PLANET FRIENDLY GUIDE

FOR SCREEN PRINTERS

ENVIRONMENTAL MANAGEMENT TECHNIQUES

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profit for purpose

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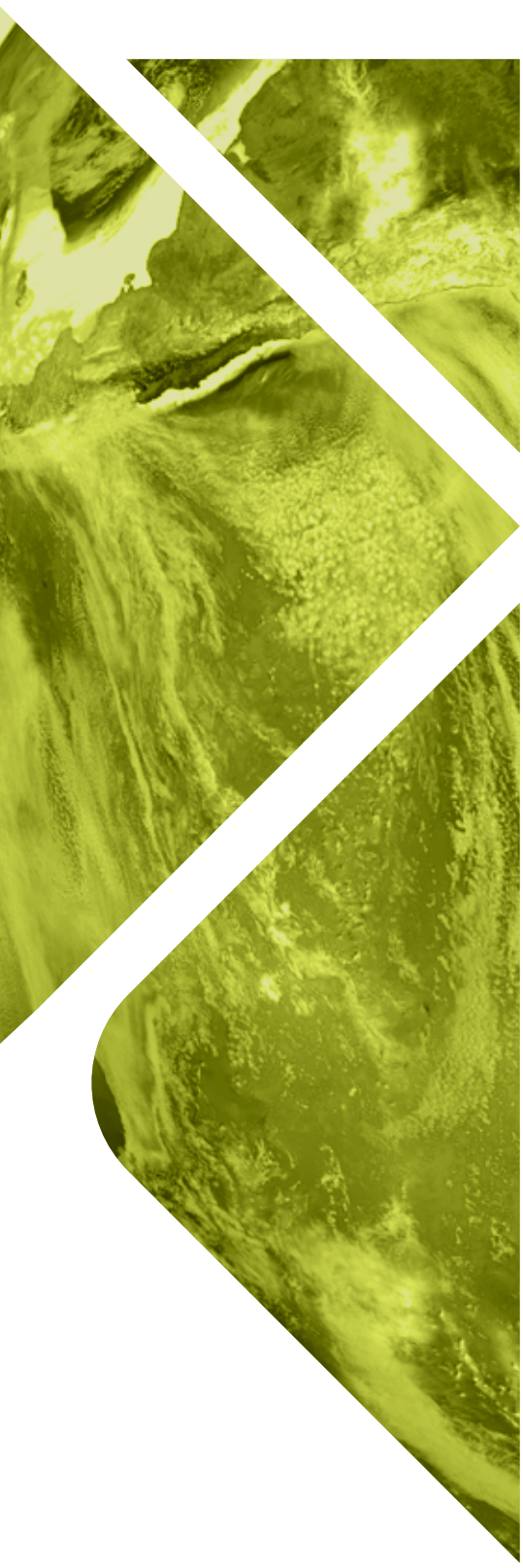


ABOUT THIS FESPA PLANET FRIENDLY SUMMARY GUIDE

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.

ENVIRONMENTAL MANAGEMENT TECHNIQUES

Within the European Union, many organisations have decided on a voluntary basis to implement environmental management systems based on EN ISO 14001 or the EU Eco58 management and audit scheme (EMAS). Many larger organisations are stipulating that products will be preferentially purchased from companies that have an accredited environmental system.

Alternatively, many of the larger organisations are requiring the suppliers to provide their carbon footprint and/or for the actual product they are supplying.

ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

LARGER PRINTING COMPANIES

1.ISO 14000 ENVIRONMENTAL MANAGEMENT STANDARDS

The ISO 14000 Environmental Management Series of standards provides a comprehensive set of tools available to companies to minimize harmful effects on the environment caused by its activities and to achieve continual improvement of its environmental performance:

- **ISO 14001: 2004 Environmental Management Systems – Specification with Guidance for Use**
- **ISO 14004: 2004 Environmental Management Systems: General Guidelines on Principles, Systems and Supporting Techniques;**
- **ISO 19011: 2002 Guidelines for Quality and/or Environmental Management Systems Auditing**
- **ISO 14015: 2001 Environmental Management – Environmental Assessment of Sites and Organisations**
- **ISO 14020: 2000 Environmental Labels and Declarations - General Principles**
- **ISO 14021: 1999 Environmental Labels and Declarations – Self-Declared Environmental Claims (Type II Environmental Labelling)**
- **ISO 14024:1999 Environmental Labels and Declarations – Type I Environmental Labelling – Principles and Procedures; examples include the Nordic Swan and the Blue Angel**
- **ISO 14025: 2000 Environmental Labels and Declarations -- Type III Environmental Declarations (Technical Report)**
- **ISO 14031: 1999 Environmental Management - Environmental Performance Evaluation – Guidelines**
- **ISO 14032: 1999 Environmental management – Examples of Environmental Performance Evaluation (Technical Report) ; this is a support standard for ISO 14031**
- **ISO 14040: 1997/2006 Environmental Management - Life Cycle Assessment - Principles and Framework**
- **ISO 14047: 2003 Environmental Management -- Life Cycle Impact Assessment -- Examples of application of ISO 14042 (Technical Report)**
- **ISO 14048: 2002 Environmental Management -- Life Cycle Assessment -- Data documentation format (Technical Specification)**
- **ISO 14049: 2000 Environmental Management -- Life Cycle Assessment -- Examples of application of ISO 14041 to goal and scope definition and inventory analysis (Technical Report)**
- **ISO 14062: 2002 Environmental Management - Integrating Environmental Aspects into Product design and development**
- **ISO 14063:2006 Environmental Communication -- Guidelines and examples**

Further information is available at **http://ems.iema.net/iso14001/iso14000**

2. EUROPEAN ECO-MANAGEMENT AND AUDIT SCHEME (EMAS)

EMAS includes the management system requirements of EN ISO 14001, but places additional emphasis on legal compliance, environmental performance and employee involvement; it also requires external verification of the management system and validation of a public environmental statement.

Further information is available at **http://ec.europa.eu/environment/emas/about/summary_en.htm**

RESPONSIBILITY

It is essential that the Chief Executive Officer of the company is wholly committed to the successful operation of the EMS. There is a need to specify the roles and responsibilities of staff including the appointment of one specific management representative. This representative will oversee the implementation and continual improvement of the company's environmental performance. The company management must ensure that all the staff are kept informed and trained in their roles to meet the standards laid down to meet the applicable EMS that has been selected. The senior management will have to define the environmental policy and undertake regular reviews of the company's environmental performance.

ACTION PLAN

- **Appoint a senior management representative to implement the EMS**
- **Define the environmental policy**
- **Plan and establish agreed objectives and targets**
- **Implement the necessary operational procedures**
- **Institute checking and corrective action**
- **Conduct routine management reviews**
- **Prepare a regular environmental statement**
- **Obtain validation by a certification body or external EMS verifier**
- **Review design considerations for end-of-life plant decommissioning**
- **Consult each section of the Planet Friendly Guide and select the applicable BAT activities that will generate the best financial and environmental benefits**
- **Benchmark the company's performance in environmental management techniques**

BENEFITS

An environmental management system can provide a number of advantages, these are:

- **improved insight into the environmental aspects of the company**
- **improved basis for decision-making**
- **improved motivation of personnel**
- **additional opportunities for operational cost reduction and product quality improvement**
- **improved environmental performance**
- **improved company image**
- **reduced liability, insurance and non-compliance costs**
- **increased attractiveness for employees, customers and investors**
- **increased trust of regulators, which could lead to reduced regulatory oversight**
- **improved relationship with neighbours and environmental groups**

KEY ISSUES

ENVIRONMENTAL POLICY

Senior management is responsible for defining an environmental policy for the company and ensuring that it is appropriate to the nature, scale and environmental impacts of the activities of that company. It must include a commitment to pollution prevention and control, compliance with all relevant applicable environmental legislation and regulations. It must provide the framework for setting and reviewing environmental objectives and targets and is documented and communicated to all employees as well as available to the public and all interested parties.

