Print Media Academy

HEIDELBERG

Profi Tip
Ecological Printing

Foreword

STATEMENT BY STEPHAN PLENZ, CHIEF TECHNOLOGY OFFICER OF HEIDELBERGER DRUCKMASCHINEN

Environmentally friendly sheetfed offset printing is no longer a niche market. More and more customers now expect manufacturers and service providers to exhaust all available possibilities for reducing environmental burdens and conserving resources.

In this issue of “Professional Tips”, Heidelberg would like to show how printers can take an integrated approach to meeting this challenge, downing two birds with one stone by combining environmental friendliness with business success. For example, printing with reduced or no alcohol lets them lower expenditures for dampening solution while also improving the air in the pressroom and significantly slashing emissions of volatile organic compounds (VOCs). Climate-neutral printing enhances their competitiveness, supports projects to protect the climate, and helps – by providing an incentive to curb carbon emissions – reduce waste sheets and energy consumption. By offering customers paper made from wood from sustainably managed forests or vegetable oil-based inks, print shops can also set themselves apart from the competition and keep price from being the only criterion driving buyers’ choices.

Various certificates and labels attest to pro-environmental services and a sustainable orientation – for environmental management systems, for instance, compliance with ISO 14001, and logos like those of the FSC and PEFC.

Sincerely, Stephan Plenz

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1.1 PAPER

ENVIRONMENTAL CRITERIA FOR PAPER

- Origin of the raw materials
- Environmentally friendly production
- Short-distance transport
- Recyclability when used

Paper from sustainably managed forests is designated, for example, by the FSC symbol (FSC stands for Forest Stewardship Council) or the PEFC logo (Program for Endorsement of Forest Certification Schemes). If you or your customer would like, for example, a FSC symbol on your print products, then you have to get yourself certified. Because it takes considerable amounts of water, energy, and chemicals to make raw paper pulp, the use of recycled fiber has special importance for being kind to the environment. Papers that contain a high proportion of recycled fiber are now indistinguishable from paper made from fresh fiber, in terms of both appearance, printability, and handling in the press.

PAPER HAS GREATER ENVIRONMENTAL RELEVANCE THAN ANY OTHER ASPECT OF THE PRINT PROCESS. A HEIDELBERG SPEEDMASTER XL 105-6+LX THAT IS USED TO FULL CAPACITY IN THREE-SHIFT OPERATION GOES THROUGH OVER 4,000 TONS OF IT IN A YEAR.

DEINKING OF PAPER

The ability to deink paper – in other words, to separate ink and coatings from it – is crucial for sustainable recycling of it. Good deinkability is a prerequisite for using used paper to make graphical papers and hygienic paper products. Effective processes are available today for removing aqueous coatings and sheetfed offset inks. It is considerably more difficult to achieve good results with UV-cured inks and coatings, the liquid toners used in digital printing, and inkjet inks.

Paper must be deinked before it can be recycled. In Germany, 86% of all used paper is recycled. (Photograph: UPM)

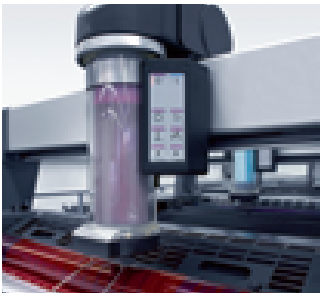
CHOOSING SUSTAINABLY PRODUCED PAPERS CAN GREATLY IMPROVE THE ENVIRONMENTAL FRIENDLINESS OF PRINT PRODUCTS.

1. Consumables

1.2 INKS AND COATINGS

Offset inks typically consist to 30 % of mineral oils. Using eco-inks, also known as eco-solvent inks and green inks, can cut down on the consumption of fossil fuels. These products use modified vegetable oils instead, such as linseed or soy esters. Eco-inks are already widely used in some markets. The differences in reproduction quality and processing are hardly noticeable. All major European producers are participating in the voluntary commitment made by the EU ink industry to protecting health and ensuring product safety.

