
**Graphic technology — Requirements
for communication of environmental
aspects of printed products —**

**Part 1:
General printing**

*Technologie graphique — Exigences pour la communication des
aspects environnementaux des produits imprimés —*

Partie 1: Impression en général

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

A list of all parts in the ISO 22067 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document provides requirements for effective communication of environmental aspects of products and processes for participants in print production supply chains. [Figure 1](#) provides an overview of the some of the elements to which it applies.

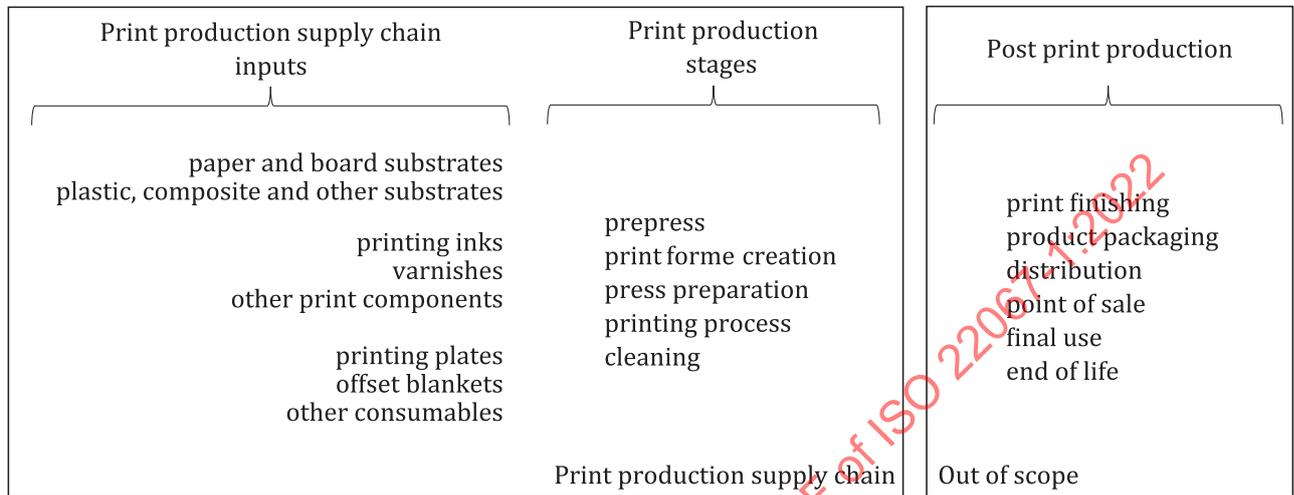
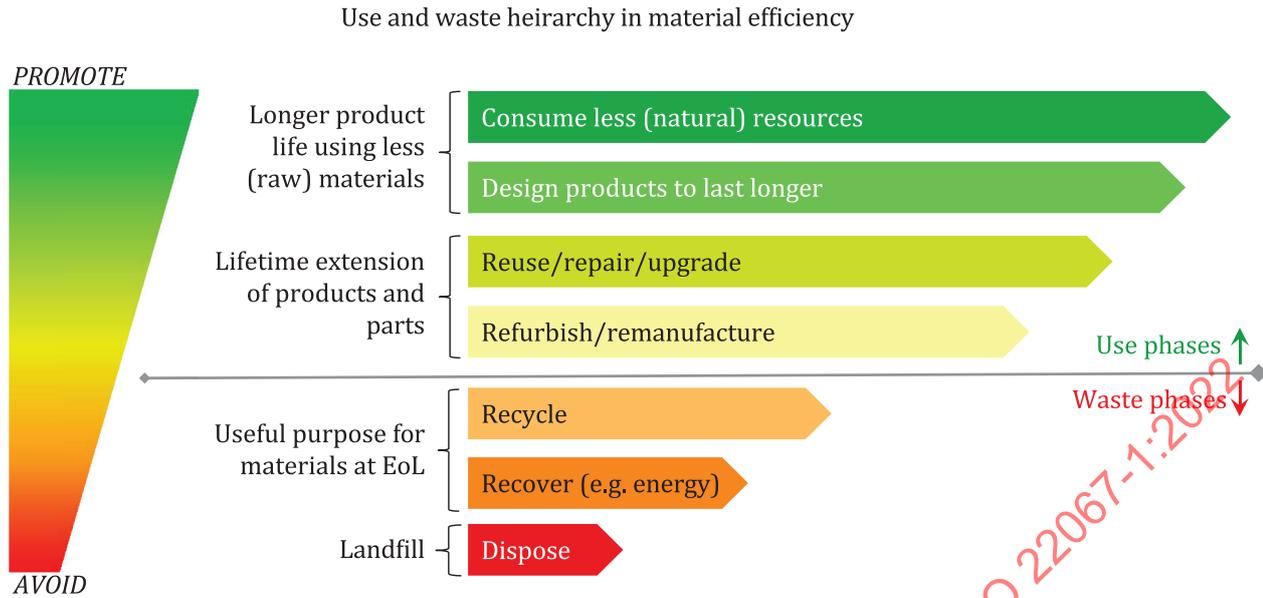


Figure 1 — Elements of print production

While the requirements and criteria in this document promote communication of environmental impacts from the technical aspects of general printed products, they are not in and of themselves a labelling system.

