# PLANET FRIENDLY GUIDE

## FOR SCREEN AND DIGITAL PRINTERS

PAPER AND OTHER SUBSTRATES

FESPA
profit for purpose

# INDEX

**Please click on the links below to go to the relevant information.**

# ABOUT THIS FESPA PLANET FRIENDLY SUMMARY GUIDE

**This FESPA PLANET FRIENDLY SUMMARY GUIDE has been developed as part of a series.**

The Guides aim to provide screen and digital printers with everything they need to know about printing sustainably.

The best available techniques, included in the Guides, give proven practical methods that can also generate financial savings. The Guides can assist printers who are planning to undertake any Environmental Management Certification.

The environment is a global topic that involves all the major industrialised nations. This has led to multi-international agreements such as the Kyoto and Montreal Protocols, the Durban Climate Change Conference, the Rio Earth and the Copenhagen Summits.

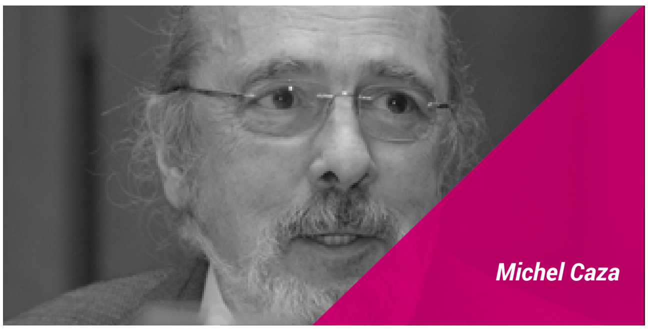
The European Union (EU) has been an early adopter of these agreements through various Directives and Regulations. The standards set by the EU in this field are often used as the benchmark by countries all over the world. However, there may be differences and the Guide user should always check with their local government bodies.

**THE FESPA PLANET FRIENDLY SUMMARY GUIDES** are based on these EU Directives and full details of references to this legislation can be found in the appropriate section of the Guide.

FESPA's Associations and their print company members can use and translate the Guides and the images used in them at no cost.

## THE HISTORY OF THE GUIDE

The Guides are based on FESPA's Planet Friendly Guide which has been used as the print industry's reference on this subject since it was created by FESPA in January 2012. Under the expert guidance of Michel Caza and Paul Machin, the Planet Friendly Guide has been developed and regularly updated for use by screen and digital printers all over the world.





Michel Caza is a multiple award-winning leading light in the global screenprinting industry, and one of the 'founding fathers' of FESPA in 1962 and has been a Board Member since 1990.

Paul Machin is a chemist and lawyer Paul has spent 40 years dealing with European and international issues relating to the health, safety and environmental topics within the printing industry.

***While every effort has been made to ensure that the information contained in the Guides is correct as at August 2014, readers are asked to note that FESPA makes no representation, expressed or implied.***

# PAPER AND OTHER SUBSTRATES

## INTRODUCTION

Whether it is paper, plastic, textile, metal, glass or other substrates, this is the largest commodity either by volume, cost or both of the screen printer's annual purchase. It is therefore potentially the most likely product to affect the environmental performance of that company. This is clearly illustrated by the impact that substrates have upon the carbon footprint of the total printing process where they often represent in excess of 75% of the carbon footprint. Because of these factors, it is necessary to study the impact of substrates upon the environmental sustainability of the screen printing process.

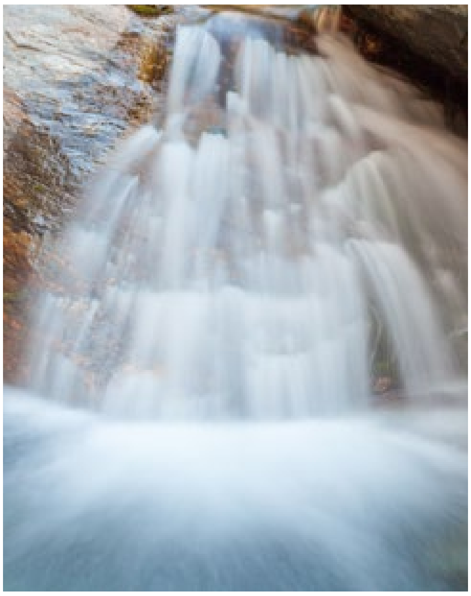
To use the traditional definition, sustainable development is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs.„ It is therefore essential that the impact of the substrates used in screen printing are understood.