PLANNING

Procedures are necessary to identify the environmental aspects of the installation to determine those activities which have or can have significant impacts on the environment and to keep this information up-to-date. There are also requirements for procedures to identify and have access to legal and other requirements applicable to the environmental aspects of its activities. It must establish and review documented environmental objectives and targets, taking into consideration the legal and other requirements and the views of interested parties such as neighbours and customers.

There is a need to establish and regularly update the environmental management programme, including the designation of responsibility for achieving the objectives and targets at each relevant function and level as well as the means and timeframe by which they are to be achieved.

IMPLEMENTATION AND OPERATION OF PROCEDURES

It is important to have effective environmental management systems in place to ensure that procedures are known, understood and complied with. These include:

- **Structure and responsibility**
- **Training, awareness and competence**
- **Communication**
- **Employee involvement**
- **Documentation**
- **Efficient process control**
- **Maintenance programme**
- **Emergency preparedness and response**
- **Checking and corrective action**
- **Monitoring and measurement**
- **Corrective and preventive action**
- **Records:**
  - **Audit**
  - **Periodic evaluation of legal compliance**
  - **Management review**
  - **Preparation of a regular environmental statement**

IMPLEMENTATION AND OPERATION OF PROCEDURES

Procedures are necessary to identify the environmental aspects of the installation to determine those activities which have or can have significant impacts on the environment and to keep this information up-to-date. There are also requirements for procedures to identify and have access to legal and other requirements applicable to the environmental aspects of its activities. It must establish and review documented environmental objectives and targets, taking into consideration the legal and other requirements and the views of interested parties such as neighbours and customers.

There is a need to establish and regularly update the environmental management programme, including the designation of responsibility for achieving the objectives and targets at each relevant function and level as well as the means and timeframe by which they are to be achieved.

MEDIUM AND SMALLER PRINTING COMPANIES

Many of the principles enunciated within this part of the FESPA Planet Friendly Printing Guide can be used without attempting to conform to the rigours of a formalized environmental management system. It should be noted that the information published within this section of the Guide does not contain all the requirements for compliance to EN ISO 14001 and EMAS, but covers those topics raised within the Guide. Companies wishing to comply with either EN ISO 14001 or EMAS should acquire the necessary standards from the appropriate organisations.

For the medium and smaller printer who does not have the manpower resource to implement EMS, it is possible to pick applicable parts of the Best Available Technologies (BAT) shown below to achieve both environmental and financial benefits.

STRUCTURE AND RESPONSIBILITY

The appointment of one specific management representative to oversee the implementation and continued adherence to the principles outlined in the best available techniques.

TRAINING, AWARENESS AND COMPETENCE

There is a requirement to identify training needs to ensure that all personnel whose work may significantly affect the environmental impacts of the activity are aware of the implications.

COMMUNICATION

It is necessary to establish and maintain procedures for internal communication between the various levels and functions of the company that foster a dialogue that could provide the benefits of the environmental approach to the business.

EMPLOYEE INVOLVEMENT

A critical matter is getting the employees involved in the process to achieve a high level of environmental.

EFFICIENT PROCESS CONTROL

There must be adequate control of processes under all modes of operation, namely preparation, start-up, routine operation, shutdown and abnormal conditions. There is a need to identify indicators for measuring and controlling these parameters (for example airborne solvent emissions, water quality, waste levels and energy consumption).

REVIEW BAT ACTIVITIES

Consult each section of the Planet Friendly Guide and select the applicable BAT activities that will generate the best financial and environmental benefits.

MAINTENANCE PROGRAMME

It is important to establish a structured programme for maintenance.