Eco-labelling systems confirm stated environmental performance claims and many environmental certification programs are relevant for graphic technologies and products, for example those endorsed by the global eco-labelling network (GEN). Such labels are convenient and widely used in various markets and, when tied to a robust scheme, can be very effective. However, these labels do not necessarily communicate application-specific environmental aspects and impacts. Potentially negative environmental aspects and impacts of printed products can be outweighed by other positive benefits, such as recyclability. Many eco certification schemes use a points-based inventory of checks to determine overall environmental aspects and impacts. In such schemes, certification is awarded when the overall number of points fulfils the certification scheme's requirements, but such an approach can conceal negative impacts. In other words, although the scheme is convenient and easy for users of the final product to understand, these systems do not provide a complete picture of the environmental aspects and impacts of the product to the stakeholders.

In advanced initiatives, recycling is no longer considered to be the best option for environmental impact mitigation (see [Figure 2](#)). These approaches require the improvement of material efficiency, prolonging the life of products, and encouraging product designs that do not assume disposal. Considering the use cases of printed products, it is often not useful to extend their lifetime, and these approaches cannot be applied directly, but there are many things to learn from them.



NOTE In the IEC Webinar ACEA on circular economy and material efficiency^[30], the presentation material and video can be seen from "Past webinars". Find the webinar held on 2020-02-14.

Figure 2 — Advanced concept to reduce the environmental impact

Efficient use of materials is an aspect of production that applies to the printing industry. An example of such a consideration is that plastic film products may be designed to take into account when and how to end their lifetime. Such considerations may be extended to all printed products. At least, it should be possible to design in consideration for the recyclability.

Even if the printing industry is unable to reach such a level immediately, efforts should be made to avoid the use of environmentally harmful substances as the first step. Where the use of such substances cannot be avoided, it should be a priority that information on their environmental aspects and impacts is communicated along printing industry supply chains. Printing industry stakeholders must be able to accurately extract and use information on environmental aspects and impacts of production processes and materials. The ISO 22067 series is a means to contribute to this.

Currently, the graphics industry has no formal tools to stipulate which data relating to environmental aspects and impacts should be collected and communicated between stakeholders. Accurate data for production-related environmental aspects and impacts is therefore generally unavailable to interested parties in the supply chain. ISO 22067 is a multi-part document providing sector specific requirements for data to be used in environmental impact evaluation and aimed at solving this problem in the graphics industry. The series provides a means for quantifying printing systems specific environmental aspects and impacts, to encourage the communication and use of relevant and accurate environmental data. For example, the environmental information prepared by manufacturers of printing inks can be quantified in a standard way and made available to stakeholders considering recycling of printed materials.

The ISO 22067 series relates to the production of print media products, but not their entire life cycle. This document specifies general requirements and criteria for the data to be collected and communicated between stakeholders to quantify environmental risks for materials, equipment and products used for general printed products. Participants in the print production process, whether as a supplier of materials, a printer, a print buyer, consumer, recycler or re-user of printed materials can use the information gathered according to this document to consider the environmental aspects and impacts associated with all stages of the print production process.

When providing data to the supply chain, participants in the supply chain require those data to be credible. Since this document has been developed in harmony with the ISO 14020 series it can be used to quantify more accurately environmental aspects and impact data related to print media production of interest to consumers, print buyers, printers, regulatory agencies, environmental agencies and other

stakeholders. All stakeholders can use print industry sector specific documents that conform with ISO 22067 to provide clear communication of environmental aspects and impacts to other interested parties throughout supply chains.

Due to the nature of security printing, communication of environmental aspects of components or processes used may pose a security risk or otherwise weaken the security of the final product. For this reason, security printing is excluded from the communication requirements of this document.

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Graphic technology — Requirements for communication of environmental aspects of printed products —

Part 1: General printing

1 Scope

The ISO 22067 series specifies requirements and criteria for communication of environmental aspects within the print production supply chain. This document specifies requirements for environmental communication on print production, including all processes and print components used for the production of the final printed materials. This document is applicable for most printing methods but excludes, due to their unique processing requirements, printing on textiles and ceramics.