Also with UV inks a few manufacturers have succeeded in replacing up to 30 % of the ingredients that go into their formulations with renewable raw materials. From an environmental perspective, in connection with packaging it is relevant that only extremely small amounts of ink constituents migrate from the printed surface into the substrate.



Print coatings can also be regarded as unpigmented inks. Like eco-inks, it is therefore also straightforward to use vegetable oil derivatives instead of mineral oils to make them. Dispersion and UV coatings are considerably less conducive to substituting renewable raw materials. In 2008, the first products based on naturally occurring resins and waxes reached the market. Preference should be given to dispersion coatings that only contain very small amounts of ammonia.

A HEIDELBERG SPEEDMASTER XL 105-6+LX USED TO FULL CAPACITY IN THREE-SHIFT OPERATION CONSUMES BETWEEN 20 AND 50 TONS OF INK PER YEAR.

1. Consumables

1.3 PRINTING WITHOUT ALCOHOL

Adding 8 to 10 % of isopropyl alcohol to the dampening solution is neither necessary for printing nor desirable from the point of view of occupational safety and environmental protection. The optimum amount for ensuring a stable process, reducing waste sheets, and cutting down on expenditures for alcohol is between 2–3 %. Printing completely without alcohol is now also feasible with the equipment available today, if your operation is appropriately organized. Scientific studies have failed to reveal any constraints on the materials that can be used. In order for it to work, the press must be appropriately equipped and its operator(s) must be willing to learn new approaches and track down the real causes of any problems that crop up.

WATER QUALITY

The water used for the dampening solution must be analyzed to determine its overall hardness and concentrations of calcium, magnesium, and hydrogen carbonates. To ensure consistently good water quality, it may be necessary to increase the hardness if the water is too soft or soften it with an ion exchanger followed by reverse osmosis if it is too hard. The process should be monitored by a conductivity sensor.

DAMPENING SOLUTION ADDITIVES

Do the following:

- Carry out tests to see whether additives are compatible with the printing plates.
- Clean the entire system.
- Add precise amounts of additives.

- Monitor the relevant process parameters: temperature of the dampening solution and inking unit, pH, and conductivity.
- Minimize soiling of the dampening solution by appropriately filtering it (with single- or multiple-stage filter systems to remove foreign particles such as paper dust, ink pigments, or oil from ink).

WATER TRANSPORT

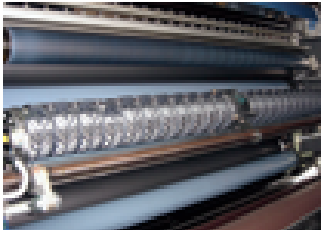
The formulation of a uniform, sufficiently thick film of dampening solution in the dampening unit is supported by special water pan and form rollers with surface structures designed to optimize transport of the solution. It is important to adjust them as required and regularly check them.

In general, when printing without alcohol the water pan roller must rotate faster in order to provide enough dampening solution to coat the plate. Our recommendation is to print with a water pan roller speed 5–10 % faster than the point at which smearing would normally begin, which has the effect of minimizing the scumming caused by other factors. Water transport is also improved by optimizing the following: moisture, control of the intermediate rollers, control of the dampening unit, and pre-, intermediate, and post-dampening.

ADVICE AND SUPPORT

Heidelberg offers a number of services to help you print without alcohol. They include equipping ordered presses to meet your particular needs, training your employees, providing instruction and support during the changeover, support during the first few months, and a helpdesk hotline.

The CombiStar central dampening solution supply unit



The Alcolor dampening unit

Isopropyl alcohol (IPA)

- Labeled according to EEC guidelines with letters indicating the hazards associated with the product:

Xi = irritating
F = highly flammable

- Hazard components for labelling
- R numbers:
  R 11 = highly flammable,
  R 36 = irritating to eyes

SWITCHING TO PRINTING WITH LOW OR MINIMIZED ALCOHOL CALLS FOR BOTH TECHNICAL AND ORGANIZATIONAL CHANGES TO BE MADE. AN ALCOHOL CONCENTRATION OF NO MORE THAN 2-3% IS REQUIRED FOR OPTIMUM WORK WITH A STABLE PROCESS, FEWER WASTE SHEETS, AND REDUCED EXPENDITURES FOR ALCOHOL.

