

Eco Footprint of a generic reference – version 2020

The European Printing Inks Association (EuPIA) is dedicated to sustainability. Product stewardship is the major pillar of its action delivering safe and efficient product to use on various substrates and with different print processes.

Due to the application process of printing, a very thin layer of ink is laid down on a relatively thicker substrate and as such previous third parties' studies are showing that the relative impact of printing inks is negligible versus the overall printed material footprint.

Nevertheless, EuPIA has decided to perform a Life Cycle Assessment with CEPE (European Confederation of Paint, Printing Inks and Artists' Colours) to gather its own viewpoint on the LCA of printing inks.

Aim of the study

EuPIA has taken the approach of studying the footprint of a generic printing ink formulation that would represent correctly all print processes. As such the idea was to focus on the highest possible quality of a limited number of raw materials. Indeed, printing inks are made of thousands of raw materials and trying to evaluate all possible combinations would not be a reachable target.

The scope of the study covers the impact from raw material extraction to printing ink production (cradle-to-gate). In addition, a downstream simplified analysis has been also

performed to put the results of the study into a meaningful context for printed products.

Product Description – Generic reference

The generic reference is a virtual product representative of the market for printing inks in Europe, as defined and selected by EuPIA, the European Printing Ink Association.

The formulation of the generic reference is the weighted average of the actual production mix of printing inks in Europe. Therefore, it does not represent a real product, but a virtual combination of the raw materials currently used in the production of different types of printing inks.

Production Process

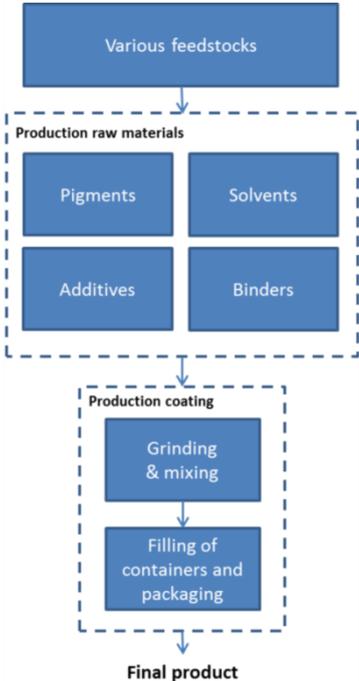
The cradle-to-gate production process of ink starts with the extraction of feedstock and the production of raw materials. The raw materials are then transported from the supplier to the ink producer, where they undergo various grinding and mixing processes. Finally, the ink is filled into packaging units.

Models and data used in the study

The models for the production of the virtual reference are based on the life cycle inventories (LCI) of raw materials and solvent-borne coatings, as developed by CEPE, the European coatings trade association, as part of its raw materials and coating manufacturing databases.

Environmental Footprint Results for 1 kg of Generic Ink product (Cradle-to-Gate)

| Impact categories | | 1 kg of printing ink |
|--|--|--|
| Global Warming Potential or Carbon footprint (GWP) | | 3264 g CO ₂ eq |
| Ozone Depletion Potential (ODP) | | 351 µg CFC-11 eq |
| Photochemical Ozone Creation Potential (POCP) | | 2190 mg C ₂ H ₄ eq |
| Acidification Potential (AP) | | 24.5 g SO ₂ eq |
| Eutrophication Potential (EP) | | 9608 mg PO ₄ eq |



Life cycle assessment on printed substrate

In addition to the cradle-to-gate footprint, a life cycle screening study was designed by Ecomatters (based on sector selected literature and public data) and validated by EuPIA through a data questionnaire.

The full life cycle of printing inks combines the Eco footprint of the generic reference, as a virtual printing ink, with the downstream scenario (use phase and end-of-life) of two substrates (paper and plastic).

Starting at the factory gate, the packaged generic reference is transported to the printing location, where it is printed on a suitable substrate (paper or plastic). The printed substrate is then distributed, consumed and used, and at the end of its lifetime, it is collected, treated and disposed. The generic reference only contributes to a very small fraction of the full life cycle impact. For paper substrate, the role of the printed ink is smaller than 2%, whereas for plastic it is smaller than 5%.

Conclusions

The screening study was performed on a generic printing ink formulation, and is used as a representative reference for high-level assessment of environmental impacts. The study presents the impact of the reference ink for five major impact categories, and shows that the generic reference only contributes a minor share of the full life cycle impact of printed substrates.