NOTE Recognising established environmental communication, provision is made (see [Clause 4](#)) to permit communication of environmental information for paper, board or other substrates based on requirements and guidelines provided by standards organizations or industry bodies.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14067, *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification*

ISO 16759, *Graphic technology — Quantification and communication for calculating the carbon footprint of print media products*

ISO 18605:2013, *Packaging and the environment — Energy recovery*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

organic recycling

controlled microbiological treatment of biodegradable plastics waste under aerobic or anaerobic conditions

Note 1 to entry: The term “biological recycling” is used synonymously.

[SOURCE: ISO 15270:2008, 3.23]

**3.2
environmental statement**

collection of sector and application specific environmental performance data communicated between stakeholders

**3.3
ecolabel**

label which can be used to identify environmentally preferable choices within specific product categories

**3.4
environmental aspect**

element of a product or its production process that, during its life-cycle, can interact with the environment

Note 1 to entry: ISO Guide 64 has a similar definition that does include production processes as these aspects are out of its scope.

[SOURCE: ISO Guide 64:2008, 2.9, modified — "or its production process" and Note 1 to entry have been added.]

**3.5
environmental impact**

any change to the environment, wholly or partially resulting from a product *environmental aspect* (3.4)

[SOURCE: ISO Guide 64:2008, modified — The original term is "product environmental impact"; this document uses "environmental impact" synonymously.]

**3.6
environmentally hazardous substances**

materials that can pose a risk to ecosystems, humans, flora, fauna and other forms of life

**3.7
allocation**

assigned portion of the input or output of a component, process, production machine or system under study

Note 1 to entry: Input or output values are allocated across one or more similar entities

**3.8
life cycle**

consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal

Note 1 to entry: "Final disposal" includes recycling which is the preferred method of disposal. Processes such as refurbishment and reuse are encouraged in order to extend life cycle of a product and reduce its environmental impact.

[SOURCE: ISO 14025:2006, 3.20, modified — A note to entry has been added.]

**3.9
waste**

substances or objects which the holder intends or is required to dispose of

Note 1 to entry: This definition is taken from the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (22 March 1989), but is not confined in this International Standard to hazardous waste.

[SOURCE: ISO 14040:2006, 3.35]

3.10**hazardous waste**

waste (3.9) containing substances with potentially harmful polluting properties

Note 1 to entry: Harmful polluting properties mean that a substance is flammable, combustible, ignitable, corrosive, toxic, reactive or injurious to human beings, wildlife, flora or the environment.

[SOURCE: ISO 37100:2016, 3.1.10, modified — The harmfulness is generalized so that it is not limited to human and property. Note 1 is added to explain it concretely.]

3.11**circular economy**

economy that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles

[SOURCE: ISO 20400:2017, 3.1]

3.12**volatile organic compound****VOC**

organic compound which is liquid at room temperature (20 °C) and which has a boiling point below 250 °C at standard atmospheric pressure

Note 1 to entry: VOCs with a boiling point lower than 180 °C are considered low-boiling.

3.13**reuse**

use of a pre-existing artefact

[SOURCE: ISO/IEC 19501:2005, 0000_58]

3.14**synthetic micro fibres**

environmentally damaging short filaments of material made from synthetic or bio-derived polymer

Note 1 to entry: These fibres, sometimes known as micro plastic fibres, are typically less than 1 mm in length or become (much) smaller after degradation.

3.15**GHS hazard statement**

standard references for chemical substances and mixture classifications

Note 1 to entry: GHS is abbreviation of Globally Harmonised System of classification and labelling of chemicals.

3.16**calorific gain**

positive difference between the energy released on combustion of a material and Ha

[SOURCE: ISO 18605:2013, 3.3]

Note 1 to entry: Ha means required energy, which is defined as "energy necessary to adiabatically heat the post combustion substances of a material and excess air from ambient temperature to a specified final temperature" in ISO 18605:2013, 3.2.

3.17**carbon footprint**

net amount of greenhouse gas emissions removals, expressed as CO₂ equivalents

[SOURCE: ISO 16759:2013, 3.1.1]

3.18

print production supply chain

linked and interdependent processes and components used to produce a printed product

Note 1 to entry: This does not include print finishing, converting or other post print processing.

4 General principles

Declaration of environmental aspects and impacts through the use of eco labels clearly confirms that a product complies with a reference ecolabelling scheme's requirements. Tied to a robust scheme, such labels are convenient communication tools and are widely used in various markets around the world to determine the environmental performance of products and services. However, these labels cannot communicate all the factors that impact the environment. The graphic industry requires tools to provide accurate quantified data on the factors that impact the environment and communicate the detailed information, which assist ecolabelling models. This document is intended to prepare those tools which will encourage environmentally responsible print media production.