1. Consumables

1.4 POWDER

The spray powder used to keep freshly printed sheets apart and prevent unwanted transfer of ink between them consists of either starch or inorganic calcium carbonate. From an environmental perspective, preference deserves to be given to starch, which is obtained from renewable raw materials.

The most important criterion for choosing a powder is uniformity of the particle sizes. The use of well-sorted powder reduces both smearing in the delivery and dust emissions. Soiling of the delivery means more work to keep it clean, and inhalation of the fine particles poses a hazard to health.

Example of poorly sorted powder with a high proportion of fine particles.

Example of well-sorted powder with a low proportion of fine particles.

HIGH-QUALITY POWDER, TOGETHER WITH EFFICIENT APPLICATION BY A SUPERIOR SPRAYER SUCH AS THE POWDERSTAR, ENSURES UNIFORM GAPS BETWEEN SUCCESSIVE SHEETS IN THE DELIVERY PILE, MINIMUM POWDER CONSUMPTION, AND LOW DUST EMISSIONS.

1. Consumables

1.5 CLEANING

Cleaning agents are used in offset printing to soften dried ink, paper dust, and other contaminants adhering to rollers and cylinders. These are then rinsed with water and wiped clean with washup blades or cloths.

Over 10 years ago, producers of printing presses, inks, and cleaning agents, toxicologists, and occupational physicians joined forces with the German Printing and Media Industries Federation and the responsible accident-prevention association to found the “Industry Initiative to Reduce Solvent Emissions in Offset Printing.” Since then, the amount of volatile cleaning agents used in offset printing in Germany has declined by about 80 percent.

The cleaning agents that are preferred today have high flashpoints and boiling points. Because very little is therefore lost due to evaporation, they are used more sparingly and also significantly reduce emissions of volatile organic compounds (VOCs).

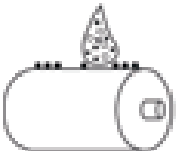
Parallel to this industry initiative, certification of cleaning agents was also introduced: at the request of the cleaning agent producers, the Fogra Graphic Technology Research Association now tests submitted cleaning agents to check whether they comply with the requirements for preventing health risks and ensuring press compatibility. The press manufacturers then decide which of them to approve for use on their equipment. The current list of certified products can be viewed at www.fogra.de.

THE BEST WAY TO SAFEGUARD HEALTH AND PROTECT THE ENVIRONMENT IS TO REPLACE VOLATILE SOLVENTS WITH CLEANING AGENTS THAT ONLY MINIMALLY EVAPORATE (WITH A FLASHPOINT ABOVE 100°C) OR, PREFERABLY, THAT ARE BASED ON VEGETABLE OILS AND DON'T EVAPORATE PRACTICALLY AT ALL.

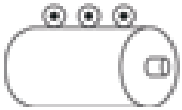
VEGETABLE OIL-BASED CLEANING AGENTS

For quite some time already, cleaning agents based on soy, coconut, rapeseed, and sunflower seed oil and their esters are available in the market. Emulsifiers are used to mix them with water.

Being based on vegetable oils, they hardly evaporate at all. This translates into less pollution of pressroom air and the environment, but it also requires new approaches for using these agents, for example special washup programs which ensure that washing and cleaning is done with enough water.



Apply cleaning agent



Detached contaminant particles coated with oil and emulsifier

The emulsifier lets the coated particles be washed off with water.

BECAUSE OILS DON'T EVAPORATE, IT IS ESSENTIAL TO MAKE SURE TO CLEAN ALL OF THE OIL OFF PRINTING PLATES, ROLLERS, AND BLANKETS. AFTER LETTER THE CLEANING AGENT WORK BRIEFLY, RINSE OFF THE OIL WITH WATER. DON'T LET ANY OIL DRIP INTO THE CYLINDER GAPS OR THE DAMPENING UNIT. IF ANY OIL GETS ONTO THE CATWALK OR FLOOR, CLEAN IT UP TO PREVENT SLIPPAGE.

