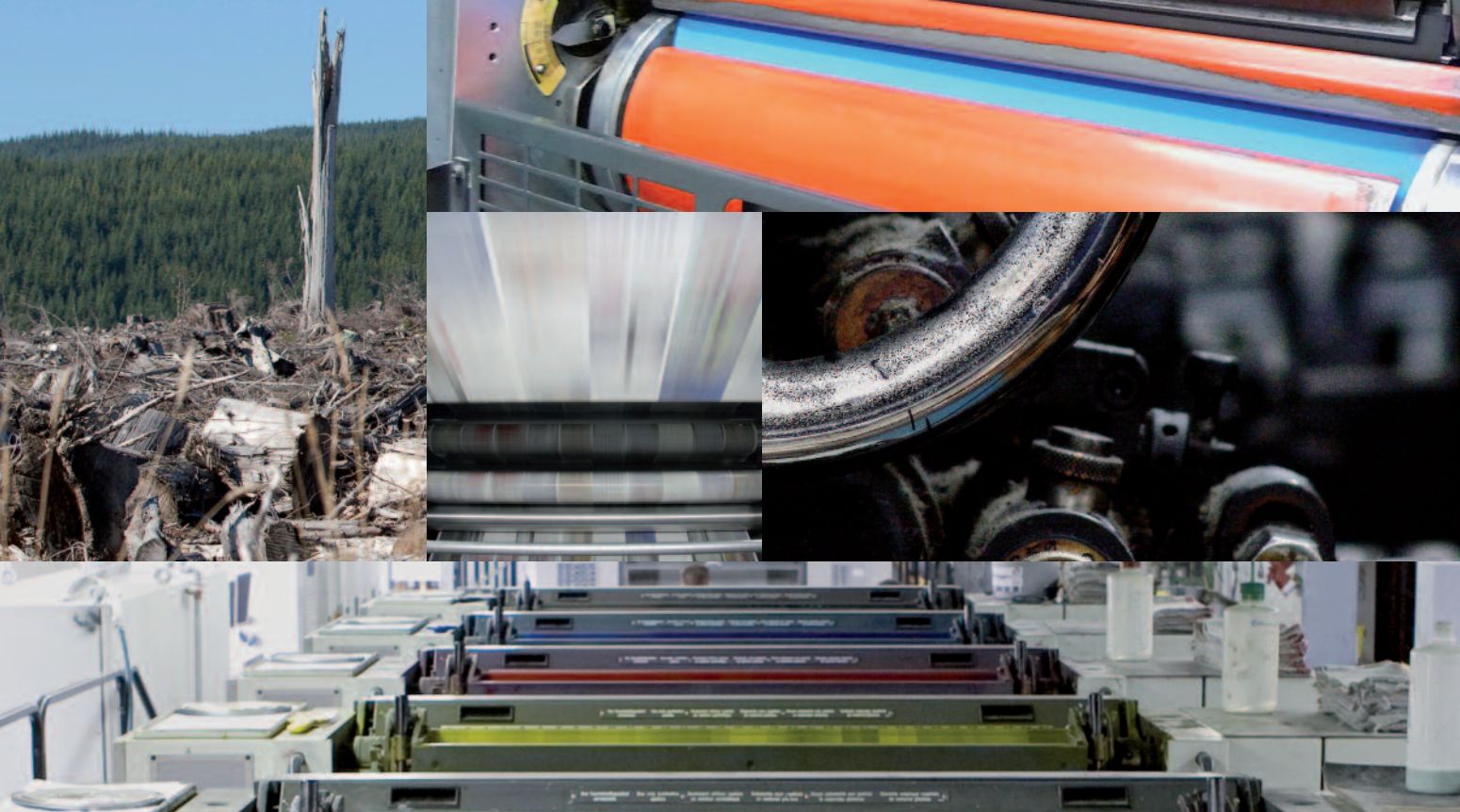




# Ideas for Greener Pages



## Table of Contents

<b>1.</b>	<b>Recognizing the signs of the time</b>	S. 4
1.1	The project »Sustainable Publishing«	S. 5
<b>2.</b>	<b>Method</b>	S. 6
<b>3.</b>	<b>Sustainability requirements for printing papers and processes</b>	S. 7
3.1	Criteria for sustainable printing papers	S. 7
3.2	Conclusion and sustainability recommendations for printing papers	S. 9
3.3	Criteria for sustainable printing processes	S. 10
3.3.1	Sustainability requirements independent of the processes involved	S. 10
3.4	Sustainability requirements for specific printing processes	S. 12
3.4.1	Heatset offset printing	S. 12
3.4.2	Newspaper offset printing (coldset offset printing)	S. 13
3.4.3	Sheet-fed offset printing	S. 13
3.5	Conclusion and sustainability recommendations for printing processes	S. 14
<b>4.</b>	<b>At a glance: The basics of sustainable publishing</b>	S. 15
<b>5.</b>	<b>Contact</b>	S. 16

## Introduction



Books, newspapers and magazines accompany the daily routine of most people. Germany's paper consumption is ranked fourth worldwide. Roughly nine million tonnes of graphic paper are processed annually. In Germany there are approximately 2,800 publishing companies and about 22,000 further institutions operating in the publishing sector.

Printed products have, likewise their electronic equivalents, significant impacts on the environment. However, it is possible to considerably reduce these impacts by adopting adequate measures. During printing processes volatile organic compounds (VOC) emerge in addition to climate-relevant greenhouse gases. Furthermore, printing ink can also substantially affect the environment.