NOTE 1 A product's potentially negative environmental aspects and impacts can be outweighed by other positive benefits, such as reduced waste or emissions in production and over a product's lifespan. Many eco certification schemes often use a points-based inventory of checks to determine overall environmental aspects and impacts that do not necessarily reflect such nuances. In such schemes, the overall number of points can fulfil the certification scheme's requirements, outweighing negative impacts. For example, the use of an ink recipe containing substances without a negative impact on the environment can result in less waste, less energy consumption and less carbon emissions to produce the package, and yet it is possible that this information will not be fully reflected in an exclusively points based evaluation.

Environmental statements promoting this communication prepared in accordance with this document shall relate to all aspects of print production and be based on comprehensive and reliable data. The environmental statements prepared according to this document shall be available to all stakeholders in the supply chains of printed products. However, the supply chains of security printing are excluded, because the protection of information about materials and processes can outweigh the worth of environmental communication.

NOTE 2 Country or regional laws, regulations and international trade agreements can apply where it can be necessary to provide additional related statements.

Communication of environmental information on paper, board or other substrates may be restricted to requirements and guidelines provided by standards organizations or industry bodies. Where such a restriction has been applied, references to the guidelines and standards used shall be provided.

Environmental communication shall be clear. Where data provided is accumulated over a production period, the communication should clearly indicate that these are "typical values".

5 Criteria and parameters

5.1 Data collection of materials and consumables

All environmental information on materials used in the process of producing print products, including consumables, shall be collected and evaluated to determine the quantifiable environmental aspects and their potential impacts. When potential environmental impacts are identified in products, they shall be described according to [Clause 6](#).

5.2 Supplier requirements

Suppliers of prints and suppliers of materials to be used in the print production process shall ensure that environmentally hazardous substances used are stated. All known environmental impacts should be communicated including any known risks that can arise due to improper handling or management of the material.

Suppliers shall state the VOC and carbon footprint relating to the printing process. If the VOCs may remain in the product, the possibility shall be stated. Suppliers shall provide a statement of the levels used in production, the anticipated or potential processes of energy recovery, the suitability for reuse or recycling, and any other relevant environmental aspects. This shall include requirements for additional processes to make the printed product suitable for its target application.

NOTE One form of disposal is burning or some other form of energy recovery (chemical reaction) with a view to recovering the energy that remains in the product at its end of life.

5.3 Print production and printing methods

The prepress chemicals, associated cleaning chemicals, and materials used in the printing process to produce the printed product, shall be defined and information on potential environmental aspects and impacts including allocation for all processes involved should be provided, along with associated waste, including an allocation for waste.

5.4 Suppliers and third-party services

The organisations in the print production supply chain shall request compliance data relevant for an environmental statement either in total or on an allocation basis. The third party supplied data shall be communicated and shall be subject to audit by the contracting organisation. Uncertainties and an explanation for their context shall be communicated.

5.5 Record keeping and assessment

Records and all related documentation that quantifies and documents environmental aspects and impacts, chemicals and materials shall be kept. Records should be produced in accordance with ISO 9001 and ISO 14001 management standards which provide frameworks for record keeping and document management. Management should use assessment data to measure environmental aspects and impacts over time for a given type of printed product.

5.6 Exclusions

The following criteria and parameters apply to all participants in printing supply chains except where materials are provided, or processes are used whose purpose is for security printing. In such cases, the provider shall clearly indicate that, since materials and processes are intended for security printing, communication of environmental aspects cannot be provided.

5.7 Chemicals and materials

The use of environmentally hazardous substances in printed products affects all phases of the life cycle of products and shall be identified and stated, along with the quantities used and disposal information.

The lists of environmentally hazardous substances shall be in accordance with [Annexes A](#) and [B](#).

Where any substance is used in the printing component comprising more than the value specified in [Annex A](#) (see [Table A.1](#)) and [Annex B](#) (see [Table B.1](#)), it shall be listed in the statement described in [Clause 6](#). The use of environmentally hazardous substances listed in [Annex A](#) and high-risk environmentally hazardous substances listed in [Annex B](#) should be avoided.

The estimation of the quantity of environmentally hazardous substances shall identify the means used to calculate their concentration in the materials, processes or printed matter. The provider of the information shall be responsible for ensuring that it is accurate and complete. The concentration of all chemicals used in a printed product may be determined by chemical analysis. However, since it is impractical to test for the presence of all substances, this document requires only that those materials with levels likely to be hazardous are identified and measured. Users shall be aware of regional laws or regulations regarding specific methods of estimating environmentally hazardous substances. Where no such laws or regulations exist, the concentration of environmentally hazardous substances contained

in the printed product shall be determined by the calculation performed by the supplier of the product based on the information from suppliers.

