation protection officer
- No photo initiators, no mercury, no solvents (with the EB offset)
- Easily adjustable: dose, acceleration voltage, current
- "Color blind"
- No heat input to the material
- Constant performance over time
- No exhaust air
- No explosion protection

EB Curing System

Drying Rotogravure

Energy sources: natural gas, heating oil, electricity, etc.

Sustainable: "Green hydrogen", green electricity



Drying CI Flexo

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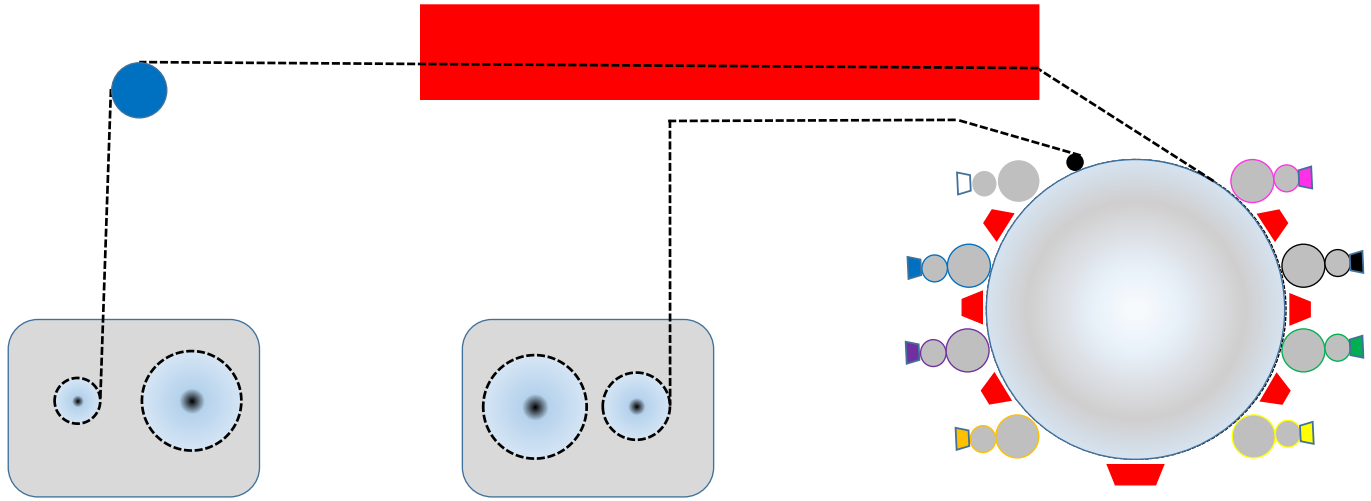
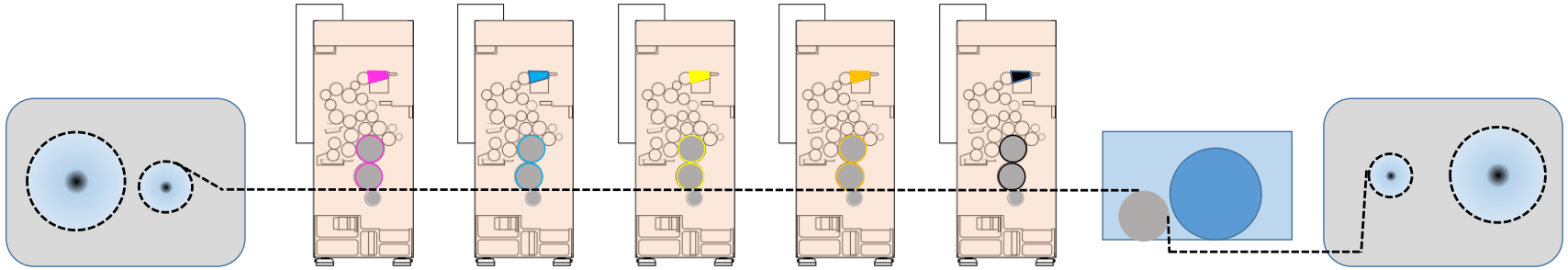
Sustainable: "Green hydrogen", green electricity



Curing VARIOMAN EB Web Offset

Energy source: electricity

Sustainable: green electricity



Energy requirement for drying an 8-color 1300mm wide press at 400m / min (estimation)

Heating energy, fans, cooling of the web:

	Energy Volume
Rotogravure	400kW – 800kW
Flexo	160kW – 350kW
EB Offset	80kW – 110kW

Printing inks plus drying processes in comparison

Water is sustainable,

but the drying process consumes a lot of energy.

Gravure & Flexo

A. Solvent based inks
- Ethanol, Ethylacetat, etc.
- (Toluol)

B. Water based inks

Drying

Energy for heat + air
⇨ hot air
⇨ pollution

Offset & Flexo

Radiation-curing printing inks
- UV
- EB

Hardening

UV rays or electron beams

EB offset inks

- Multi-color printing e.g. B. 7c (Expanded Color Gamut), register accuracy +/- 30µm (PET, BOPP)

The color quantity / color density is regulated via color zones.