Thus, it is matter of concern of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) to involve the publishing and printing industry in current efforts to enhance the efficient use of resources. The aim is to further decouple economic growth and the consumption of resources.

The Federal Government has already launched a number of initiatives focussing on the issue of paper – not only because of its environmental relevance, but also because of the way published products are capable of influencing public awareness. These activities include the German Blue Angel eco-label for recycled paper and, in particular, measures for public procurement. For instance, the Federal Government has set itself the goal to raise the proportion of recycled paper applied in federal ministries and their subordinate authorities up to 90 per cent by 2015.

The project »Sustainable Publishing« complements the Federal Government's strategy. Therefore, the BMU supports this project together with the Federal Environment Agency (UBA). The project doesn't merely tend to draw up guidance for publishing companies to become more environmentally friendly. It is rather aimed at developing criteria for a new standard of environmentally friendly publishing products that can be integrated into the Blue Angel eco-label. Having this in mind we presented the results of the project to the Environmental Label Jury on its meeting in December 2012. Accordingly, the Jury approved the development of comprehensive basic criteria for awarding the Blue Angel environmental label.

In addition, we will convey the results of the project within the Federal Government in order to facilitate implementation at this level, too. I assume that the project will lead to further efforts to make printing processes even more environmentally friendly, at both national and international level.

Dr. Ulf Jaeckel  
Federal Ministry for the Environment,  
Nature Conservation and Nuclear Safety (BMU)





## Recognizing the signs of the time

Climate change and resource scarcities will significantly affect the publishing industry. Publishing companies in particular provide intermediary functions regarding environment and sustainability. By means of a wide range of media, publishers provide diverse access for society to global environmental issues such as climate protection and the conservation of biodiversity, but also to issues referring to everyday life such as sustainable consumption and environmentally friendly mobility.

In contrast, only few publishing houses are aware of the ecological footprints of their own products and production processes – notably the production and distribution of publications are of significant environmental relevance.

### Turning the pages

Already the very beginning of the value chain affects the environment, the production of the material indispensable to publishers: paper. In Germany alone, some nine million tonnes of graphic paper are processed every year. In order to produce one tonne of fresh fibre 5.5 cubic metres of wood are required as well as approximately the same amount of energy needed to produce one tonne of primary steel.

Worldwide about 40 per cent of the wood used for industry is devoted for the production of paper. A part from that wood is still extracted from tropical rainforests and primary boreal forests deserving protection. The environment and biodiversity also suffer from the impacts of plantation growing, wood harvest and transport of raw materials. Logging primary forests is one of the causes for global climate change. Illegal logging and the depletion of tropical forests irreversibly destroy the habitats of many plant and animal species.

Processing wood fibre for paper production also impacts the environment. The fibre is obtained via chemical or mechanical methods on the basis of fresh fibre or processed waste paper. The chemicals used burden the waste water. Along with fibre and chemicals, the production of pulp and paper requires large quantities of process water and a great amount of energy in terms of steam and electricity. As a result, the paper industry ranks fifth regarding industrial energy consumption in Germany.

### Colourful – but green

Printing books, newspapers and magazines pose, from an ecological perspective, another fundamental challenge for publishing companies. Depending on the final product printing companies apply a variety of techniques differing with regard to the chemicals in use and to the environmental impacts. The greatest environmental burden occurs during the printing process via emissions of solvents into the air, the water and the soil.

Many printing inks still contain colouring pigments and solvents based on mineral oil as well as binding agents made from modified oils and resins that are hardly biodegradable. These substances cause emissions hazardous to the climate during processing, they contain carcinogenic and mutagenic components and leave undesir-

able residues on the imprinted media reducing their capacity of being recycled.

Particularly high emissions of volatile organic compounds (VOC) are problematic. They emerge during printing processes by the use of volatile washing agents and detergents, as well as by the use of isopropyl in damping solutions for offset printing. In 2010, the German printing industry was responsible for 105,349 tonnes of VOC emissions. VOC are considered to be potentially harmful to both human health and climate.

Furthermore, printing processes negatively affect the environment through enormous energy consumption. In fact, the printing

sector is one of the largest power consumers within the industrial sector: Electricity consumption account for about 17,500 kilowatt hours per employee per year.

### Exploring green paths

After the completion of books and magazines environmental impacts continue. Shipping and delivery also contribute to the ecological footprint of printed products. Distribution causes considerable CO<sub>2</sub> emissions by means of fuel consumption during the transport of printed products to retailers and final customers.

The environmental impacts of distribution and the capability of publishing companies to modify these impacts, vary significantly between different product fields and distribution channels. Therefore, periodicals and magazines being regularly issued cause different CO<sub>2</sub> emissions than those resulting from the distribution of books.

## The project »Sustainable Publishing«

### From previous experience to future practice

The search for greener ways of producing and distributing books, newspapers and magazines is not just based on ecological considerations. In the face of climate change and resource scarcities, publishing companies are also economically well-advised to deal with their environmental record. There are many options within the publishing sector that constitute environmentally benign adjustments. Nevertheless, publishing companies either hesitate to implement environmental improvements or if they do so their activities remain isolated. This is mainly because the present knowledge of the possibilities tends to be fragmented and, up to now, no specific practical guidance to sustainability standards within the publishing sector has been available. However, this is about to change: For several years a number of pioneers of the publishing sector have been engaged in Green Publishing i. e. in finding environmentally benign solutions for publishing and producing books and magazines.