CARBON FOOTPRINT METHODS

Alternatively, many of the larger organisations are requiring the suppliers to provide their carbon footprint and/or for the actual product they are supplying.

CARBON FOOTPRINT CALCULATORS

Recognising the organisational requirements associated with obtaining an environmental accreditation, FESPA has recognised the potential advantage of securing access to international recognised Carbon Footprint calculation techniques. There two European methods which FESPA supports, namely those provided by:

- **Febelgra (Belgium) (www.febelgra.be) and**
- **BVDM (Germany) (www.bvdm-online.de)**

Both are specifically designed for the printing industry.

ISO 16759:2013 Graphic technology -- Quantification and communication for calculating the carbon footprint of print media products

This standard specifies the requirements for quantifying the carbon footprint of those processes, materials and technologies required to produce print media products using any form of printing technology and that are within the user's knowledge and control. It is based on a Life Cycle Assessment (LCA) approach, using defined system boundaries and a specified functional unit as the basis for complete or partial carbon footprint studies.

Further information is available at **http://www.iso.org/iso/catalogue_detail.htm?csnumber=57615**

GENERAL TERMS, ABBREVIATIONS, ACRONYMS AND SUBSTANCES

Many abbreviations and acronyms are used sometimes without providing their meaning. To assist readers a comprehensive list is provided on the following pages.

TERM	MEANING
Acid	a proton donor: a substance that liberates hydrogen ions in water
Aerobic	a bliological process that occurs in the presence of oxygen
alkali (base)	a proton acceptor. A substance that liberates hydroxide ions in water solution
anaerobic	a biological process which occurs in the absence of oxygen
AOX	adsorbable organic-halogen compounds. The total concentration in milligrams per litre, expressed as chlorine, of all organic halogen compounds (except fluorine) present in a sample of water that are capable of being adsorbed on activated carbon
BAT	best available techniques
biodegradable	that can be broken down physically and/or chemically by microorganisms. For example, many chemicals, food scraps, cotton, wool and paper are biodegradable products
BOD	biochemical (or biological) oxygen demand: a measure of the content of organic matter in water and wastes. It is the amount of dissolved oxygen required by micro-organisms in order to decompose organic matter. The unit of measurement is mg O2/l. In Europe, BOD is usually measured after 3 (BOD3), 5 (BOD5) or 7 (BOD7) days.
b.p	Boiling point
BREF	BAT reference document
CAS	Chemical Abstract Service
CEN	European Committee for Standardization
containment contained area	(secondary) containment refers to additional protection against storage tank releases over and above the inherent protection provided by the tank container itself. There are two major types of secondary containment for leakages, namely those that are part of the tank construction, such as double tank bottoms (only for above ground tanks), double skinned and double walled tanks and impervious barriers which are placed upon the soil surface below the tanks
cross-media effects	the calculation of the environmental impacts of water/air/soil emissions, energy use consumption of raw materials, noise and water extraction (i.e. everything required by the IPPC Directive)
DIN	Deutsche Industry Norm
EC	European Commission
effluent	physical fluid (water together with contaminants) forming an emission
EFTA	European Free Trade Association
EIPPCB	European IPPC Bureau
ELY	emission limit values: the mass, expressed in terms of certain specific parameters, concentration and/or level of an emission, which may not be exceeded during one or more periods of time
EMAS	environmental management and audit scheme
emission	the direct or indirect release of substances, vibrations, heat or noise from individual or diffuse sources in the installation into the air, water or land