# MANAGEMENT OF NATURAL RESOURCES AND WASTE

The European Union, as part of its sustainable development programme, has set out its objectives to ensure that the consumption of renewable and non-renewable resources does not exceed the carrying capacity of the environment. It has set out to achieve a decoupling of resource use from economic growth, through significantly improved resource efficiency and the reduction of waste. With regard to waste, the specific target was to reduce the quantity going to final disposal by 20 % by 2010 and 50 % by 2050.

**The actions to be undertaken are as follows:**

- **the development of a strategy for the sustainable management of resources by laying down priorities and reducing consumption;**
- **the taxation of resource use;**
- **the removal of subsidies that encourage the overuse of resources;**
- **the integration of resource efficiency considerations into integrated product policy, eco-labelling schemes, environmental assessment schemes, etc.;**
- **establishing a strategy for the recycling of waste;**
- **the establishment of Eco labelling;**
- **the improvement of existing waste management schemes and investment in quantitative and qualitative prevention and**
- **the integration of waste prevention into the integrated product policy and the Community strategy on chemical**



As part of this process the EU has examined the sources of timber and timber products and has set out a programme to reduce the illegal logging of timber. The Timber Regulation EU 995/2010: **https://www.gov.uk/eu-timber-regulation-guidance-for-business-and-industry** lays down the obligations of operators who place timber and timber products on the market. These obligations include the traceability of the paper source if it is bought within the EU and/or a due diligence system if the paper is purchased from a non-EU country. Guidance is available at the following web site addresses:

**http://ec.europa.eu/environment/forests/pdf/Final%20Guidance%20document.pdf** and

**https://www.gov.uk/eu-timber-regulation-guidance-for-business-and-industry**

Purchasing paper from suppliers who source from either the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC) does not in itself satisfy the requirements of the Timber Regulation. The chain of custody certification will assist in the justification of compliance with the regulation.

Since the substrates used within the screen processes are the largest consumable item it is important to ascertain how it is possible to meet the aspirations of sustainable development while at the same time achieving the desired financial performance. It is necessary to examine the various substrates that are commonly used by screen printers, commencing with the most common which is paper.

## COMMISSION DECISION 2014/256/EU

Establishing the ecological criteria for the award of the EU Ecolabel for converted paper products

The product group ‘converted paper products’ shall comprise the following products:

(a) envelopes and paper carrier bags that consist of at least 90% by weight of paper, paperboard or paper-based substrates;

(b) stationery paper products that consist of at least 70% by weight of paper, paperboard or paper based substrates, except for suspension files and folders with metal fastener subcategories

Ref **http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.135.01.0024.01.ENG**

## COMMISSION DECISION 2014/345/EU

This amends Decision 2012/481/EU Ecolabel for printed paper. It changes the substrate criteria to provide Ecolabels for a wider substrate range.

**http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.170.01.0064.01.ENG**

## COMMISSION DECISION (2014/350/EU)

Establishing the ecological criteria for the award of the EU Ecolabel for textile products

**http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.174.01.0045.01.ENG**

# PAPER

Paper is arguably the most sustainable raw material that exists today provided it is managed properly.

One of the many unique qualities about paper is that its main raw material is renewable, recyclable, acts as an energy source and provides a natural habitat for wildlife.

Paper manufactured within Europe has the composition of 43.9% recovered paper; 40.4% wood pulp 1.1% of pulp other than wood; and 14.6% of other materials. The latter includes 8.0% calcium carbonate; 3.3% clay; 1.7% starches and 1.6% of other non fibrous materials. It therefore pursues an active policy of using recycled materials.

More than 70% of pulp delivered to a paper and board mill is certified to an independent forest management certification scheme and the mill can count this in their own Chain of Custody.* The two main global forest certification schemes are the Forest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC).

***http://www.cepi.org/docshare/docs/3/MJMKACACNJNFAABDMNILNOADGA6OB6U966Y6VB4JHE4T/CEPI/docs/DLS/Sustainability_Report_WEB-20111110-00018-01-E.pdf**

## FSC

FSC is an independent, non-profit, non-governmental organisation. It was founded in 1993 with the aim of establishing a single global forest certification body (**http://www.globalforestregistry.org/**). It has the support of the 1995+ Group, a number of environmental organisations (most prominent was the World Wildlife Fund) and social non-governmental organisations (NGOs). FSC has now accredited 16 organisations to certify forests that are managed in accordance with its principles and criteria in Canada, France, Germany, Italy, South Africa, Switzerland, the Netherlands, UK, and USA. Over 70 million hectares of forest have been certified by FSC accredited auditors.

