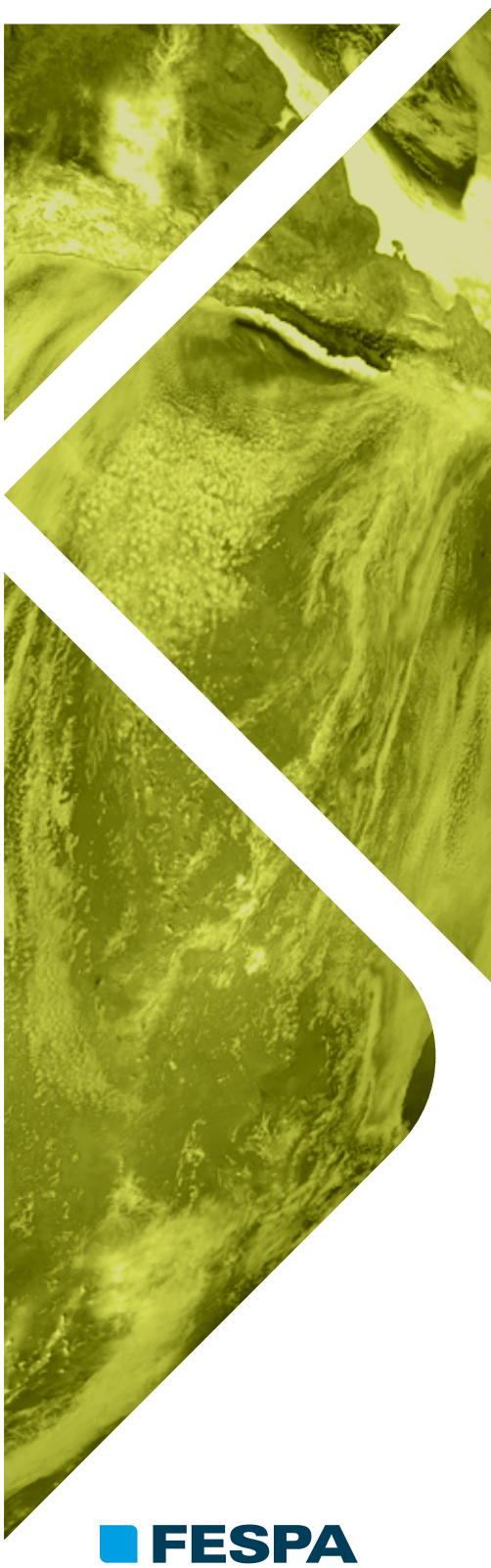
PLANET FRIENDLY GUIDE

FOR SCREEN PRINTERS

HAZARDOUS SUBSTANCES



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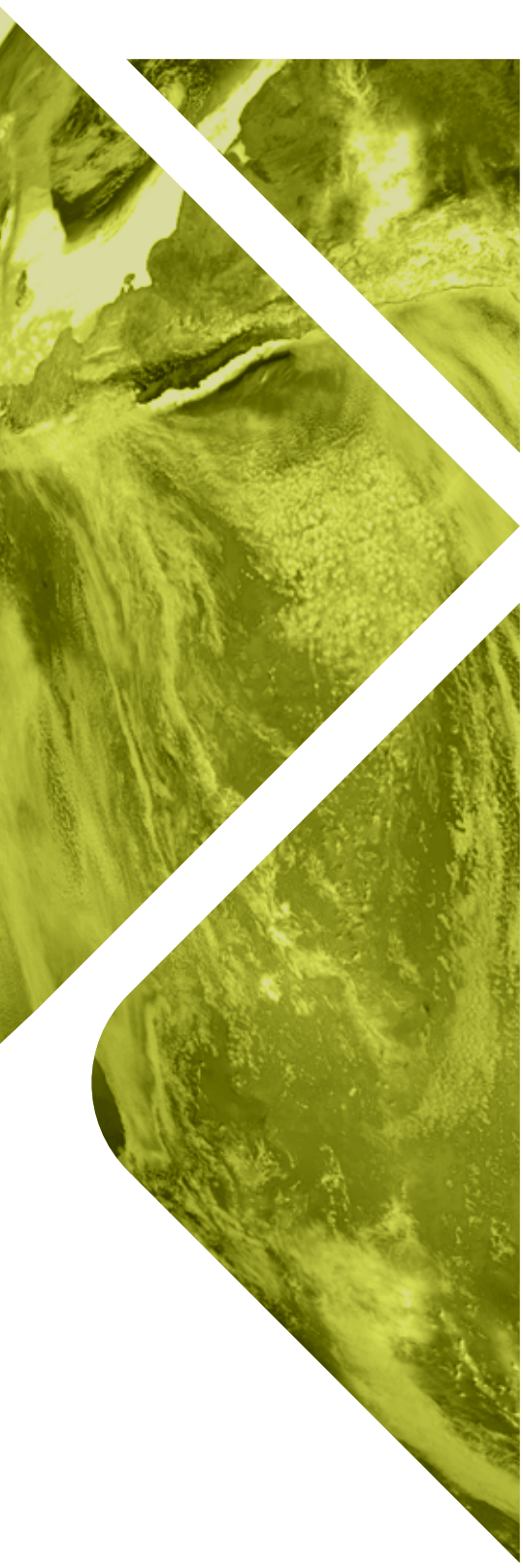