The project »Sustainable Publishing – new environmental standards for the publishing industry« (»Nachhaltig Publizieren – Neue Umweltstandards für die Verlagsbranche«) was initiated by the publisher oekom verlag in 2010 and is funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). It aims at raising awareness of social responsibility among publishing companies with regard to the environmental relevance of their production processes and products as well as developing new sector-specific standards for sustainable publishing and, finally, making them available to the entire industry. In order to unlock the potential of mitigating the environmental burden – so far left unexploited by most publishers – it is necessary to scrutinize the entire value chain of publications and to identify concrete options that reflect the specific requirements of publishers.

From August 2011 to December 2012, the publisher oekom verlag carried out the project in co-operation with the Institute for Ecological Economy Research (IÖW) in Berlin, the Institute for Energy and Environmental Research (ifeu) in Heidelberg, the Federal Environment Agency (UBA) and the Frankfurt Book Fair.

The first phase of the project focused on the two compartments of particular environmental relevance – the purchase and use of paper and the printing processes.<sup>1</sup> The following section presents the »Sustainability Requirements for Printing Paper and Printing Processes« (»Anforderungen zur Nachhaltigkeit bei Druckpapieren und in Druckprozessen«)<sup>2</sup> that resulted from the project.



»We view this project as a sort of pilot project for the development and establishment of environmental standards within an industry.«

Dr. Ulf Jaeckel  
Head of Division in the Federal Environment Ministry,  
on occasion of the opening event of the Frankfurt Book Fair 2011

<sup>1</sup> As of mid-2013 activities regarding the distribution and logistics as well as the issue of an environmentally benign office routine is in the process of planning.

<sup>2</sup> The full version of the background document is available for download under [www.nachhaltig-publizieren.de/fileadmin/GP/Hintergrundpapier\\_Anforderungen\\_zur\\_Nachhaltigkeit\\_2013.pdf](http://www.nachhaltig-publizieren.de/fileadmin/GP/Hintergrundpapier_Anforderungen_zur_Nachhaltigkeit_2013.pdf)

The project aims at offering concrete options for making the production process of printed publications more sustainable. Rather than generating a completely new set of requirements, it has been a matter of our concern to provide the publishing sector with ordinary criteria constituting a basis for its decision-making process.

Until 2012 we identified approaches and standards of environment protection that are publicised and practised. We also

examined them in order to determine whether they in principle frame requirements relative to sustainable paper procurement and printing processes and, if so, whether they can be rated as adequate requirements.

Based on these studies, criteria for environmental standards in the compartments named above were developed, which were then discussed with stakeholders of the publishing industry in expert workshops focussing on specific topics as well as at a number of important events of the sector such as the MediaMundo fair, the drupa 2012 and the Frankfurt Book Fair 2012. The positive impulses from this practical phase entered into the development of the criteria.

For the purpose of the sustainability analysis, the following environmental labels and industry standards were considered:

- **Blue Angel (Blauer Engel)** RAL-UZ 14 – recycled paper<sup>3</sup> and RAL-UZ 72 – printing and publication papers<sup>4</sup>
- **Austrian Ecolabel (RL) 02**, printing and writing paper<sup>5</sup>
- **Austrian Ecolabel (RL) 24**, printed products<sup>6</sup>
- Paper & recycling label of the **Forest Stewardship Council (FSC)**<sup>7</sup>
- Paper & recycling label of the **Programme for the Endorsement of Forest Certification (PEFC)**<sup>8</sup>
- Commission Decision of 7 June 2011 on establishing the ecological criteria for the award of the **EU Ecolabel for copying and graphic paper**<sup>9</sup>
- Commission Decision of 16 August 2012 establishing the ecological criteria for the award of the **EU Ecolabel for printed paper**<sup>10</sup>
- **Nordic Ecolabelling of Copy and Printing Paper**<sup>11</sup>
- **Nordic Ecolabelling of Printing companies**, Version 4.4<sup>12</sup>
- **BREF (Best Available Techniques Reference Document)**, IPPC reference document on the best available techniques in the pulp and paper industry<sup>13</sup> and on surface treatment using organic solvents.<sup>14</sup>

<sup>3</sup> RAL-UZ 14 recycled paper, version of February 2009.

<sup>4</sup> RAL-UZ 72 printing and publication paper, version of April 2011.

<sup>5</sup> Austrian Ecolabel (RL) 02, printing and writing paper, version of 1 January 2009.

<sup>6</sup> Austrian Ecolabel (RL) 24, printed products, version of 1 January 2009.

<sup>7</sup> FSC Standard for sourcing reclaimed material for use in FSC product groups or FSC-certified projects, Bonn 2007.

<sup>8</sup> Guideline on use of the PEFC logo, PEFC D 1004:2010, version of 26 November 2010.

<sup>9</sup> 2011/332/EU: Commission Decision of 7 June 2011 on establishing the ecological criteria for the award of the EU Ecolabel for copying and graphic paper

<sup>10</sup> 2012/481/EU: Commission Decision of 16 August 2012 establishing the ecological criteria for the award of the EU Ecolabel for printed paper

<sup>11</sup> Nordic Ecolabelling of Copy and Printing Paper: Basic Mod. Vers. 1.0; 2003 & Supplementary Mod. Vers. 4.0; 2011.