## PAPER STORAGE

There is a belief within the industry that the paper used in the machine must be kept at a certain temperature to avoid humidity problems and paper jams on start-up. This has resulted in either thermostatically controlled heating or air-conditioning being installed to control air temperatures. Over time heat controls are not maintained leading to excessive and unnecessary energy use.

Most papers can be stored at 12°C, saving energy on heated store rooms, and, as they come in waxed packaging, damp paper is generally not an issue.

## PEFC

The Programme for the Endorsement of Forest Certification (PEFC) is the world's largest forest certification system and the certification system established by the forest industry. A non-profit, non-governmental organization, PEFC is dedicated to promoting sustainable forest management through independent third-party certification.

PEFC works throughout the entire forest supply chain to promote best practice in the forest and ensure that timber and non-timber forest products are sourced with respect for the highest ecological, social and ethical standards. Thanks to its eco-label, customers and consumers are able to identify products from sustainably managed forests.

PEFC is an umbrella organisation. It endorses national forest certification systems developed through multi-stakeholder processes, tailored to local priorities and conditions that meet PEFC International's globally recognised Sustainability Benchmarks.

PEFC has endorsed 30 national forest certification systems in 29 countries.
See **http://www.unece.org/forests-welcome/publications/markets.html**

For every tree that is logged in these managed forests, generally 3-4 are replanted. This has led to an annual increase of forest cover within Europe that is equivalent to more than 1.5 million football pitches. This is effective sustainable forest management which the Ministerial Conference on the Protection of Forests in Europe (MCPFE) defined as:

"The stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems."

Forest certification provides evidence of sustainable forest management, which is defined as the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems.

# PAPER CHOICES

## UNCERTIFIED PAPER

Paper from non-sustainable sources can result in the permanent destruction of forests and the communities and wildlife they support. Such paper would not be acceptable for products covered by categories 47 and 48 in the Combined Nomenclature or meet the EU Timber Regulation.
(**http://ec.europa.eu/taxation_customs/customs/customs_duties/tariff_aspects/combined_nomenclature/**).

## CERTIFIED PAPER

This will exhibit the FSC or PEFC logo.

## RECYCLED PAPERS

Recycled paper has been produced to the same standards as virgin pulp paper for several years but still suffers from a perception of poor quality. It can be equal in quality to paper from virgin forest sources. It is readily available and it supports your Corporate Responsibility Agenda, demonstrating that your organisation is committed to sustainable procurement. It diverts waste paper from landfill.

## PAPER PROFILE

This is a standardised product declaration system developed by paper suppliers, manufacturers, distributors and industry associations that provides product-specific environmental data. Data are provided on a standardised one-page declaration so product information is comparable. A Paper Profile gives essential information regarding product composition and key environmental parameters (e.g. chemical oxygen demand (COD) of wastewater discharges, sulphur and CO2 emissions and solid waste). Additional topics include environmental management systems adopted by the producing mills and details about wood procurement. (**http://www.paperprofile.com/**)

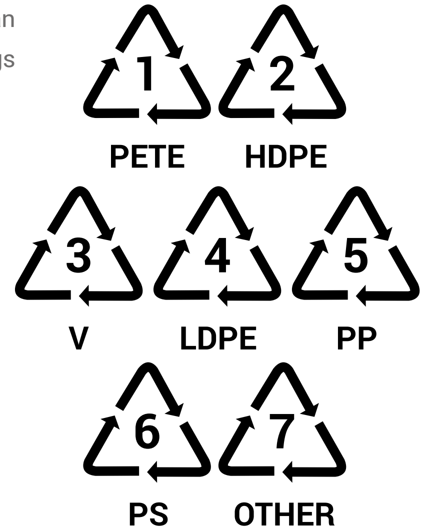
# OTHER SUBSTRATES

There are a wide number of other substrates available, and there has been an increase in the use of wide-format printing, especially for advertising on buildings and hoardings.