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ABOUT THIS FESPA PLANET FRIENDLY SUMMARY GUIDE

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.

HAZARDOUS SUBSTANCES

The health, safety and environmental characteristics of all chemicals used within the **EU** are currently under review in accordance with the Registration, Evaluation, Authorisation and restriction of Chemicals Regulation **(REACH)**. Downstream Users (ink and other consumable print product manufacturers) should be aware of any restrictions imposed on the use of any chemicals pertinent to their products.

Information on the hazardous nature of substances used in the printing industry can be found in the following European Directives and Regulations at the following website address: **http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/index_en.htm**, which is to be updated during the first semester of 2014 into the new EUR-Lex web-portal. **This web site will provide information on:**

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

1. GENERAL

The labelling of substances was changed to comply with the **EU Classification, Labelling and Packaging Regulations** and those products that have the Hazard Statement H300, H301 H302, H304, H310, H311, H312, H330, H331, H332, H334, H340, H350, H351, H360, H361, H400, H410 and H411 must be substituted immediately by products that avoid such substances.

Any chemical that is considered by the **European Chemicals Agency (ECHA)** to be a **Substance of Very High Concern (SVHC)** should be avoided or replaced as soon as practically possible.

2. TOXIC METALS AND METAL COMPOUNDS

Cadmium, lead, chromium and nickel could occur as pigments as well as driers and catalysts. These are controlled by the Registration, Evaluation, Authorisation and Restriction of Chemicals **(REACH)** Regulation (see page 2 DANGEROUS SUBSTANCES AND PREPARATIONS) restricting the marketing and use of these and other pigments across the EU. Similar restrictions are applied under the Directive on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment, etc. **(RoHS)** (see page 2 MACHINERY).

The European Toys Directive 2009/48/EU limits the use of pigments and other constituents based on aluminium, antimony, arsenic, barium, boron, cadmium, chromium, cobalt, lead, copper, manganese, mercury, selenium, strontium, tin and zinc. Many purchasers of children's clothes require that the inks used must comply with EN 71-3. As such clothes can be sucked by children.

The discharge to a sewage system of any silver compounds should be controlled. Many of these toxic metals and metal compounds degrade either slowly or not at all and therefore must be disposed of only as hazardous waste.

DANGEROUS SUBSTANCES AND PREPARATIONS:

- **Regulatory framework for the management of chemicals (REACH), European Chemicals Agency**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/l21282_en.htm
- **Classification, packaging and labelling of chemicals and their mixtures**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/ev0013_en.htm
- **Classification, packaging and labelling of dangerous substances**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/l21276_en.htm
- **Classification, packaging and labelling of dangerous preparations**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/l21273_en.htm
- **Detergents**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/l32025_en.htm
- **Biocides**
- **Community strategy for endocrine disrupters**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/l21277_en.htm
- **Community strategy concerning mercury**
  http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/chemical_products/l28155_en.htm

MACHINERY

Information on machinery used in the printing industry can be found in the following European Directives and Regulations at the following website address:

http://europa.eu/legislation_summaries/environment/waste_management/l21210_en.htm, which is to be updated during the first semester of 2014 into the new EUR-Lex web-portal. This web site will provide information on:

- **Waste electrical and electronic equipment**
- **Restriction of the use of certain hazardous substances in electrical and electronic equipment**

TOYS

Information on toys can found in the following European Directives and Regulations at the following website address:
http://europa.eu/geninfo/query/resultaction.jsp?ResultCount=25&Collection=EuropaFull&ResultMaxDocs=200&SourceQueryText=scadplus01&qtype=simple&DefaultLG=en&ResultTemplate=%2Fresult_fr.jsp&page=1&QueryText=Toys&y=4&x=16

GUIDANCE:

Green Paper of 26 July 2000 - Environmental issues of PVC [COM (2000) 469 - Not published in the Official Journal].

European Council of Paint, Printing Ink and Artists' Colours Industry (CEPE); Exclusion list for printing inks and related products – October 2006 (**http://www.foodcontactmaterials.com/materials/eupia.pdf**)

Acrylate Preference Criteria; Guide to the classification and labelling of UV acrylates
(**http://www.radtech.org/health_safety/pdf_docs/ Cefic%20document.pdf**).

3. PLASTICISERS

Plasticisers are included in ink and photo-stencil emulsions as a means of producing the necessary flexibility in the product to avoid breakdown of such products under material stress. Such substances may include a group of chemicals known as phthalate esters. Phthalate esters e.g. di-ethyl phthalate and dicyclohexyl phthalate have been assessed as having a high level of concern with respect to being an endocrine disruptor. As a group of chemicals, phthalates are either being reviewed under **REACH** as **Substances of Very High Concern (SVHC)** or subject to authorised use only that would normally exclude printing (see green right hand page DANGEROUS SUBSTANCES AND PREPARATIONS).

The endocrine system is a complex network of glands, hormones and receptors. It provides the key communication and control link between the nervous system and bodily functions such as reproduction, immunity, metabolism and behaviour.

5. SURFACTANTS

Surfactants are used in water and solvent based cleaning preparations. Surfactants often belong to the group of chemicals known as alkyl ethoxylate, alkyl phenol ethoxylates or sulphonate derivatives. These chemicals are subject to restrictions and cannot be used in quantities of greater than 0.1% unless authorised under **REACH** (see page 2 DANGEROUS SUBSTANCES AND PREPARATIONS). Such surfactants are included in detergents and other cleaning products in order to reduce the surface tension of liquids so that they can wet surfaces and clean them more effectively. Since the inclusion of a surfactant will increase the products biodegradability it will adversely affect the Chemical Oxygen Demand/Biological Oxygen Demand (COD/BOD) and the cost of the sewage treatment charge.

To reduce the impact of these surfactants with any cleaning preparation, avoidance of any discharge to the sewage system should be promoted by recycling of the product.

4. BIOCIDES

This group of chemicals is present in most water-based compositions. Their role is stopping the formation of bacteria that could cause the composition to malfunction after prolonged storage. Because the biocide stops the generation of living organisms, that degeneration will also occur if the composition containing the biocide is allowed to enter the environment through the sewage system. This can have an adverse effect on any sewage treatment plant. There is an **EU** approved list of substances that can be used as biocides. The biocide will need to be named if the treated article uses a biocide and the preservative properties are claimed for the treated article printing (see page 2 DANGEROUS SUBSTANCES AND PREPARATIONS).

6. RESINS

Resins are the essential constituent of any ink and act as the film former. The major area of concern is Polyvinyl Chloride (PVC). It is extremely difficult to degrade and therefore it presents problems if disposed of by landfill. It can be recycled but incineration of this resin can give rise to the production of toxic chemicals to the person or the environment.

Some acrylate based UV resins do have certain skin irritation properties. It is possible to limit this problem associated with such resins by using inks that have been formulated using the Acrylate Preference Criteria.

7. MONOMERS

Monomers are the non volatile solvent constituent of UV curing inks. They dissolve the resin film formers. During the curing process the UV light causes a chemical reaction that instigates the almost instantaneous polymerisation of these chemicals.

A number of other monomers are known to cause allergic dermatitis; these can be avoided by using inks that have been formulated using the Acrylate Preference Criteria.