<sup>12</sup> Nordic Ecolabelling of Printing companies, Version 4.4, 13 December 2005 – 31 March 2013.

<sup>13</sup> Best available techniques in the pulp and paper industry; summary translated into German by the Federal Environment Agency (UBA), January 2002.

<sup>14</sup> Best available techniques for surface treatment using organic solvents, UBA, Dessau-Roßlau, August 2007.







# Sustainability requirements for printing papers and processes

Apart from the EU Ecolabel for printed products, considered to be inadequate by the project partners, there is still no standard in place that addresses sustainability requirements for printing papers and printing processes comprehensively and that has actually been met by companies. Taking account of existing environmental labels, guidelines and initiatives the following criteria for environmental standards were developed in the project. All criteria are equally important with regard to sustainable production processes for printed products; the order in which they are presented is not intended as an order of priority.

## Criteria for sustainable printing papers

### 1. Conserving resources

The utilization of recycled fibre instead of virgin fibre helps to protect forests by reducing wood extraction. It thus becomes available for other uses. In addition, the use of recycled paper reduces energy consumption by up to 60 per cent, cuts water consumption by up to 70 per cent, significantly decreases CO<sub>2</sub> emissions and reduces waste and other emissions.

There are only few printed products that require the exclusive use of virgin fibre. Then again, a certain proportion of virgin fibre is needed in the paper recycling loop on an ongoing basis for a market of recycled paper to perform. Therefore, to qualify as being sustainable, printed products should – wherever possible – be generated

from paper based on a large proportion (100 per cent, or considerably more than 50 per cent) of recycled fibre.

### 2. Sustainable forest management

In the case of products that must be printed on paper of virgin fibre, because there are no types of recycled paper suitable for the designated use available on the market, sustainable production definitely requires the exclusive use of wood originated from forests and wood-processing operations that have been proven to be sustainably managed. The same applies to the portion of virgin fibre in mixed paper.

In 2006 a working group of the World Bank, the Global Forest Alliance and the Worldwide Fund for Nature (WWF) summarised the criteria for sustainable forest management in the Forest Certification Assessment Guide.<sup>15</sup>

An important partial aspect referring to the criterion of sustainable forest management is the involvement of all stakeholders in the development and validation of the standard.

Discussions about the use of fibre from tropical timber in products of everyday life and about the proceeding destruction of tropical rainforests coming along with severe climatic and ecological problems have led to the insight that paper made partly or completely of fibre of tropical timber cannot, from the current point of view, be considered a sustainable product. However, it is only the Blue Angel that explicitly brings up this issue: »The extraction of timber from forests particularly worthy of protection such as, for example, tropical or boreal primeval forest shall be unacceptable.«

### 3. Energy and water consumption, water pollution and use of chemicals

Further key criteria for sustainable paper production include the consumption of fossil fuels and of production water throughout the entire life cycle for printing paper.

Paper produced using chemicals harmful to human health or to the environment cannot qualify as being sustainably produced. For this reason nearly all eco-labelling and processes described in the BREF (Best Available Techniques Reference Document) restrict the use of chemicals to an indispensable minimum. The provisions spe-

<sup>15</sup> Forest Certification Assessment Guide (FCAG); WWF/World Bank Global Forest Alliance, July 2006.

<sup>16</sup> As of 20 January 2009, the EU's CLP Regulation (Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures), which aligns the EU's relevant classification system with the Globally Harmonized System, has repealed the old directives 67/548/EEC (Dangerous Substances Directive) and 1999/45/EC (Dangerous Preparations Directive).

cified for this purpose include the relevant EU regulations (such as the new Regulation (EC) 1272/2008, for alignment with the GHS16, and the old EU Directive 67/548/EEC, A. VI) and its H- and R-phrases that are still valid. This specification thus eliminates all »substances that are carcinogenic, mutagenic or toxic for reproduction«.

An important concern of sustainable production is to avoid or at least reduce the use of chlorine-based chemicals. Thus, one partial aspect referring to the use of chemicals in paper production is the avoidance of any types of chlorine bleach. However, only the Blue Angel eco-label and the Austrian Ecolabel explicitly preclude any use of elemental chlorine or other halogenated bleaching agents.

Furthermore, to be sustainable paper production shall exclude any use of poorly biodegradable complexing agents such as ethylenediaminetetraacetic acid (EDTA) and diethylene-triamine-penta-acetate (DTPA). These substances potentially impact the water pathway, they are suspected of dissolving heavy metals from sediments.

Also, as partial criterion, graphic paper should include safety limits for pollutants in recycled paper. This is an important issue of the discussion on the sustainability of such products in particular with regard to the recent controversy about the migration of mineral oils from printing inks and other sources into groceries via food package made of recycled paper. None of the labels considered are explicit on the subject of mineral oil concentrations in end products.

#### 4. Usability

Apart from the criteria of the conservation of resources, sustainable forest management and the sustainable use of materials, the paper product is necessary to be suitable for its intended use.

#### 5. Environmental management systems

The existence of a functioning environmental management system is an inherent part of sustainable economic activi-

ties. Certified environmental management systems such as EMAS (Eco-Management and Audit Scheme) and DIN EN ISO 14001 are possible guiding principles.

Of the existing standards, only the Austrian Ecolabel and the Nordic Ecolabel explicitly refer to environmental management systems in connection with the awarding of the label.