Washup/ cleaning agents	Flashpoint	Evaporation	Potential hazards	Usage recommendation
Cleaning oils (based on vegetable oil)	High	Almost none	Flammable, but does not catch fire until very high temperatures are reached	Recommended
Washup/ cleaning agents (hydrocarbon-based)	Above 100°C	Very little	Flammable, but does not catch fire until heated to above 100°C	Recommended
White spirit	55 to 100°C	Fairly little	Flammable, noxious vapors	Permitted
White spirit (until the end of 2002, VbF class AII)	21 to 55°C	Less than special spirit	Flammable, noxious vapors, harmful if swallowed	White spirits with flash-points above 40°C may only be used in exceptional cases on presses installed prior to May 1995 and only if no other product can be used for technical reasons (proof must be provided). They pose a risk of fire. Not permitted on presses built in 1995 or later.
Special spirit (until the end of 2002, VbF class AII)	Up to 21°C	Very fast	Highly flammable, noxious vapors, risk of explosions and detonations	Not permitted. Must be replaced by another product.

THE FLASHPOINT IS A MEASURE OF THE FIRE HAZARD POSED BY A FLAMMABLE LIQUID. THE LOWER THE FLASHPOINT, THE MORE LIKELY IT IS THAT THE LIQUID WILL CATCH FIRE AND/OR EXPLODE OR DETONATE BECAUSE EVAPORATION OF THE LIQUID CAUSES A SUFFICIENT QUANTITY OF FLAMMABLE VAPORS TO ACCUMULATE AT LOWER TEMPERATURES.

1. Consumables

1.6 PRINTING PLATES

Printing plates mainly consist of new aluminum. In terms of their contribution to the total CO2 emissions caused by the making of a print product (relevant from the standpoint of climate protection), printing plates take second place after paper on short runs. This is because of the large amounts of energy that are used to produce aluminum.

Because significantly less energy is consumed to recycle aluminum, printing plates should be collected and recycled, even if they are used to make other aluminum products instead of more plates.

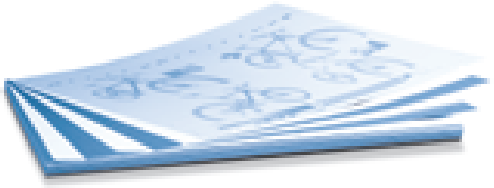
EUROPE RECYCLES MORE ALUMINUM THAN ANY OTHER PART OF THE WORLD. REUSING ALUMINUM SLASHES THE ASSOCIATED EMISSIONS OF GREENHOUSE GASES BY ABOUT 95 PERCENT.

2. Print Shop Operation

2.1 PREPRESS

SUITABLE PRINTING PLATE MATERIALS

Environmentally friendly platemaking without chemical development and regeneration saves 14-20 liters of water per plate and avoids the use of chemicals. The elimination of chemistry makes the whole process more stable.



Saphira “Thermoplate PN” plates are highly resistant to cleaning agents and mechanical stresses. When using aggressive washup agents or alcohol substitutes, they produce stable results in runs of up to about 350,000 prints. Consequently, this type of plate is excellent for IPA-free printing. When using UV or metallic inks, they last for about 100,000 prints without being burned in.

DOP (developed-on-press) plates do not require any special developing apparatus. Instead, they are washed out in the press via the dampening unit.

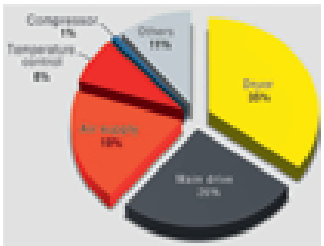
2. Print Shop Operation

2.2 ENERGY MANAGEMENT

Good energy management is aimed at ensuring efficient use of energy in the print shop. The first step is to take inventory of what is consuming energy.

