FlintGroup
Flexographic Products

Press Release

September 2008

Contact
Inken Steinhauser
T: +49 2561 9826 719
inken.steinhauser@flintgrp.com

Good Marks for Carbon Footprint and Costs with Proven Technology

Eco-Efficiency-Analysis sees solvent-based Plate Production as an Advantage

The ongoing public discussion about CO_2 emissions exerts an increasing pressure on consumers and industry, which cannot be avoided by packaging printers either. The branded goods industry and trading companies in particular react to the growing environmental awareness of their customers and pass on the requirement for the most environmentally friendly production possible to their suppliers. However which technologies are really more beneficial in this respect? And are ecological and economic aspects contradictory, or can they even be reconciled?

In order to find objective answers to these questions, the Flint Group Flexographic Products business unit commissioned an Eco-Efficiency-Analysis (EEA) with the BASF SE company. According to Dr. Jens Schadebrodt, who is responsible for the study on the part of the Flint Group, the central issue of this research was the search for the most advantageous technology for the processing of flexo printing plates, which in the final analysis can be equally convincing in terms of criteria based on cost and on ecological factors and also reliably realises high quality requirements.

In principle the study amounts to a comparison of processes in which the proven technology of photopolymer plates which can be washed out by solvents and thermo-technology, offered by the company DuPont for several years, are compared to one another. As Flint Group was interested in a long-term determination of technological development, the company consciously chose the complex format of the Eco-Efficiency-Analysis. Ultimately customers are to be offered the process which is considered superior overall in the future as well. For the vast majority of users of this technology, it was an important confirmation that, in the end result, washing out flexo-printing plates using solvents and with it the prevailing technology had its nose just in front with respect to ecological factors, but above all was able to come off better in terms of costs.

A small Area that gets a lot of Attention

Wherever climate change is discussed, the term “carbon footprint” is not far away. The processes surrounding CO_2 emissions are however only one factor, when the assessment of environmental impacts is involved (see figure 1). An Eco-Profile on the other hand represents a larger scope of the relevant parameters, e.g. the use of raw materials for a product seen over the whole manufacturing process, and therefore has greater significance. The so-called Life-Cycle-Assessment (LCA) goes one step further. In addition to the use of the product, recycling is taken into account as well.

With industrial products or processes economic factors play a decisive role, so an evaluation method is to be preferred here, which considers these criteria sufficiently. Therefore the Eco-Efficiency-Analysis was selected. This standardised and TÜV (German Technical Inspection Agency) validated method is acknowledged by several institutes and authorities in Europe (amongst others the German Environmental Protection Agency) and in the USA (amongst others the National Science Foundation). It analyses the whole life cycle from raw materials to disposal, including the related costs. For this reason this form of eco-study goes one important step further than, for example, an Eco-Profile according to the guidelines of the ISO 14000 environmental standard.

Comparable Base Assumptions for both Technologies

For the study comparable base assumptions have been made for both alternative processes. For the printing plate the Flint Group Flexographic Products’ nyloflex®ACE along with DuPont’s Cyrel® FAST DFH were the types selected – both in the version for digital imaging. Plate thickness (1.14 mm), format (920 x 1,200 mm) and structure of the printing plate were identical in each case. The manufacturer’s instructions applied for the processing. Consumption data and prices correspond to market data and customer information. Details of both alternative processes are compared in the table below.

	Solvent-based plate development	**Thermal plate development**
Processing method	unpolymerised plate material removed by washing with solvent mixture followed by plate drying and recycling of solvent	unpolymerised plate material removed by heat / PA non-woven
Printing plate	nyloflex® ACE 114 Digital	Cyrel® FAST DFH 114 Digital
Size	920 × 1200 mm	
Thickness	114	
Consumable material	Solvent: nylosolv® A 87.5% recycling	PA web 20% excess of nominal consumption
Solvent / web consumption	22.5 l / 1000 µm relief / m^2 (for full material removal to relief depth)	11.3 m^2 / m^2 plate / 700 µm relief (plate size 920 x 1200 mm)
Annual plate usage	10.000 m^2	
Plate volume = User Benefit (UB)	10 m^2 per processing run (50% material removal of total relief volume)	

Table: Consistent base assumption to compare both alternative processes of plate production.

Remarkable Difference in Costs

Printing plates represent the largest cost factor with plate production (see figure 2). For the study an identical plate sales price was assumed for both alternative processes. In addition solvents and correspondingly web material were also important factors. Since with solvents a high percentage is recovered through redistillation, the costs for solvent-based plate production are reduced significantly. The remaining investigated cost-factors are either comparable or so small that their impact on the overall result hardly needs considering. The bottom line is that the proven solvent process thus records a cost benefit of more than 10%.