#### 6. Standard, transparency, audits, revision

It is the aim of the research project »Sustainable Publishing« of the Federal Environment Agency not to generate a completely new standard, but instead to expand the existing standards by important criteria. Therefore it is necessary to consider the configuration of the label and the award criteria. Important partial aspects in this regard include a transparent configuration and evaluation of the award criteria, independent internal and external audits and revisions of the standards on a regular basis.

#### 7. Minimising transports, regional substance flows

Sustainable products involve regional substance flows based on transports kept to a minimum. The use of »domestic« fibrous material and recycling paper fibre produced in »domestic« paper mills shall be preferred to the use of imported materials – especially when imported from overseas. Likewise, printing shall be carried out close to the customers.

#### 8. No genetic engineering

From a present-day perspective, genetically engineered materials and products may pose a risk on flora and fauna – and, thus, ultimately on humanity. As long as reasonable doubts about genetically engineered materials cannot be completely confounded, sustainable paper products mustn't be made of such materials. This means that all materials used in the value chain of paper must be demonstrably free of genetically modified ingredients.

The two forest certification systems FSC and PEFC are commendable involving passages on the absence of genetic engineering in wood and fibre resources added after the recent revision of the standards.







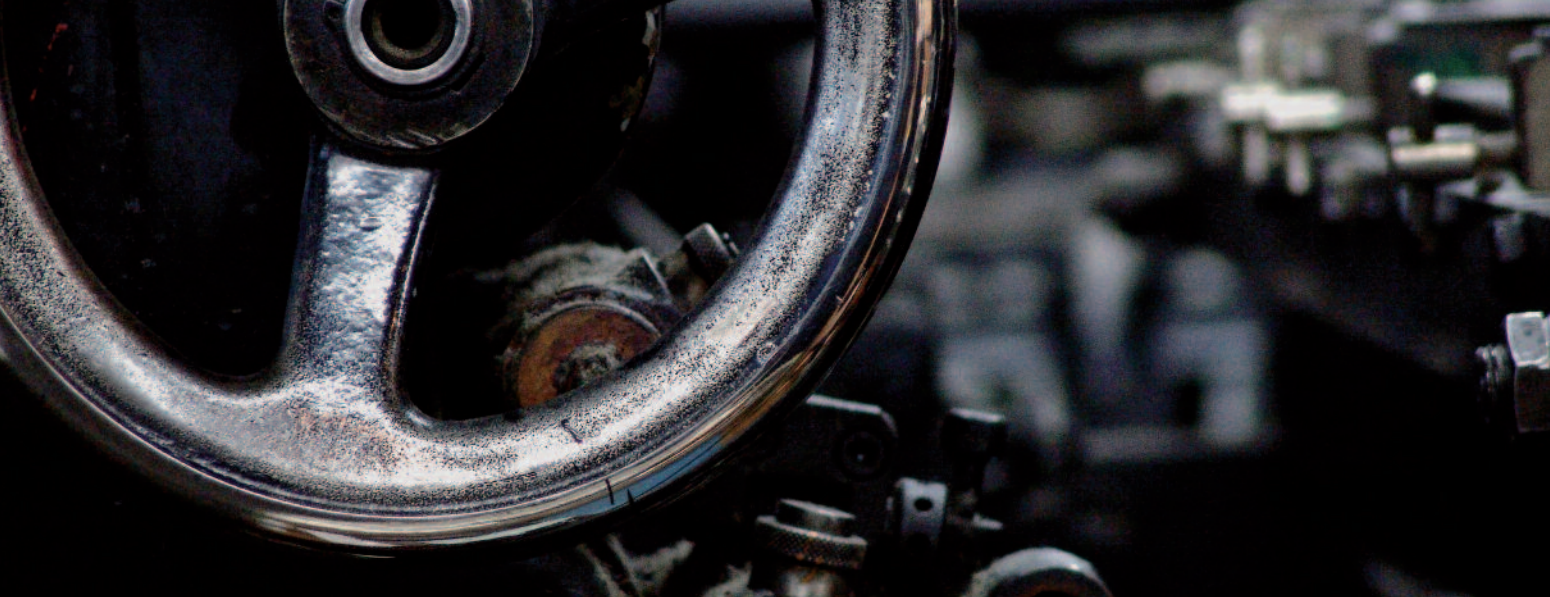
## Conclusion and sustainability

### recommendations for printing papers

Referring to the issue of paper, the Blue Angel eco-label (Blauer Engel; RAL-UZ 14 for recycled paper and RAL-UZ 72 for printing and publication paper) already shows a strong compliance in terms of the requirements for a sustainable paper product based on the existing standards and labels taking into account the eight sustainability criteria aforementioned. There are only comparatively few requirements the environmental label doesn't involve such as the existence of an environmental management system along the production chain, the preference of regional products and products with short routes of transportation as well as raw materials used to be free of genetically modified ingredients. In addition, the environmental label still needs to develop suitable criteria to address the

issue of mineral oil residues in recycled paper, an issue that has generated much controversy recently.

The selection of paper for sustainable publishing encounters difficulties if a special product requires paper of a certain quality that isn't met by any recycled paper available on the market. Unfortunately, the two international forest labels FSC and PEFC do not make clear statements neither about energy and water consumption nor about the use of chemicals and materials during production. In keeping with their self-conception the two systems focus primarily on the production and marketing of sustainable timber products. Therefore they urgently require such paper-specific criteria for production, whereas it is unlikely to be realized in the near future. From a present-day perspective only printing papers that feature the FSC label in combination with a certification in accordance with the Nordic Ecolabel criteria or the criteria of the new EU Ecolabel for printed products come close to papers being awarded the Blue Angel eco-label. A few types of papers produced by Scandinavian and French manufacturers already have such dual certification.