In recent years, many options have emerged for increasing energy efficiency, especially in press peripherals, heating and lighting systems, and building insulation.

Hydroelectric plant on the Neckar River in Germany



Wind turbine

OPTIONS FOR REDUCING ENERGY CONSUMPTION AND CO_2 EMISSIONS:

In existing operations	When investing in new equipment or buildings
Modernize heating/air conditioning systems, including thermal insulation	Passive building design
Optimize air compression and distribution	Integrate heat recovery concepts (especially when UV technology is used, enough waste heat is produced to make using it worthwhile)
Install energy-efficient lighting that is appropriate to requirements	Water-cooled peripherals (retrofittable)
Install IT systems that use less energy; unplug when not in use	Use groundwater for cooling
When choosing a utility, check whether power is generated from renewable sources such as wind and water	Install energy-efficient equipment (that combines high performance with low energy consumption)

SAVING ENERGY AND REDUCING COSTS GO HAND IN HAND. EVEN MINOR STEPS SUCH AS AVOIDING STANDBY LOSSES OR MODERNIZING THE LIGHTING CAN HELP CUT ENERGY CONSUMPTION.

2. Print Shop Operation

2.3 WASTE SHEETS

Reducing waste sheets has the greatest potential for protecting the climate. With a Heidelberg Speedmaster XL 105, for example, it is possible to save up to 200 t of paper a year in this way, which can correspond to 250 t of carbon dioxide. The exact amount of avoided CO_2 emissions depends on the paper-making process and the energy sources used.

Possibilities for reducing waste sheets:

- Take advantage of all available applications for improving color and quality management (e.g. Heidelberg Prinect Workflow) when starting up the press and during production runs.
- Achieve the target colors as fast as possible.
- Precisely measure and control register.

Another way to cut down on waste sheets is to use Anicolor technology.

This short inking unit lets you reduce waste sheets by more than 80 % compared to standard inking units. The savings add up especially fast if you frequently print short runs. Good deinkability of the printed sheets is a further advantage over digital printing with liquid toner.

REDUCING WASTE SHEETS CAN CONTRIBUTE THE MOST TO PROTECTING THE CLIMATE. A STABLE PRINT PROCESS WITH HIGH PRINT QUALITY IS ENVIRONMENTAL PROTECTION IN ACTION.

2. Print Shop Operation

2.4 ACCIDENT AND FIRE PREVENTION

A fire in your print shop or pollution of the soil or groundwater with chemicals can not only cost you a lot of money but also destroy the environmental image you have meticulously cultivated over a period of years. And once you lose your customers' trust, it is hard to win it back again.

- Accident and fire prevention must therefore have top priority, especially in environmentally friendly print shops.
- In order to identify risks and nip them in the bud, make sure you know what amounts of which substances are used where and how.
- Investigate your processes, and make reductions wherever possible.
- Make sure that only minimal amounts of hazardous substances are stored where work is done; the proper place for them is in a special storeroom.
- Check to ensure that appropriate precautions are taken, for example grounding of solvent containers, sufficiently large catch pans, and adequate ventilation of storerooms.
- Catalog the substances used. This is the only way to ensure that all required information will be available in the event of an accident to enable fast, effective action.
- Observe all information provided in product safety data sheets to ensure that hazardous substances are properly handled and used.
- Regularly instruct and train your employees.


Environmental hazard


Flame

INVESTIGATING AND ELIMINATING THE CAUSES OF ACCIDENTS AND FIRES THAT ARE "WAITING TO HAPPEN" IS AN ACTIVE CONTRIBUTION TO ENVIRONMENTAL PROTECTION.

3. Climate Neutrality

More and more printers are realizing that their customers expect them to make a credible effort to voluntarily protect the climate. “Climate-neutral printing” is now well-established in the graphic arts industry, and quite a few companies have meanwhile specialized in advising printing companies on how to achieve climate-neutral printing.