NOTE 1 In principle, the product supplier at each stage of the supply chain is the information provider. The information provider is responsible for collecting the necessary information and providing this information to the supply chain.

NOTE 2 Environmental information on paper substrates are provided in accordance with the requirements and guidelines of standards bodies and industry groups. The requirements of this clause are satisfied when those are harmonised with the UN GHS document.

5.8 Emissions to air and water

5.8.1 Emissions to air

Information related to environmentally hazardous materials that can be emitted to air shall be communicated. Local regulations can require further communication.

When materials used in the printing process contain VOCs above the threshold, their use shall be reported as described in [Clause 6](#). The threshold of VOC concentration shall be as specified in [Annex C](#).

The amount of the VOC content in production and the amount released shall be determined as precisely as possible by the supplier or print service provider. VOC content may be determined and measured using a recognised measurement method or according to the following calculation: the amount of the VOC content used shall be determined by the theoretical mass fraction (expressed as a percentage) of VOC ingredients to the total ink mass. The amount of the VOC content released should be determined by the concentration if all VOCs in the ink were to be released into the atmosphere of the workplace. The actual concentration should be measured when the calculated concentration is largely different from the actual concentration by using solvent removal equipment.

NOTE In some cases, solvent removal equipment is integrated with the printing press.

In some cases, especially for small printing organisations, it can be difficult to measure the amount of VOC released into the atmosphere. In such cases, the organisation may use calculations provided by the press manufacturer and ink manufacturer as long as the method used and results obtained have been independently verified by a third party and printing is done in accordance with the press manufacturer's recommendation.

Users of this document should consider both emissions to the workspace and to the open air.

5.8.2 Emissions to water

Information related to environmentally hazardous materials that can be discharged into water shall be communicated. Cleaning solutions and other materials listed in [Annex D](#) shall be treated as potentially damaging to the environment. Any unavoidable discharges and accidental discharges shall be reported. Users shall be aware of regional laws or regulations regarding communications.

5.9 Energy management and carbon dioxide emission

5.9.1 Energy recovery

Suppliers of printed products shall evaluate and report the potential energy recovery for individual products in the recycling and production processes. The calculation methods for these amounts of thermal energy (calorific gain and theoretical minimum net calorific value) shall be according to ISO 18605:2013, Annex A. The necessary thermal data for various materials of printed products are shown in ISO 18605:2013, Annex B. The suppliers shall calculate the calorific gain and theoretical minimum net calorific value and evaluate the possibility of energy recovery according to the procedure described in ISO 18605:2013, Annex B.

Where materials of printed products contain environmentally hazardous substances as specified in 5.7, information regarding possible problems and appropriate preventative measures shall be communicated to all individuals involved in their handling. This is particularly important where there is a possibility that they contain any of the heavy metals listed in Table B.1. In such cases, these individuals should be familiar with the preventive measures described in ISO 18605:2013, Annex C.

5.9.2 Carbon dioxide emission

5.9.2.1 General

Production of printed matter involves several stages, such as:

- a) procurement of raw materials;
- b) print production (including design, proofing and prepress);
- c) distribution/selling;
- d) use; and
- e) disposal or recycling.

Among these stages, a) and b) are within the scope of this document and requirements for communication about these stages are specified in this clause.

Carbon dioxide emissions shall be calculated and reported according to the requirements of ISO 16759 or ISO 14067.

5.9.2.2 Procurement of raw materials

The carbon footprint related to substrates, inks, printing plates and other consumables shall be provided by the manufacturer. This shall include the carbon footprint related to production, procurement, transportation of these consumables and to the production, procurement and transportation of their component parts and for the energy used in their production.

5.9.2.3 Printing process

The carbon footprint related to substrates, inks, printing plates (plate material) and other consumables shall be in accordance with the requirements in ISO 16759 and be managed as follows.

- **Design and proofing:** the carbon footprint of these processes can be calculated using ISO 20294 and is generally very low compared to other processes related to print production. When the carbon footprint of each process exceeds 1 % of the printing process, the emission shall be added to that of printing process.
- **Plate imaging and processing:** when using printing plates, print service providers shall calculate the carbon footprint originating from the consumptions of electricity and fossil fuels due to the operation of plate making equipment used. Further, when the carbon footprint of processing chemicals exceeds 1 % for the carbon footprint of plate making, it shall be added to the emissions of the plate making process.
- **Printing process:** print service providers shall calculate the carbon footprint originating from the consumptions of electricity and fossil fuels due to the operation of the printing system used (if the drying process is separated, drying equipment shall be included).