8. SOLVENTS

Solvent is the chemical that dissolves the film former, in many cases aids the adhesion of the ink to the substrate and acts as a controlling influence on the rate of drying of the print. Because it dissolves the film former, it is used as a cleaner to remove ink from the screen. The vast majority of solvents used in screen printing are volatile organic compounds (VOCs).

Solvents have an adverse effect on the environment. They have a harmful impact upon the atmosphere, the aquatic environment and land if disposed of by landfill. Because of their power they dissolve the essential protective skin oils and can cause dermatitis.

Reduction of the effect on the environment can be achieved in a number of ways:

- **Using UV curing inks**
- **Using medium and high flashpoint cleaning agents also has some health and safety advantages, because the exposure of personnel to the evaporated solvents will be reduced.**
- **End-of-pipe technology**
- **Recycling or valorisation of solvent based waste**

Solvents that are available within the **EU** that satisfy good health, safety and environmental practices are controlled by REACH (see page 2 DANGEROUS SUBSTANCES AND PREPARATIONS).

9. DYES

This group of chemicals is only used for specialised applications and formulations and must satisfy the requirements of **REACH** (see page 2 DANGEROUS SUBSTANCES AND PREPARATIONS).

IMPACT OF HAZARDOUS SUBSTANCES

For many years printers have had to be aware of the impact of hazardous products either from a health and safety or product liability standpoint. Many consumable products such as inks, thinners and cleanerswill display an EU warning label. Some electrical and electronic equipment may show a laser warning sign.

The Waste Electrical and Electronic Equipment (WEEE) and the Reduction of Hazardous Substances in electrical and electronic equipment (RoHS) Directives will require all suppliers of printing equipment to update their designs to incorporate these changes.

Suppliers of consumables such as inks and cleaners will have to meet the exacting standards laid down by the Registration, Evaluation, Authorisation and restriction of Chemicals Regulations (REACH). This involves the testing of chemicals that have been used within the print industry for many years, many previously presumed to be safe to use. These chemicals will also be subject to rigorous review as to their impact upon the environment. Any chemical that is considered to have carcinogenic, mutagenic, repro-toxic or bio-accumulating effects will require specific authorisation before it can be used.

This regulation has already had an impact upon the printing industry. The substantial costs involved in the registration process have resulted in the costs being passed down the supply chain and also some chemicals being withdrawn from the market. Many commercial organisations faced with these challenges are reviewing their purchasing policies. High on their buying requirements are environmental issues; their corporate responsibility is usually stated by every multinational company and this corporate responsibility includes sustainability and lower carbon emissions. These organisations are looking to their suppliers to help them improve their environmental performance and image. It is therefore necessary to review the products used within the printing Industry to enable the printer to make an informed decision as to the necessary steps needed to meet today's health, safety and environmental requirements.

1. RESPONSIBILITY

There are dual responsibilities in ensuring that the products used and produced by the printing industry meet the challenges of today's stricter health, safety and environmental requirements.

- **The producer of consumables, inks, cleaners and ancillary products etc. is required:**
  - To be satisfied that the chemicals used are in accordance with the requirements of REACH
  - Properly label their products to comply with the requirements of the Classification, Labelling and Packaging Regulations
  - Supply safety data sheets that advise the user of all the hazards present
- **The printer must ensure that:**
  - The necessary data is supplied by the producer of consumables
  - Review this information to determine whether:
  - The appropriate precautions and control measures are in place from all persons using the products can do so safely
  - It meets the clients' requirements

2. ACTION PLAN

The printer must:

- **Review that the appropriate safety data sheets:**
  - Are available for all the products that are used within the organisation
  - Ascertain that the usage proposed by the printer is included
- **Determine all the hazardous substances that are used by examining the appropriate safety data sheets:**
  - Contact the supplier if any products contain substances that are carcinogenic, mutagenic, repro-toxic or have bio-accumulating effects and request alternative products. These chemicals will have been assigned the CPL Hazard Statement H300, H301, H302, H304, H310, H311, H312, H330, H331, H332, H334, H340, H350, H351, H360, H361, H400, H410 and H411 or risk phrases R40, R45, R46, R49, R60 and R61 or R50, R51, R54, R55, R56, R57, and R59 on the label and/or safety data sheet.
- **Review all other hazardous substances and ascertain from the data supplied under the heading "Health, Safety and Environmental Information" whether less hazardous alternatives could be used.**

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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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