- Printing units do not have to be washed
- Less ink waste, less ink consumption
- No explosion protection

Cost comparison of ink consumption for different printing technologies

Given average values by practical experience of flexible packaging printers and converters

➡ **more cost advantage of Offset with EB curing**

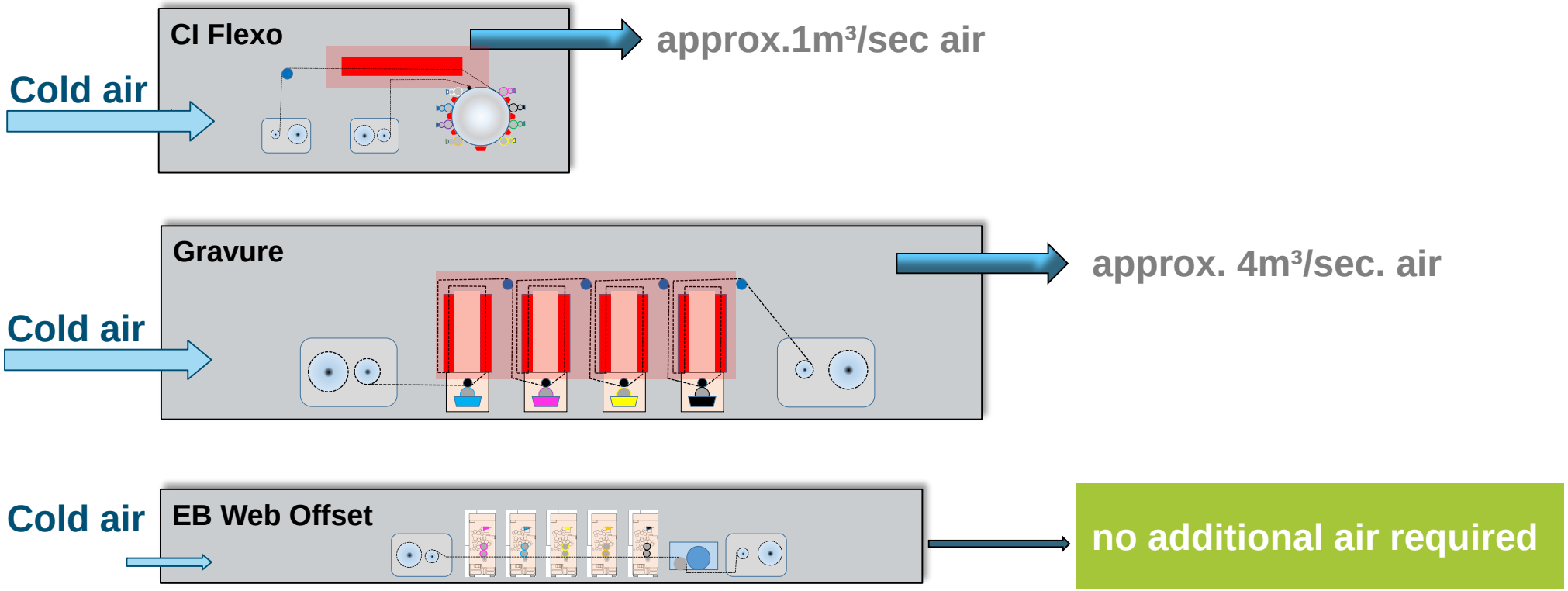
ink system	ink price *	quantity * (100% ink coverage)	cost per sqm * (100% ink coverage)
Offset EB	12 €/kg	1,1 g per sqm	0,013 €
Gravure solvent based hot air drying	4,5 €/kg	8,5 g per sqm	0,038 €
Flexo solvent based hot air drying	5,0 €/kg	3,7 g per sqm	0,019 €

* values are indicative and may vary by region, applications, individual conditions, etc.

Additional savings due to less ink wastage in Offset printing because of:

- ✓ no daily cleaning requirement of the printing units vs. cleaning after production on solvent based inks
- ✓ avoiding unused spot ink remains by using **ECG** (**E**xpanded **C**olor **G**amut) out of 6-7 standard colors

Air conditioning in a print shop, e.g. clean room production

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The VARIOMAN machines and environmental protection go together like ink on paper.

Sustainability is the future. Only a few years ago far too few printing companies were committed to environmental protection. Now manroland Goss is conquering the future of the printing industry with the convincing concept of the VARIOMAN.

The requirements for environmentally friendly production and product packaging are constantly changing due to stricter marketing regulations. The VARIOMAN presses have been specially developed for packaging printing and are thus – in addition to the increasing variety of brands and designs as well as the strong retail competition – designed to meet new environmental and recycling requirements.

Offset technology shines with green advantages
The printing technology of the VARIOMAN is based on the offset printing process. In contrast to flexo and gravure printing, this process does not require the printing units always to be cleaned of ink, which results in significantly less ink waste. The excellent register accuracy of the VARIOMAN offset solution provides the basis for high-quality printing with standardized 6- or 7-color systems (ECG = Expanded Color Gamut). This completely eliminates ink changes and also the washing agent and ink consumption. Of Course, additionally it permits much shorter changeover times. But this is only one of the many sustainable advantages of the VARIOMAN.

Enormous savings in energy and ink costs
If you decide for a VARIOMAN with electron beam curing, you will benefit from much lower energy consumption compared to conventional hot air based drying. Next to lower power consumption you benefit from several more advantages. Thanks to the high-performance ink curing, the surface of the printed product is already scratchresistant and glossy and often no further coating layer is required. The electron beam ink is not only inexpensive due to the higher mileage per kg, but can also remain wet in the unit. This saves the need for daily cleaning, which means less ink waste and reduced use of cleaning agents. However, the lower cleaning costs are surpassed here by another green advantage: Significantly less use of solvents. The printing ink used is even completely solvent-free.

manroland Goss is the future
With the VARIOMAN presses, manroland Goss convinces in the area of sustainability at a high level and sets a sign for a strong future.

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VARIOMAN – an important part of a sustainable world