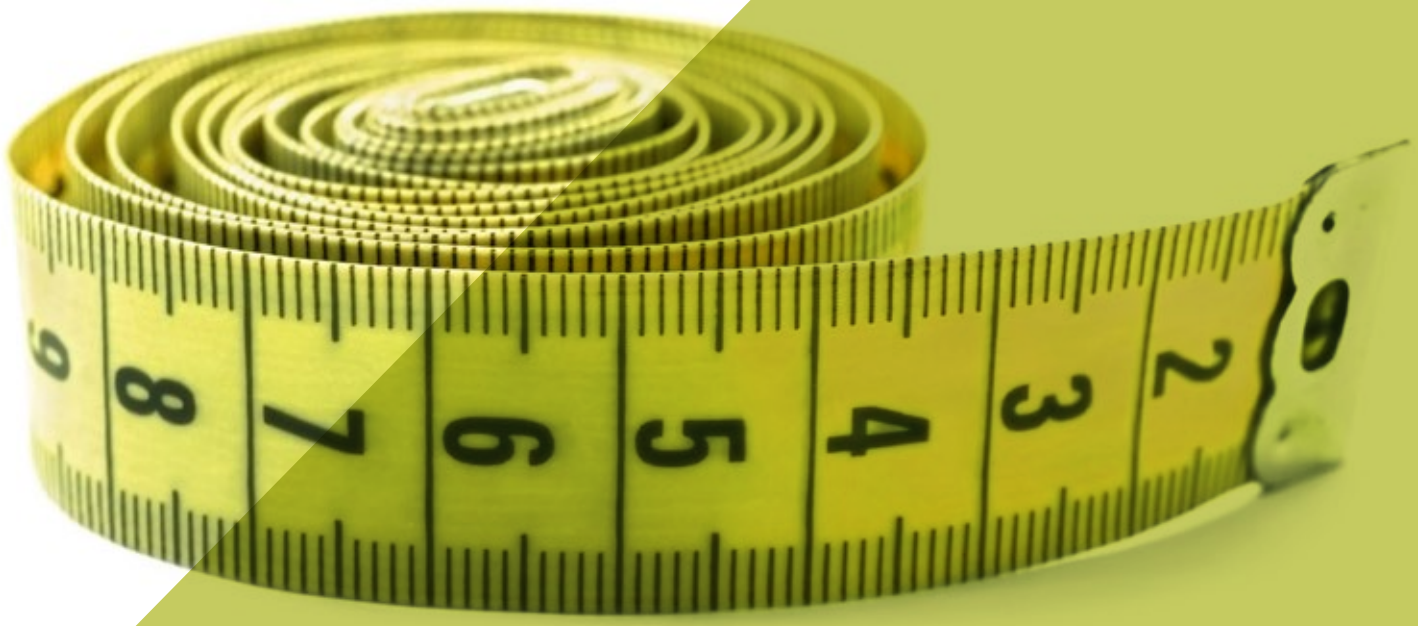
EMS	environmental management system
'end-of-pipe' technique	A technique that reduces final emissions or consumptions by some additional process but does not change the fundamental operation of the core process. Synonyms: 'secondary technique', 'abatement technique'. Antonyms: 'process-integrated technique', 'primary technique' (a technique that in some way changes the way in which the core process operates, thereby reducing raw emissions or consumptions)
environmental footprint	a measure of the burden or impact that a product, operation or business places on the environment. For IPPC, this will be: • the consumption of energy, raw materials and water • emissions to air, water, groundwater, and soil; and as waste • damage to material property and the impairment or interference with amenities and other legitimate uses of the environment. IPPC includes a consideration of noise and vibration, dust and odour. It does not include aspects such as life cycle analysis of products
EQS	environmental quality standard
EU	European Union
EUA	European Union Allowance: the term used for the trading units for the EU carbon trading scheme in EUR per tonne CO2
existing installation	an installation in operation or, in accordance with legislation existing before the date on which a Directive is brought into effect, an installation authorised or in the view of the competent authority the subject of a full request for authorisation, provided that installation is put into operation no later than one year after the date on which this Directive is brought into effect
flocculation	waste water treatment involving gentle stirring whereby small particles are chemically attached to substances such as bentone to create larger particles so their weight causes them to settle to the bottom of the treatment tank
footprint	a company's environmental impact determined by the amount of depletable raw materials and non-renewable resources it consumes to make its products, and thequantity of wastes and emissions that are generated in the process
fugitive emission	in this document, the SED definition is used: any emissions not in waste gases of VOCs into air, soil and water as well as (unless stated in the SED) solvents contained in products. They include uncaptured emissions released to the outside environment via windows, doors, vents and similar openings (conversely, see also waste gas)
HBS	high boiling solvents
IBC	intermediate bulk container
IDOP	integrated downwind ozone production: a measure of the reactivity of a solvent increating tropospheric ozone
installation	a stationary technical unit where one or more activities listed in a specific Directive are carried out, and any other directly associated activities which have a technical connection with the activities carried out on that site and which could have an effect on emissions and pollution
IPA	iso propyl alcohol
IPPC	integrated pollution prevention and control
K1, K2 and K3	an indication of flammability used in the Netherlands and Belgium, according to flashpoint: • K1:<21°C • K2:21-55°C • K3: >55 °C
LCA	life cycle assessment
LEL	lower explosion level