## Criteria for sustainable printing processes

The following section presents requirements for sustainable publishing regarding the three printing processes heatset offset, newspaper offset (coldset offset) and sheet-fed offset. It does not provide recommendations on sustainable publishing for digital and illustration rotogravure printing. This is because there are no comparable and reliable relevant studies on aspects of sustainability carried out for this complex process, even though digital printing is used increasingly.

Toluene, a solvent used in printing inks for illustration rotogravure printing, has been classified as being harmful to human

health, toxic for reproduction, mutagenic as well as hazardous to water. This fact calls the sustainability of that process into question – although there are stringent and binding legal regulations for illustration rotogravure printing.

The next passage lists the requirements that apply to all three aforementioned printing processes in equal measure. Along with paper selection, the application of such overarching criteria is another step toward sustainable publishing. The following pages describe separately the specific sustainability requirements for the individual processes.

All criteria are equally important for sustainable production processes of printed products; the order in which they are presented is not intended as an order of priority.

### Sustainability requirements independent of the processes involved

#### 1. Minimising ecologically and potentially health-harming ingredients and compounds

Throughout the entire printing process, the use of chemicals which are ecologically damaging, hazardous to water, harmful to human health, mutagenic or toxic for reproduction is kept to a minimum. In particular, all chemicals used in printing inks, binding agents and drying agents (siccatives), washing agents and auxiliary substances spare ingredients or preparations classified via the hazards information or risk phrases pursuant to EC Regulation 1272/2008 and Directive 67/548/EEC.

An absolute ban is on particularly problematic components such as surfactants (including LAS) and hormonally active phthalates is necessary.

Concentrations of substances and compounds of very high concern do not exceed the mass fraction of 0.1 maximally.

Printing inks ready for use must conform to the requirements as specified in the Austrian Ecolabel (RL) 24 for pigments, binding agents and siccatives.

In the case of benzines and mixtures of plant-based washing agents being used for the presses and other equipment they conform, like regenerating agents, to the provisions of the Austrian Ecolabel (RL) 24 with regard to the maximum of permitted concentrations and the exclusion of certain substances such as halocarbons. All washing agents used are recovered in keeping with technical and economic means.

## 2. Recyclability/deinkability

The printing inks used are verifiably deinkable complying with the deinkability score of the Deinkability Scorecard of the European Recovered Paper Council (ERPC). Deinkability is a key factor in maximising the recyclability of printed products. Thereby it is possible to increase the use of recycled paper in the production of new paper of high quality containing recycled paper. As a rule, printed products produced nowadays via offset printing (heatset offset, newspaper offset, sheet-fed offset) are readily deinkable. Fractions of mineral-oil that are capable of migration from coldset-offset products (newspaper offset printing), however, reduce the quality of the recycled fibre. In order to prevent such fibres of low-quality from finding its way into food package, at present there are only two options for recycling processes involved in the production of package paper: expensive sorting or a complete exclusion of newspapers from recycling. These two options, neither of which is economically or ecologically sustainable, can be circumvented by using printing inks proven to be deinkable and free of mineral oils (see p. 13, point 2).

## 3. Energy consumption and efficiency in printing processes

Sustainable printing plants run an energy management in accordance with DIN EN 16001. This means that they make every effort to use energy efficiently, that they continually monitor and document their energy consumption which they minimise by operating energy-efficient printing presses and by optimising their settings.

Additional options for minimising energy consumption offer the heatset offset printing (see p. 12, point 4).

## 4. Use of electricity from renewable energy sources or cogeneration of heat and power (CHP)

On average, at least 38 per cent<sup>17</sup> of electrical energy used in printing processes (for machines, cooling, lighting, etc.) annually is obtained from:

- certified renewable, non-fossil energy sources (wind, sun, geothermal energy, wave and tidal energy, hydro-power, landfill gas, sewage gas and biogas),
- CHP plants, preferably using renewable fuels,
- new plants, preferably having been in operation less than seven years.

<sup>17</sup> In keeping with Germany's 2020 target about the use of renewable-energy cf. the National Renewable Energy Action Plan in accordance with Directive 2009/28/EC on the promotion of the use of energy from renewable sources, p.2.

## 5. Generation of heat for heating the production site

The heat required for heating the production site is locally generated by geothermal systems or industrial CHP plants and is also locally used.

The heatset offset printing offers additional options for efficient heat consumption (see p. 12, point 5).

## 6. Reduction of (waste-) water quantities

Sustainably operating printing plants minimise their use of fresh water.

In the processes of plate production they:

- recycle fixing baths,
- increase the re-use of rinse water via suitable processes (such as closed-loop rinsing systems).

## 7. No genetic engineering

All materials used in process chains for the printing of books and magazines must be proven to be free of genetically modified ingredients (see p. 8, point 8).

## 8. Environmental management systems

For business practices to be sustainable a functioning environmental management system has to be in place. Certified environmental management systems such as EMAS (Eco-Management and Audit Scheme) and DIN EN ISO 14001 are possible guiding principles.

For small printing plants and publishing companies in particular certified regional environmental management systems such as Ökoprofit®, the ECOfit promotional programme of the federal state of Baden-Württemberg or others accomplish these requirements, too.