5.10 Waste

Waste is produced at most stages of print production and in the production of components and raw materials. The examples of information on local waste regulations are described in Annex E. If

potentially harmful substances are contained in components, the information shall be communicated within the supply chain and the waste disposal chain.

5.11 Recycle/Reuse

5.11.1 Recycle

5.11.1.1 General

Since various methods of recycling will be applied for different types of printed products, such as paper or film products, an appropriate recycling process should be applied for each product. The printing process and the materials used can influence the recycling process. The printer shall have a clear understanding of the recyclability impact of the printing process. This information shall be communicated.

NOTE The caveats affecting recycling compatibility are described in ISO 18604:2013, Annex B. The description of the chemical recycling process is in ISO/TR 16218. The report on the materials and substances which create obstacles to recycling processes are listed in ISO/TR 17098. These documents are intended for packaging but are good references for general printed products.

5.11.1.2 Printed products with paper substrates

The impact of the printing process on the recyclability of printed products with paper substrates shall be evaluated based on requirements and guidelines provided by standards organizations or industry bodies. Results shall be communicated according to [Clause 6](#). The recyclability of the printed products is generally evaluated by a percentage of recyclable material among all materials.

NOTE ISO 21993, ISO/TS 21331 and the European Paper Recycling Council scorecards can be used to evaluate deinkability.

5.11.1.3 Printed products with plastic film and composite substrates

The recyclability of printed products with film substrates shall be evaluated. Results shall be communicated according to [Clause 6](#). The recyclability of the printed products is generally evaluated by a percentage of recyclable material among all materials.

5.11.1.4 Printed products with organic substrates

Procedures and requirements for organic recycling should be according to ISO 18606. A print product is regarded as recyclable by organic recycling only if all individual parts satisfy these requirements. However, when parts that do not satisfy the requirements can be separated by simple physical means before recycling starts, the parts remaining after separation can be regarded as organic recyclables. If print products, or the materials used in their manufacture, are intended to be classified as organic recyclables the substances listed in ISO 18606:2013, Annex A, or are substances known or estimated to be harmful to the environment such as substances in [Table A.1](#) and [B.1](#), they should not be used.

5.11.2 Reuse

Many printed products can be reused by other users or for purposes for which they were not designed. In some markets demand for reuse is increasing as an alternative for disposal so printed product design should, where possible, take reuse into account.

When print suppliers inform "reusable" under the intended use of the printed product, the conditions and requirements of ISO 18603 should be satisfied.

6 Requirements for the environmental statement

As a result of the evaluations in [Clause 5](#), environmental aspects related to the printed product's components are identified and quantified. The report should indicate whether the specified checks were made.

When environmental aspects and impacts are involved, a statement describing details of the aspects and impacts shall be prepared. This statement may use an arbitrary format, but shall contain the following:

- a) details of environmental aspects and impacts ;
- b) recommended uses and limitations on use;
- c) confirmation that the material or process has been checked against all relevant items and that nothing is missed in the description of substances, etc. with environmental impact;
- d) confirmation of compliance with local legislation and regulations;
- e) any other mitigating factors or any other circumstances influencing the evaluation; and
- f) details of any uncertainties and allocations, remakes leading to excess and unanticipated waste.

The following should be included:

- g) the name of the reference product,
- h) the name of printing company (the address, phone number, or e-mail address should be added),
- i) the date and location of the evaluation, statement and the period of study, and
- j) assurance [third party (internal or external organization), certification program, self-declaration].

Ambiguous or unspecified claims shall not be used in the statement. All claims shall be supported with relevant measurement data. In order to provide reliable document, the statement should be consistent with ISO 14024, ISO 14021 or ISO 14025 requirements. Communicating stakeholders shall be aware of the principles of ISO 14063, which are transparency, appropriateness, credibility, clarity and regionality.

When the substances specified in [5.7](#) are contained above the threshold, information on the substance used, amount, and the GHS hazard statement(s) of [Table A.1](#) shall be communicated by stakeholders throughout all stages of the product life cycle. The print provider and the suppliers of the materials used shall prepare a document describing the substances used. An example of the environmental statement of substances is provided in [Annex F](#). In addition, when stakeholders are aware of environmental risks that do not fit the above criteria, such as problems caused by improper handling or management of the material, this information should be communicated and when appropriate should be attached as cautions to handlers.

When the VOCs, (shown in [Annex C](#)) are used above the threshold concentration, details of their use shall be provided in a document such as the example in [Annex G](#), including the name of the VOC (solvent), its concentration and GHS hazard statement(s) and information necessary for safe handling.

Other environmental risk factors such as energy recovery, carbon dioxide emission, wastes, recyclability, and reusability shall be described in the statement. An example of a complete statement is provided in [Annex H](#).