MEK	methyl ethyl ketone
monitoring	process intended to assess or to determine the actual value and the variations of an emission or another parameter, based on procedures of systematic, periodic or spot surveillance, inspection, sampling and measurement or other assessment methods intended to provide information about emitted quantities and/or trends for emitted pollutants
ODP	ozone depletion potential: a relative index indicating the extent to which a compound may cause ozone depletion
OEL	occupational exposure limit
OEM	original equipment manufacturer
OFP	ozone-forming potential
operator	any natural or legal person who operates or controls the installation or, where this is provided for in national legislation, to whom decisive economic power over the technical functioning of the installation has been delegated
ozone depletion	destruction of the stratospheric ozone layer, which can be caused by the phototytic breakdown of certain compounds containing chlorine and/or bromine (e.g. chlorofluorocarbons), which catalytically decompose ozone molecules
PBTs	persistent, bio-accumulative and toxic substances
pH	Measure of acidity and alkalinity
POCP	photochemical ozone creation potential pollutant individual substance or group of substances which can harm or affect the environment
POP	persistent organic pollutants
ppm	parts per million (by weight)
RH	relative humidity
secondary	see end-of-pipe technique
SED	Solvent Emissions Directive
SME	small and medium enterprises
specific emission	emission related to a reference basis, such as production capacity, or actual production (e.g. mass per tonne or per unit produced)
STP	standard temperature and pressure
TLV	threshold limit values: guidelines (not standards) prepared by the American Conference Governmental Industrial Hygienists, Inc (ACGIH) to assist industrial hygienists in decisions regarding safe levels of exposure to various hazards found in the workplace. A TLV® reflects the level of exposure that the typical worker can experience without an unreasonable risk of disease or injury. TLVs® are not quantitative estimates of risk at different exposure levels or by different routes of exposure
TOC	total organic carbon: a test to assess the amount of organic carbon in a sample
VOC	volatile organic compounds
waste gas	in this document, the SED definition is used: the final gaseous discharge containing VOCs or other pollutants, from a stack or abatement equipment into the air.
WFD	Water Framework Directive: Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for water use.

COMMON UNITS, MEASUREMENTS AND SYMBOLS

Many abbreviations and acronyms are used sometimes without providing their meaning. To assist readers a comprehensive list is provided on the following pages.

TERM	MEANING
normal atmosphere	(1 atm = 101325 N/m2)
bar	bar (1.013 bar = 1 atm)
billion	thousand million (109)
°C	degree Celsius
cm	centimetre
d	day
g	gram
h	hour
K	Kelvin(0°C = 273.15K)
kg	kilogram (1 kg = 1000 g)
kPa	kilopascal
kWh	kilowatt-hour (1 kWh = 3600 kJ = 3.6MJ)
L	litre
m	metre



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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