The idea of climate neutrality is based on the assumption that emissions of CO_2 and other greenhouse gases are the cause of global climate change. It involves compensating for local emissions by promoting activities to protect the climate elsewhere in the world.

The goal of climate-neutral printing is thus to make up for unavoidable emissions of greenhouse gases resulting from the production of paper, printing plates, ink, etc., the energy used for printing and finishing, and transport of finished print products by investing in certified climate protection projects. For this purpose, a consulting project is carried out to quantify the CO_2 emissions that a print shop directly or indirectly causes and identify ways of avoiding and/or reducing them. A calculation tool lets the print shop determine the CO_2 emissions of individual printed items and offer to compensate them as a service to its customers. An appropriate logo is then added to the product to indicate that its carbon footprint has been successfully neutralized.

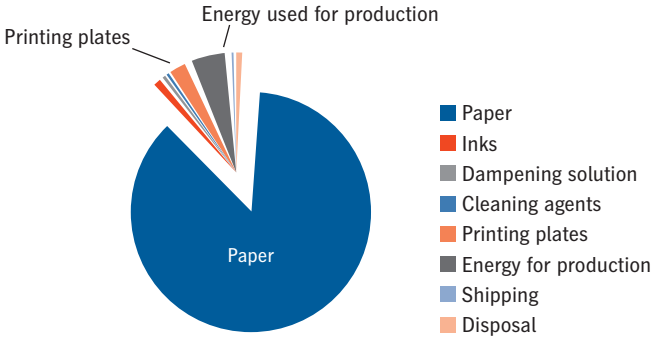
In connection with print production, it is paper, printing plates, ink, and energy consumption that are responsible for the greatest CO_2 emissions. The costs of compensation can be reduced mainly by reducing waste sheets and, to a certain extent, by taking steps to improve energy efficiency.

YOUR COMPANY'S CARBON FOOTPRINT

Printing companies can also determine their carbon footprint and take steps to reduce it. The focus is on the company as a whole and how all activities cause CO_2 emissions.

LIMITS ON WHAT A CARBON FOOTPRINT TELL US

Because there are still no generally valid rules for determining and calculating carbon footprints, statements made about them are hard to compare. Nor does your company's carbon footprint automatically permit conclusions to be drawn about its environmental friendliness, because it only describes a small part of how it impacts the environment. For example, the carbon footprint does not reflect how volatile organic compounds (VOCs) influence the phenomenon of summer smog, or the release of toxicologically problematic substances, or water consumption.



The principle of climate neutrality

The carbon footprint of producing a brochure (210 × 297 mm):
- 32 pages and cover, 4c
- 10,000 copies

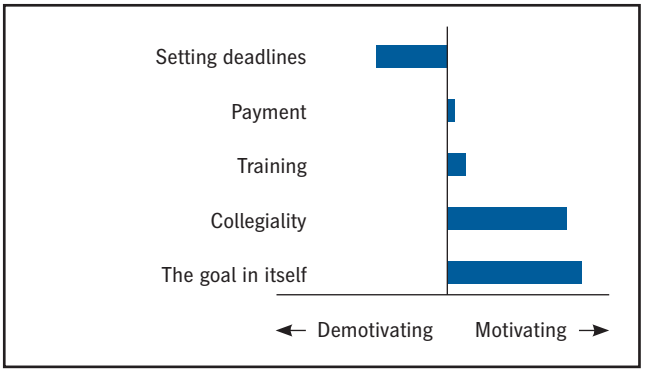
Print CO_2 compensated

German Print and Media Industries Federation

CARBON FOOTPRINTS CAN BE CALCULATED FOR PRODUCTS AND COMPANIES. WHERE PRINT PRODUCTS ARE CONCERNED, THE CARBON FOOTPRINT IS MAINLY DETERMINED BY THE PAPER USED (60-90%), THE ENERGY USED FOR PRODUCTION (< 10%), AND THE PRINTING PLATES (< 5%, DEPENDING ON HOW MANY ARE USED AND WHAT THEY ARE MADE OF).