**Other substrates can include:**

- **plastics - polystyrene, ABS, PET, PVC;**
- **glass;**
- **ceramics;**
- **metal;**
- **textiles - particularly organic and biodegradable products such as cotton, hemp and jute.**

Each material has its own unique properties in regards to printing techniques, quality and limitation. Apart from PVC, generally all the materials are recycled.




# PLASTICS

When compared to other materials like glass and metal materials, plastic polymers require greater processing (heat treating, thermal depolymerisation and monomer recycling) to be recycled. Before recycling, most plastics have to be sorted according to their resin type.  To assist in the sorting operation, a method of categorisation of polymer types is used whereby each plastic product is assigned an individual recycling code.

Plastic reclaimers can now use an automatic sort system to identify the resin, such as near infrared (NIR) technology. Some plastic products are also separated by colour before they are recycled. The plastic recyclables are then shredded. These shredded fragments then undergo processes to eliminate impurities like paper labels. This material is melted and often extruded into the form of pellets which are then used to manufacture other products.

Another method that is used is depolymerisation, whereby the plastic is converted back to its original monomer constituents.

PVC is an extremely stable polymer and does not decompose. Hence it is frequently used in buildings and electrical applications. There is a steady increase in the percentage of PVC that is recycled. For further information see http://www.pvc.org/en/p/recycling-in-europe.

Combustion of PVC leads to the production of hydrogen chloride, chlorine gases and dioxins all of which are highly toxic. Waste PVC is often converted to low grade product such as garden features etc.

# BIODEGRADABLE PLASTIC

Currently, there is research taking place in the area of biodegradable plastic. A genetically engineered bacterium capable of synthesising biodegradable plastic has also been developed. This material, however, is quite expensive to create at this point. Currently, there is a biodegradable polyester called Ecoflex, that is used for food packaging applications. Unfortunately, carbon gets locked up in these biodegradable plastics and is released into the atmosphere as carbon dioxide. Another downside to these biodegradable plastics is that they require sunlight to degrade. Plastics buried in landfills will not receive the sun they need to degrade and, therefore, can last for decades.

# GLASS

Glass bottles and jars are 100% recyclable and can be recycled endlessly without any loss in purity or quality providing that segregation by colour takes place.

# CERAMICS

Ceramic is an inert material, it will not decompose and can be recycled.  Waste ceramics are sorted then mixed and crushed with rubble and stone to produce a product which can be re-used by builders and civil engineers. The benefits of using these recycled materials are that they are less expensive and it's a conservation of resources.

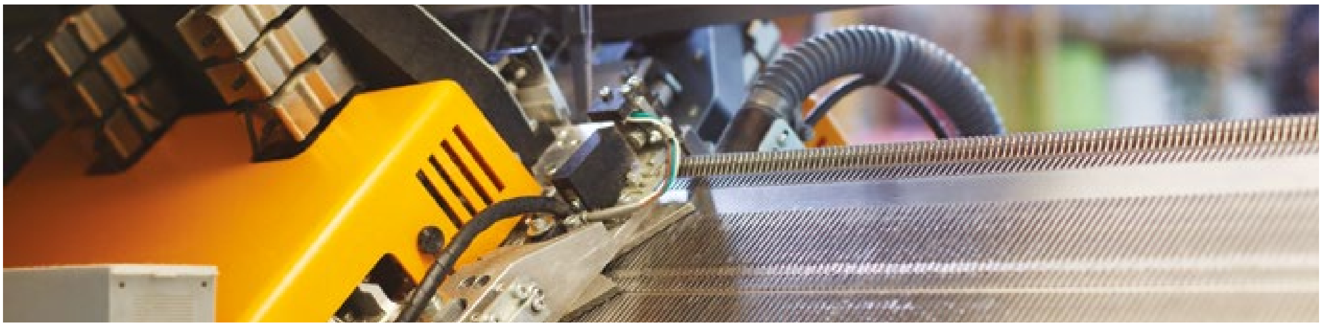
# METAL

Metal by nature is suited for recycling. Unlike paper, metal can be recycled without any loss of quality or strength because its chemical structure doesn't change when melted. Unlike plastic, metal can be recycled indefinitely. Aluminium is the most economical material to recycle; steel's magnetism makes it especially easy and inexpensive to sort and recover.

# TEXTILES

Particularly organic and biodegradable products such as cotton, hemp and jute can be recycled. Clothing fabric generally consists of composites of cotton (biodegradable material) and synthetic plastics. The textile's composition will affect its durability and method of recycling.