Subject to availability and technical practicability, production substances used (such as solvents, printing inks) are procured in refillable, reusable containers.







## Sustainability requirements for specific printing processes

### Heatset offset printing

#### 1. Minimising solvent emissions

In printing processes and cleaning of presses and other equipment, VOC emissions emerge that contribute to the formation of ozone harmful to climate and health. To minimise VOC emissions, production:

- uses waterless offset processes or
- involves an isopropyl alcohol fraction in damping solutions of considerably less than eight per cent by volume in conventional heatset offset. For this purpose, additives with low ozone-formation potential may be added to damping solutions.

Exhaust air is purified via catalytic or thermal post-combustion destroying all of the VOC contained in the printing inks, at least ten per cent of the VOC introduced via damping solutions and at least 15 per cent of the VOC introduced via washing agents.

The annual sum total of all VOC emissions emerging in the entire printing process must be considerably less than five kilograms per tonne of paper used. Emissions are calculated by subtracting from the quantities of VOC contained in the inks and chemicals used<sup>18</sup>, the quantities of VOC not emitted, that are destroyed in the exhaust-gas purification or are disposed of as waste (see the figure on p. 13).

#### 2. Minimising ecologically and potentially health-harming ingredients and compounds in washing agents for presses and other equipment

All washing agents used meet the following requirements (presented here in order of descending priority):

- a) slowly evaporating washing agents (high-boiling) or
- b) white spirits with a flash point above 55 °C–100 °C.

#### 3. Preference of vegetable oil based offset printing inks over mineral oil based inks

In keeping with the aim of resource-conserving, sustainable closed-cycle economies and in the light of crude-oil prices that continually rise as well as bearing in mind the discussion concerning the migration of mineral oils, preference should be given to vegetable oil based heatset printing inks. In such inks, fatty acid monoesters or pure vegetable oils replace mineral oil fractions. In processing such substitutes still present disadvantages in the form of higher drying temperatures and longer curing times which entails slightly higher energy consumption in comparison with mineral oil based heatset printing inks.

#### 4. Energy consumption and efficiency

Printing plants minimise their energy consumption by using the waste heat generated by post-combustion for printing processes or for the heating of the production sites.

#### 5. Heat generation and use

Plants carry out catalytic or thermal post-combustion with heat recovery for the drying systems or through the utilisation of waste heat to heat their production sites.

<sup>18</sup> The VOC concentrations of the chemicals / chemical compounds used are shown on the safety data sheets pursuant to REACH.



## Newspaper offset printing (coldset offset printing)

### 1. Minimising use of ecologically and potentially health-harming ingredients and compounds in washing agents for presses and other equipment

All washing agents used meet the following requirements (presented here in order of descending priority):

- a) slowly evaporating washing agents (high-boiling) or
- b) white spirits with a flash point above 55°C–100°C.

### 2. Preference of vegetable oil based newspaper inks over mineral oil based coldset inks

In keeping with the aim of resource-conserving, sustainable closed-cycle economies, vegetable oil based or water-based printing inks with proven deinkability should be used whenever possible. The use of mineral-based oils is not permitted in newspaper inks.

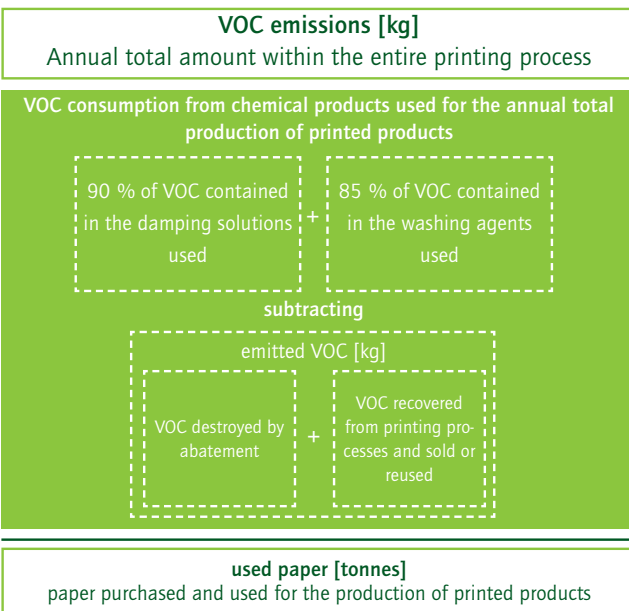
## Sheet-fed offset printing

### 1. Minimising solvent emissions

During the printing processes and during the cleaning of the presses and other equipment, VOC emissions emerge that contribute to the formation of ozone harmful to climate and health. To minimise VOC emissions production:

- a) uses waterless offset processes, or
- b) in conventional sheet-fed offset printing contains an isopropyl alcohol fraction in damping solutions of considerably less than eight per cent by volume.

The annual sum total of all VOC emissions emerging in the entire printing process must be considerably less than five kilograms per tonne of paper used. Emissions are calculated by subtracting the quantities of VOC that are disposed of as waste from the VOC contained in the inks and chemicals used (see the following figure).



< 5 [kg/tonnes]

## 2. Minimising solvent emissions from ecologically and potentially health-harming ingredients and compounds in the washing agents of presses and other equipment

Wherever possible, damping solutions used do not contain isopropyl alcohol.