4. Motivating Employees

Transforming your company into an environmentally friendly print shop is only possible if you succeed in motivating your employees to support this goal. Experience has shown that staff usually enthusiastically back a reorientation of this kind. Managers, for their part, need to have the required environmental knowledge and set a good example (at work, how they use company cars, etc.). This is especially important.



Typical effects on employees' motivation

It is often necessary to give up time-honored habits, for instance when switching to printing with little or no alcohol in the dampening solution.

It is then no longer possible to deal with certain problems by adding more alcohol, as has always been done. Instead, the problems have to be prevented by controlling process parameters more strictly than in the past.

Especially when there are minor setbacks and difficulties, it is important not to be discouraged and to keep looking for solutions.

Your print shop will need more than a day to turn into an environmentally friendly operation.

You will have to persistently maintain your environmental orientation for several years in order to have real, lasting success and convince your customers that you are serious about the change.

But once you achieve it and are rewarded with a good reputation and image, it will be that much easier to keep your employees motivated.

IN THE LONG TERM, IT WILL TAKE MORE THAN GOOD PAY TO MOTIVATE YOUR STAFF.

5. Communication

5.1 CUSTOMERS

In many cases, printing companies start going green in response to customer wishes. Make sure to talk to your customers about your possibilities for eco-friendly print production, including those who have never before expressed any concern about environmental issues. They can hone their own image by choosing the right paper and calling attention to your print shop's environmental orientation. You have the expertise – and they can leverage it in their own marketing activities.

Environmental labels and certificates also support marketing. For example, your printing company can work with appropriate service providers to calculate the CO_2 emissions caused by a print product. Then neutralize its environmental impact by investing in a climate protection project, and win points by advertising this fact with a label added to the product.

Other, more frequently used labels and logos are FSC (Forest Stewardship Council), PEFC (Program for Endorsement of Forest Certification Schemes), national environmental symbols and awards such as ÖKOPROFIT (in Germany and Austria), Imprim'Vert® (in France), and SGP certified (Sustainable Green Printing Partnership, in the United States and Canada).

CERTIFIED ENVIRONMENTAL MANAGEMENT SYSTEMS

Creating an environmental management system and getting it certified is a good way to demonstrate that your print shop processes have been checked and found to be environmentally sound. An environmental management system defines how environmentally relevant aspects are dealt with in the context of a company's regular management processes. Environmental goals are formulated, and their achievement is regularly monitored. This has the effect of reducing environmental impacts through a process of continual improvement. These days, before awarding contracts many larger companies require their suppliers to prove that they have certified environmental management system in place. Certification of compliance with the international ISO 14001 standard is most common; in Europe this is supplemented by EMAS (the Eco-Management and Audit Scheme), and in North America by the Sustainable Green Printing Partnership, which is specifically tailored to printing companies. All of these management systems are certified by independent auditing organizations.

DO A GOOD DEED AND TALK ABOUT IT! THIS RECOMMENDATION IS SIMPLE BUT EFFECTIVE.

5. Communication

5.2 SUPPLIERS

A new European regulation on chemicals and their safe use (REACH = Registration, Evaluation, Authorization and Restriction of Chemical Substances) anchors communication in the supply chain as a legal obligation: manufacturers and retailers must inform their customers about, for example, certain “especially worrying substances” in supplied products if these are not described in the manufacturer’s safety data sheet.

Independently of this requirement, it makes perfect sense to involve your suppliers in your efforts to create an environmentally friendly print shop. This includes suppliers of electric power, paper, inks and coatings, and cleaning agents. In all of these categories you can opt for renewable sources and suppliers with the corresponding expertise.

6. Getting Support

6.1 SUBSIDIES ETC.

Saving resources such as paper, alcohol, and energy or by recycling instead of disposing of waste is environmental protection in practice. However, before you can start realizing these savings it is often first necessary to invest in new equipment and buildings.

State support is available in many countries to facilitate this step, for instance in the European Union. They can take the form of low-interest loans to finance investments in environmental protection. Direct subsidies and tax breaks are also possibilities. They can turn many large investments with pilot character into truly profitable ventures. Please note that you must apply for support before signing anything. We therefore recommend that you first get in touch with a consultant or directly with the responsible government agencies.