Print providers and the suppliers of printing material shall describe problems with materials which may degrade or negatively impact the recycling process, or which have a negative impact on the quality of the recycled materials. When solutions to technical issues are expected to be developed in the near future, they shall be described in the document together with the timescale.

These documents shall be stored for the longest of the following periods:

- lifetime of printed product,

- the time between when a printing component is created and becomes a new product,
- the time for when a component used for printing is changed to a new product or other product,
- until such time as the printing process used to produce the product is replaced or upgraded,
- the timeframe for when the prints are replaced with other prints, and
- the timeframe by which print product is likely to be discontinued.

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Annex A (normative)

Environmentally hazardous substances to be communicated

Substances classified with the hazard classes listed in [Table A.1](#) are considered environmentally hazardous. Where any substances with more than the specified value in [Table A.1](#) is contained in the printing component (i.e. printing blanket, solvent, printing ink, substrate, or other surface finishing component), it shall be listed in the statement specified in [Clause 6](#), (an example is shown in [Annex D](#)). Details of concentrations shall be provided along with the GHS hazard statement(s) along with other information needed to mitigate environment risk such as handling precautions. Where these chemicals are used safe handling precautions shall be communicated. This is to ensure the safe handling of materials throughout supply and distribution chains.

NOTE 1 Where test data are available for the complete mixture, GHS classification is based on these data. Where this is not done, the mixture is assessed based on its component parts.

NOTE 2 These values will be reviewed from time to time to ensure they are aligned with best industry practice. Information on chemical risks is available on the web site of the European Chemicals Agency (ECHA, <https://echa.europa.eu/information-on-chemicals>).

Table A.1 — GHS classifications of environmentally hazardous chemical substances and mixtures to be communicated ^[1]

GHS Code	Hazard statement (GHS hazard statement)	Hazard class	Report if above
Toxic substances			
H300	Fatal if swallowed	Acute toxicity, oral	1,0 wt%
H301	Toxic if swallowed	Acute toxicity, oral	1,0 wt%
H304	May be fatal if swallowed and enters airways	Aspiration hazard	10 wt%
H310	Fatal in contact with skin	Acute toxicity, dermal	1,0 wt%
H311	Toxic in contact with skin	Acute toxicity, dermal	1,0 wt%
H330	Fatal if inhaled	Acute toxicity, inhalation	1,0 wt%
H331	Toxic if inhaled	Acute toxicity, inhalation	1,0 wt%
Carcinogenic, mutagenic and reprotoxic substances			
H340	May cause genetic defects	Germ cell mutagenicity (Category 1)	0,1 wt%
H341	Suspected of causing genetic defects	Germ cell mutagenicity (Category 2)	1,0 wt%
H350	May cause cancer	Carcinogenicity	0,1 wt%
H351	Suspected of causing cancer	Carcinogenicity	0,1 wt%
H360	May damage fertility or the unborn child	Reproductive toxicity	0,1 wt%
H361	Suspected of damaging fertility or the unborn child	Reproductive toxicity	0,1 wt%
Other potential hazards			
H362	May cause harm to breast fed children	Reproductive toxicity	0,1 wt%
H370	Causes damage to organs	Specific target organ toxicity (single exposure)	1,0 wt%

Table A.1 (continued)

GHS Code	Hazard statement (GHS hazard statement)	Hazard class	Report if above
H371	May cause damage to organs	Specific target organ toxicity (single exposure)	1,0 wt%
H372	Causes damage to organs through prolonged or repeated exposure	Specific target organ toxicity (repeated exposure)	1,0 wt%
H373	May cause damage to organs through prolonged or repeated exposure	Specific target organ toxicity (repeated exposure)	1,0 wt%
H400	Very toxic to aquatic life	Hazardous to the aquatic environment	1,0 wt%
H401	Toxic to aquatic life	Hazardous to the aquatic environment	1,0 wt%
H402	Harmful to aquatic life	Hazardous to the aquatic environment	1,0 wt%
H410	Very toxic to aquatic life with long lasting effects	Hazardous to the aquatic environment	1,0 wt%
H411	Toxic to aquatic life with long lasting effects.	Hazardous to the aquatic environment	1,0 wt%
H412	Harmful to aquatic life with long lasting effects.	Hazardous to the aquatic environment	1,0 wt%
H413	May cause long lasting harmful effects to aquatic life	Hazardous to the aquatic environment	1,0 wt%
H420	Harms public health and the environment by destroying ozone in the upper atmosphere	Hazardous to the ozone layer	1,0 wt%

GHS^[1] specifies the cut-off value/concentration limit for each hazard class as shown in [Table A.1](#).