Fibre reclamation mills grade incoming material into type and colour. The colour sorting means no re-dying has to take place, saving energy and pollutants. The textiles are shredded into „shoddy" fibres and blended with other selected fibres, depending on the intended end use of the recycled yarn. The blended mixture is carded to clean and mix the fibres and spun ready for weaving or knitting. The fibres can also be compressed for mattress production. Textiles sent to the flocking industry are shredded to make filling material for car insulation, roofing felts, loudspeaker cones, panel linings and furniture padding.



# SUBSTRATE MANAGEMENT

Substrate waste can be unnecessarily built into a job at the planning and estimating stage through choice of paper size, layout and overs allowance. This is where a lot of waste is created.

- **Review the policy on overs. How much waste is planned into the job, are office copies really necessary? What is the policy on good overs? Are they scrapped, stocked or given away? There is a balance to be struck between the cost of building in overs and the risk of a reprint if the job is short – is that balance right?**
- **High waste paper production can occur when a customer has a catalogue or flyer that has a bleed on one or more edges as this will need a larger sheet of paper for printing and then trimming. For example, a sheet size SRA3 (450 x 320 mm) is often used to print A3 pages. Some manufacturers offer a sheet 427 x 305 which reduces trim. Clients should be encouraged to avoid designs that require a bleed.**

## SHAPE NESTING

When planning die cutting or laser cutting, take care to nest shapes to minimise the area loss. Automatic nesting software is available as an option on many design packages and is worth investigating.

## PURCHASING AND STOCKING

Good stock management and control are key to reducing substrate losses. Losses due to obsolescence and damage can be significant, so take some sensible steps to control them.

- **Keep a stock list and do a regular stock take. This is invaluable for avoiding over-ordering and highlighting slow-moving stock.**
- **Avoid over-ordering. Many paper merchants will deliver the next day so there is little need to keep large stocks. Ensure order quantity takes current stocks into account. Ordering special sizes or paper types for a one-off job can be a problem when there is a minimum order quantity. Think about what to do with any leftovers. Can they be used on future jobs?**
- **Goods-in inspection procedure. There should be a clear procedure for goods in inspection and a policy on what to do if damage or shortages are noticed. This can be part of the quality system.**
- **Stocking area. This needs to be dry and clean, but does not generally need to be heated or air-conditioned. Paper can be kept at a wide range of temperatures and humidity providing extremes and sudden changes are avoided.**
- **Rotate stock. Mark incoming stock with the date of delivery. Ensure stock is rotated so that the oldest stock gets used first (FIFO = First In First Out).**
- **Damage. How much is it costing? Record write-offs due to damage and ensure a reporting and corrective action procedure is in place as part of the quality system.**
- **Slow-moving stock. Review what to do with slow-moving stock on the stock list. It could be used on selected jobs, offered to selected customers at a discount, or made into notepads.**

## PRODUCTION AND PACKING

Handling and unwrapping paper. Train operators to take care in handling and unwrapping paper to avoid damage and creasing which may cause paper jams and rejects. Are they clear what to do with any leftover paper at the end of a job?

Packing. Re-use raw materials' pallets and boxes for packaging the finished product. A positive image can be created this way.

## FINISHING/ENVELOPING

Good stock management and control are key to reducing substrate losses. Losses due to obsolescence and damage can be significant, so take some sensible steps to control them.

Finishing operations can be very reliable, allowing overs to be pared to the minimum, or they may be variable, increasing reprint risks and leading to high overs as an insurance policy.

- **Investigate finishing waste - how variable is it? If most jobs go through without a problem and then there is an occasional disaster, then high overs allowances are not the right solution - they will increase waste without preventing the disaster. Investigate and fix the cause of the disaster and set a lower overs allowance for the routine jobs.**
- **Improving the finishing process. If finishing waste is routinely high, then set up a process improvement project to understand and tackle the root causes.**


FESPA LTD
Bancroft Place
10 Bancroft Road
Reigate
Surrey
RH2 7RP

**t** +44 1737 240788
**f** +44 1737 233734
**e** info@fespa.com

WWW.FESPA.COM

## ABOUT FESPA

FESPA is a global federation of 37 national associations for the screen printing, digital printing and textile printing community. Founded in 1962, FESPA organises the leading exhibitions and conferences for this community and reinvests profits from these activities into the global print community.



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