Complex Field of Environmental Impacts

The key factors of an Eco-Efficiency-Analysis to assess the environmental impact are the consumption of natural resources, the energy consumption of the whole production process and the impact of each plate production step on the global warming e.g. due to the CO_2 emissions – also known as the “carbon footprint”. For this numerous points are to be taken into consideration, such as plate manufacture, web manufacture, solvent production, transport, packaging, imaging, exposure, thermal development, washout and drying, etc. Solvent recovery has a positive effect here as with costs, so the carbon footprint for the overall process of solvent-based plate production emerges as clearly beneficial. A marginally lower value is also to be recorded for material and energy consumption. For thermo-technology, the energy-intensive production of PA web in particular has a major impact. The main causes for emissions which have an impact on the climate are to be found in the production of solvents, web and plate raw materials. The study attests that the solvent-based process has an advantage in the end in this area as well.

Summary

It is an important finding of the Eco-Efficiency-Analysis that economy and ecology are not contradictory. In particular the many users of the proven solvent technology, who do not want to forego the quality advantage of this technology, will be pleased to see this. When the solvent used to wash out the printing plates is recovered as recommended, these users can achieve a cost benefit of 10% and more with respect to the thermal manufacturing alternative. With the carbon footprint the result tends to look similar. The solvent-based technology also shows the most beneficial values here. Both alternatives are virtually the same in terms of the environmental impacts through energy and materials consumption.

If particular preconditions change, e.g. the plate thickness, then the effects are comparable for both alternatives both in terms of costs as well as of environmental impacts. If a plate with a thickness of 1.70 mm is used instead of a 1.14 mm plate, the absolute costs rise by around 30% whilst the cost relationship remains the same. The emissions increase by around 17% with both processes. Conversely, this means that through a reduction in plate thickness both emissions and costs can be considerably reduced.

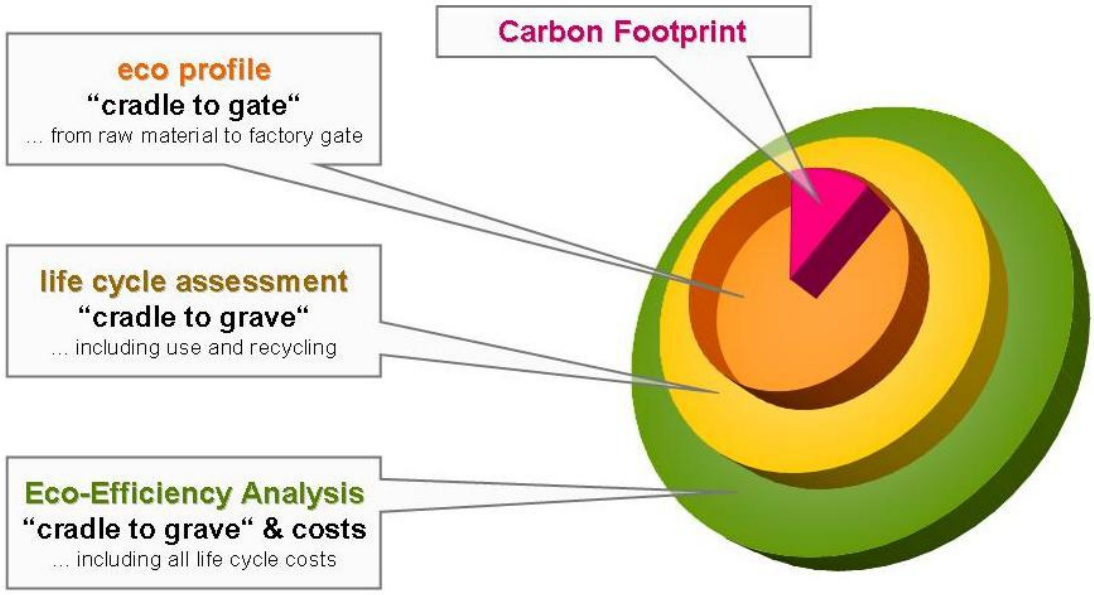

Figure 1: The Carbon Footprint presents a small but meaningful area of the ecological relevant factors.