The example of Germany:
In Germany, investments that help significantly improve the environmental situation and those that generate substantial energy savings are supported by the ERP environmental and energy efficiency program. Low-interest loans are provided within the scope of a joint initiative of the German Federal Ministry of Economics and Technology and the Kreditanstalt für Wiederaufbau (KfW). A saving is considered to be substantial if an investment in replacement equipment reduces energy consumption by at least 20 % of the average for the previous three years,or if an initial investment results in a saving of at least 15 % of the industry average. Loans of up to 2 million euros per project are granted for general environmental improvements and up to 10 million euros for measures designed to increase energy efficiency.

When submitting an application for a loan, the amount of the saving must be calculated by a consultant who has been admitted to the KfW consultant pool for providing “energy efficiency advice”. The loans may only be applied for via a freely selectable bank, which then relays the application to the KfW.

6. Getting Support

6.2 SOURCES OF INFORMATION

USEFUL INFORMATION IS AVAILABLE AT THE FOLLOWING WEBSITES (AMONG OTHERS):

CLASSIFICATION, LABELING, USE OF CHEMICALS:

REACH helpdesk of the Federal of German Industries (BDI)
www.reach.bdi.info

REACH CLP helpdesk of the German federal agencies
www.reach-clp-helpdesk.de

Hazardous substances used in printing and paper conversion
www.gefahrstoffe-im-griff.de

CLIMATE PROTECTION

Information on climate change and policies
www.bmu.de/klimaschutz/

German Print and Media Industries Federation
www.bvdm-online.de/Aktuelles/Klimainitiative/

Service provider for climate protection: ClimatePartner
www.climatepartner.de

Service provider for climate protection: natureOffice
www.natureoffice.com

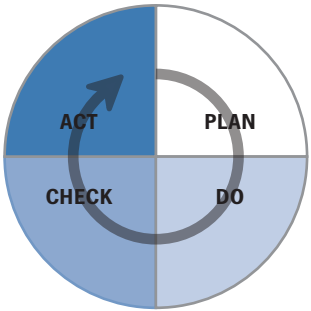
7. First Steps

7.1 STARTING THE PROCESS

In order to implement your vision of an environmentally friendly print shop, you should begin by taking stock. You won't necessarily need outside support to do this, but make sure to proceed systematically:

- Identify what is consuming energy in your shop.
- Quantify the flows of important materials such as paper, dampening solution additives, inks, and coatings.
- Determine how and in what quantities waste is produced and what happens to it.
- Check the potential health hazards associated with the chemicals used.
- Check for inefficient transport. This can be a source of waste.

This will quickly reveal where the weaknesses are and what can be improved with minimal work and expense.



The next steps:

- Define concrete, verifiable goals such as three percent fewer waste sheets by next year or reducing the alcohol content of the dampening solution to less than five percent by the end of the year.
- Assign responsibilities.
- Regularly check the progress made toward achieving your targets.
- If necessary, adjust the measures being taken.
- Document all processes in writing and define process parameters. This is an especially good idea for medium-sized and large printing companies.

IT TAKES PERSISTENCE TO IMPROVE ESTABLISHED PROCESSES SO THAT THEY REDUCE ENVIRONMENTAL BURDENS. BUT IT'S WORTH IT, BECAUSE YOU ENHANCE YOUR CREDIBILITY IN THE EYES OF YOUR CUSTOMERS AND EMPLOYEES. DON'T GIVE UP! THERE ARE PLENTY OF EXAMPLES THAT PROVE THAT ECO-FRIENDLY PRINTING HELPS DRIVE A PRINT SHOP'S SUCCESS.

Heidelberger Druckmaschinen AG
Print Media Academy
Kurfuersten-Anlage 52–60
69115 Heidelberg
Germany
Phone +49 6221 92-00
Fax +49 6221 92-4929
www.print-media-academy.com

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