Only the following washing agents may be used (presented in order of descending priority):

- a) plant-based washing agents,
- b) mixtures of vegetable oils / their esters and white spirits (flash point >100 °C),
- c) slowly evaporating washing agents (high-boiling),
- d) white spirits with a flash point above 55°C–100°C.



## Conclusion and sustainability

### recommendations for printing processes

The existing labels and standards for printing processes were reviewed in the light of the aforementioned sustainability criteria. As a result, three environmental labels were identified that already feature a great accordance with these requirements for sustainable printing processes: the Austrian Ecolabel (RL) 24, printed products; the EU Ecolabel for printed products; the Nordic Ecolabel, an environmental label for printing companies.

At the next regular revisions of these environmental labels, it is necessary to add the more stringent paper requirements set forth by the Blue Angel eco-label and the FSC certificate. Likewise, sustainably printed products might well be certified in future with a Blue Angel eco-label that complements the requirements of RAL-UZ 72 (printing and publication papers) with the requirements for publishers as set forth by the Nordic Ecolabel and requirements for printing inks laid down in for example the EU Ecolabel for printed products.





## At a glance:

# The basics of sustainable publishing

- The **use of certified recycled paper** protects valuable resources and globally reduces the pressure on the important carbon sink – the forest.
- If necessary to print on paper containing virgin fibre, that **fibre** must be obtained **from verifiably certified sustainable forest management**.
- The VOC emissions emerging **at the printing and the cleaning of presses and other equipment should be minimised** in order to prevent the formation of ground-level ozone.
- Sustainably operating paper mills and printing plants practice an **energy management**. They use renewable energy sources and continually reduce their energy consumption – for example by means of industrial heat-power cogeneration (CHP) and/or by using waste heat.
- In addition, they continually seek to **minimise their consumption of water and chemicals**.
- **The use of all ecologically and potentially health-harming substances** such as halogenated bleaching agents, organic chlorine compounds, VOC-containing solvents and auxiliary substances for the printing process, toxic heavy metals, surfactants and complexing agents **has to be avoided – or at least to be kept to a minimum – throughout the entire value chain right up to the finished publication**.
- **No genetically modified ingredients/parts** are used in paper production and in printing processes.
- **Use of printing inks free of mineral oils** must become a standard procedure within the near future.
- Sustainable published products can **easily be recycled after use**.
- Sustainable products **prefer regional substance flows** and require transport only over short distances.



# Contact

oekom verlag GmbH  
Anke Oxenfarth  
Head of sustainability department  
Waltherstraße 29  
D-80337 München

Fon: +49 89 544 184 -43  
Fax: +49 89 544 184 -49  
E-Mail: oxenfarth@oekom.de  
Internet: www.oekom.de

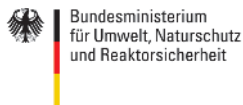
For further information, see:

[www.nachhaltig-publizieren.de](http://www.nachhaltig-publizieren.de)

## Impressum

»Ideas for Greener Pages« is a publication of the project »Sustainable Publishing – new environmental standards for the publishing industry«.

The project has been commissioned by the Federal Environment Agency (UBA) as part of the environmental research plan (Umweltforschungsplan; Förderkennzeichen /funding code: 3711 94 338) and is federally funded.



### Editors

Anke Oxenfarth (final editing), oekom verlag  
Kajsa Schwerthöffer (final editing), oekom verlag

Dr. Achim Schorb (paper),  
ifeu – Institut für Energie- und Umweltforschung,  
Heidelberg  
Wilckenstraße 3, 69120 Heidelberg  
E-mail: achim.schorb@ifeu.de

Ria Müller (printing processes),  
Institut für ökologische Wirtschaftsforschung (IÖW)  
Potsdamer Str. 105, 10785 Berlin  
E-mail: ria.mueller@ioew.de

Almut Reichart (technical support),  
Umweltbundesamt, Fachgebiet III 2.1,  
Wörlitzer Platz 1, 06844 Dessau

### Grafik

Sandra Filic, oekom verlag

### Druck

Druckkollektiv GmbH, Am Bergwerkswald 16-20,  
35392 Gießen, E-mail: info@gruendrucken.de  
Fon: +49 641 98496 -0, Fax: +49 641 98496 -25



Id-No. 1330203  
www.bvdm-online.de

This brochure has been printed on 120 g/m<sup>2</sup> Recystar Polar, certified pursuant to RAL UZ 14 – Blue Angel. The Fuji PRO-T3 printing plate employed uses no chemicals.

State-of-the-art roller technologies facilitated an alcohol-free production using offset printing with printing inks free of mineral oils and cobalt and with minimised VOC emissions.

We thank Druckkollektiv GmbH in Gießen for printing this brochure.



### Photo credits

iStockphoto.com: Spinkle (2 above-left), pixelio.de: Guido Wessel (2 centre-right), pixelio.de: Clemens Scheumann (2 above-right), fotolia.com: Oli\_ok (2 centre), fotolia.com: Ssogras (2 below), iStockphoto.com: Spinkle (4), fotolia.com: Joachim Wendler (7), fotolia.com: Africa Studios (8), fotolia.com: dresden (9), pixelio.de: Guido Wessel (10), fotolia.com: Tim Friedrich (11), pixelio.de: Clemens Scheumann (12+13), fotolia.com: Oli\_ok (14 above), fotolia.com: Ssogras (14 below +15)



I Ö W  
INSTITUT FÜR ÖKOLOGISCHE  
WIRTSCHAFTSFORSCHUNG