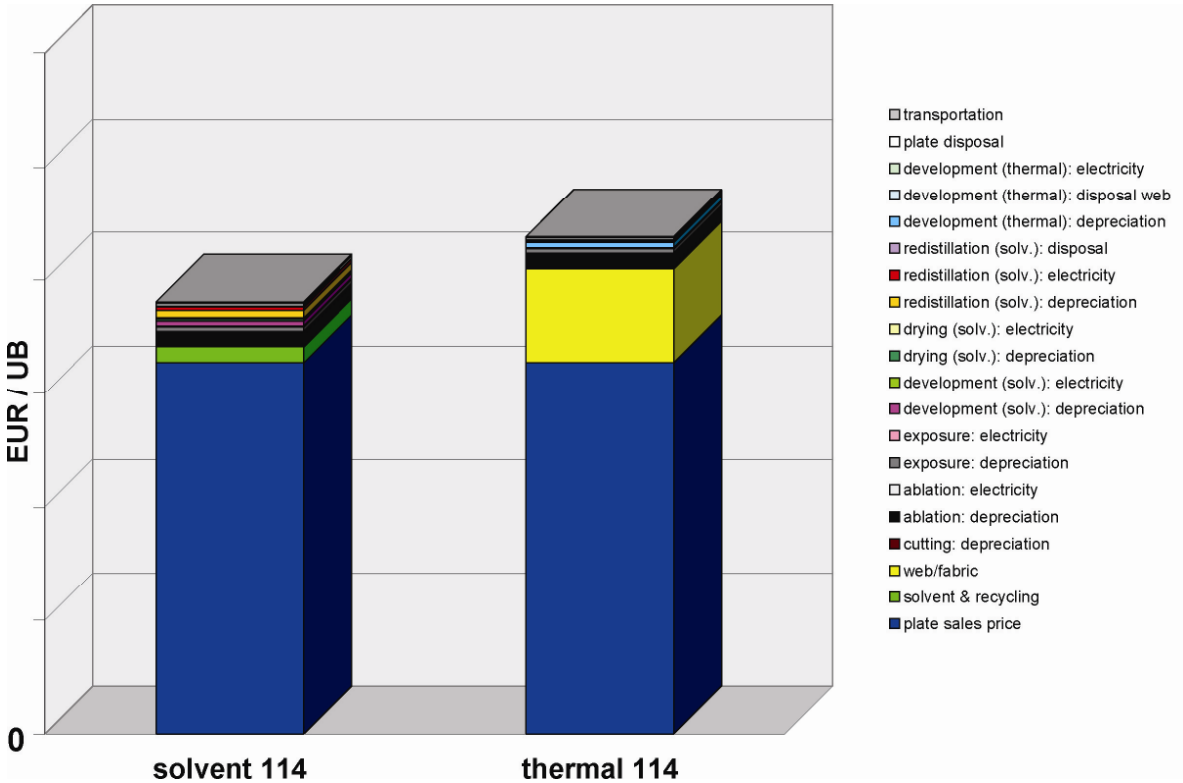

Figure 2: Comparing the process costs, the solvent based plate production shows an obvious advantage over the thermo technology.

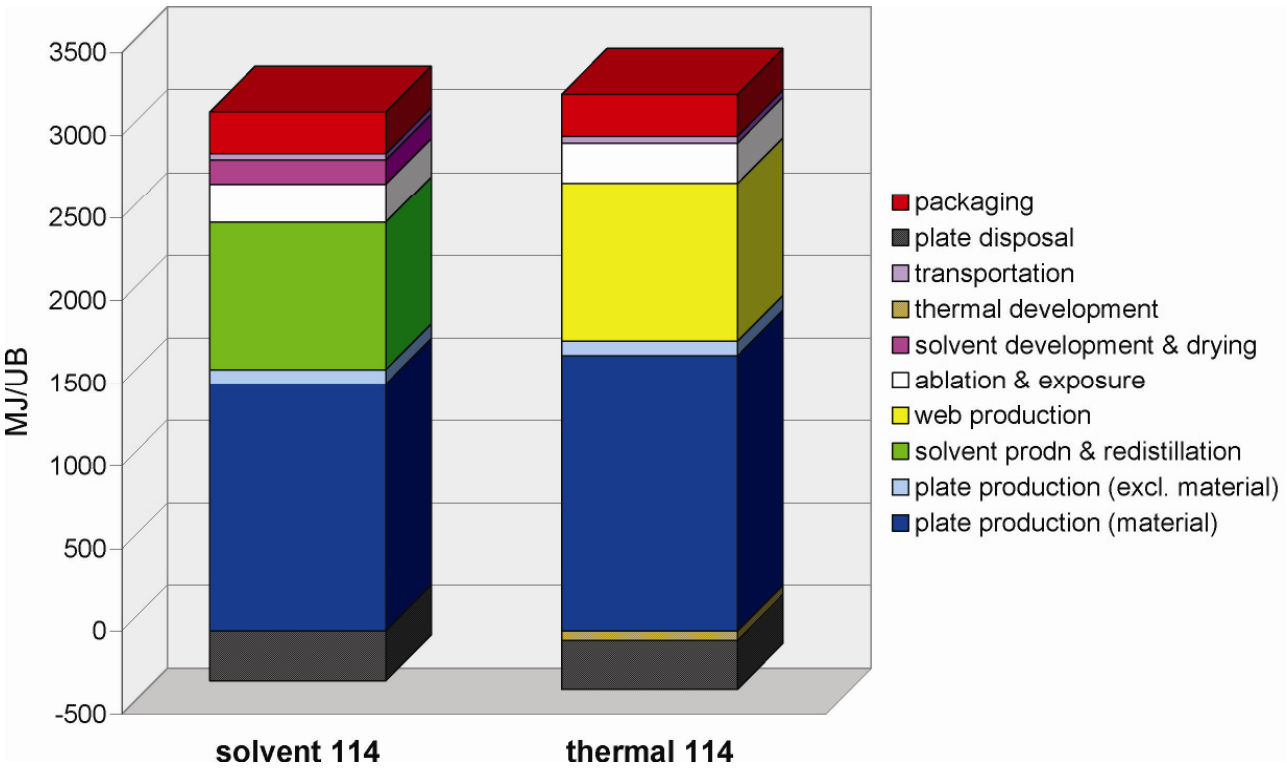

Figure 3: The thermo technology requires marginal higher energy.

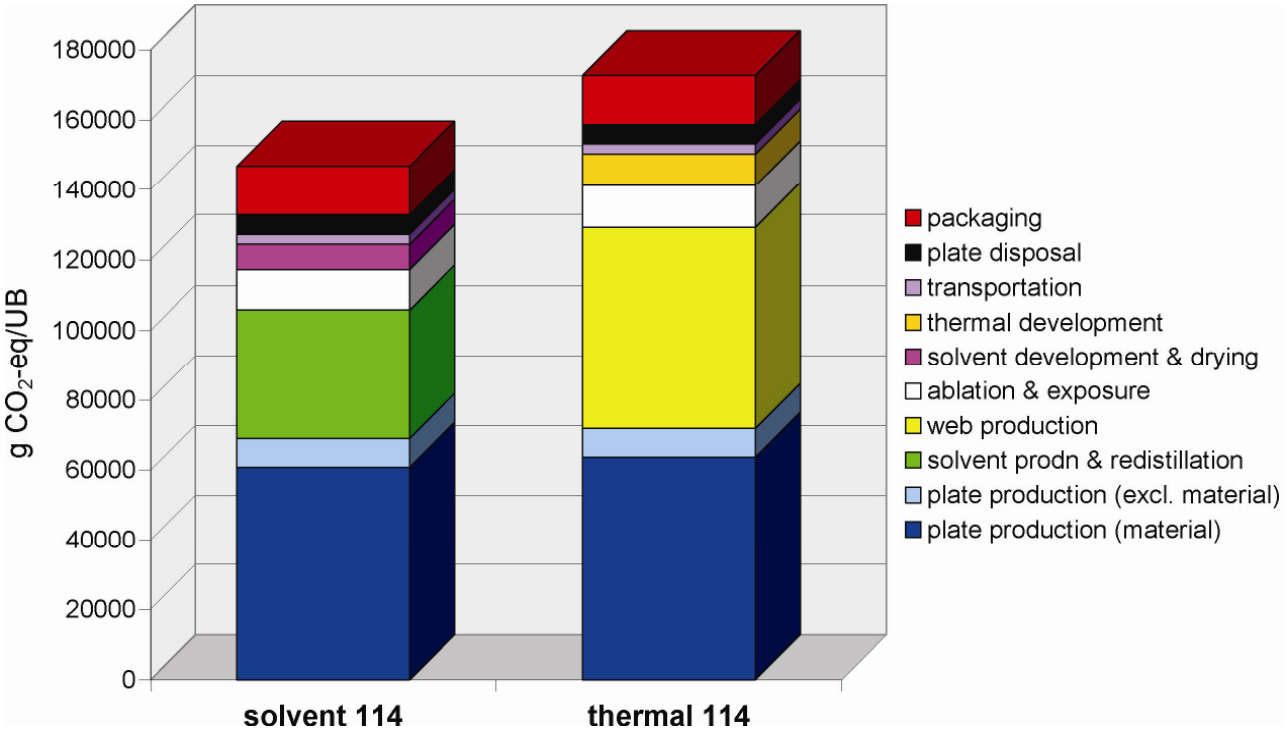

Figure 4: Assessing the whole process of both alternatives, the solvent based plate production causes fewer emissions.