Annex B (normative)

High risk environmentally hazardous substances

The use of substances listed in [Table B.1](#) shall be communicated when they are present above the stated concentration limits and should be communicated even when used at concentrations below the threshold. Where no threshold is specified, any (intentional) use of the substance shall be communicated.

NOTE These values will be reviewed from time to time to ensure they are aligned with best industry practice.

Table B.1 — Specific environmentally hazardous substances

Substances	Substances
Heavy metals	Phthalates
nickel ^{b, c}	di-(2-ethylhexyl)phthalate (DEHP) ^{a, c}
mercury (if contained in excess of 1 000 ppm) ^{a, b, c}	dibutylphthalate (DBP) ^{a, b, c}
lead (if contained in excess of 1 000 ppm) ^{a, b, c}	benzylbutylphthalate (BBP) ^{a, c}
cadmium (if contained in excess of 100 ppm) ^{a, b, c}	diisononylphthalate (DINP) ^c
antimony ^c	diisodecylphthalate (DIDP) ^c
arsenic ^c	Solvents
copper (with exception of copper phthalocyanine) ^{a, b}	halogenated solvents ^c
cobalt ^b	aromatic hydrocarbons (> 1 % in total by weight) ^c
chromium (if Cr ⁶⁺ is contained in excess of 1 000 ppm) ^{a, b, c}	Toluene ^{a, b, c}
manganese (if contained in excess of 0,5 %) ^{b, c}	Others
	PVC ^d
	synthetic micro fibres ^d
<p>^a Values from Nordic ecolabelling [13].</p> <p>^b Values from Blue Angel, DE-UZ 195 [16].</p> <p>^c Values from UL 2801 [14].</p> <p>^d Values from H/BZ 12-2000 [15].</p>	

NOTE 1 Bio-degradable fibre compositions are still in their early development stages they currently require specific conditions (temperature, UV-radiation, moisture, bacteria or combinations of them) to degrade. Communication of information related to their specific recycling and disposal conditions within the supply chain is necessary.

NOTE 2 The risk and impact of the substances listed can be confirmed at the web site of the World Health Organization (WHO, <https://www.who.int/>) and/or the European Chemicals Agency (ECHA, <https://echa.europa.eu/information-on-chemicals>).

Annex C (normative)

Volatile organic compounds (VOCs)

When VOCs are used above the concentration specified in [Tables C.1](#), details of their use shall be provided in a statement according to [Annex G](#) and including the name or category of the VOC (solvent), its concentration and GHS hazard statement(s). Where no threshold is specified, any (intentional) use of the substance shall be communicated.

NOTE These values will be reviewed from time to time to ensure they are aligned with best industry practice.

Table C.1 — Criteria for requiring VOC content to be stated

Inks and printing processes	Concentration limit
For solvent-based inks ^a	Sheetfed offset inks The VOCs exceed 4 %. The petroleum distillates content exceeds 4 %.
	Heatset web offset inks The VOCs exceed 25 %. The petroleum distillates content exceeds 25 %.
	Coldset web offset and letterpress inks The VOCs exceed 20 %. The petroleum distillates content exceeds 4 %.
	Gravure inks The VOCs exceed 20 %. The petroleum distillates content exceeds 25 %.
	Flexographic inks The VOCs exceed 30 %. The petroleum distillates content exceeds 25 %.
	Digital inks The VOCs exceed 20 %. The petroleum distillates content exceeds 20 %.
For water-based inks and optimizers ^a	Flexographic, gravure inks and optimizers The VOCs exceed 6 %. Petroleum distillates content is used.
	Inks and optimizers used in high speed digital printing systems The VOCs exceed 300 g/L Petroleum distillates content is used.
For ultra violet cured inks ^a	The VOCs exceed 3 %. Petroleum distillate content is used.
^a Values from UL 2801 [14].	
^b Values from Blue Angel, RAL-UZ 195 [16].	

Table C.1 (continued)

Inks and printing processes		Concentration limit
For all printing method ^b	cleaning agents rubber blanket regeneration agents other auxiliary printing substances	Toluene, xylene or other aromatic hydrocarbons are used.
		A substance of carbon number of more than C9 is used over 1 %.
		Benzene is used over 0,1 %.
		Halogenated hydrocarbons, terpenes, n-hexanes, secondary amines or amides are used
		A VOC with a flash point of more than 100 °C is used.
^a Values from UL 2801 [14].		
^b Values from Blue Angel, RAL-UZ 195 [16].		

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Annex D (informative)

Examples of laws related to pollution of water

D.1 Reference laws for water pollution

The substances described in the following laws and regulations, in particular, are relevant even if the print providers and the suppliers are not in the area concerned.

- a) Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive 2000/60/EC)
- b) Directives related to 2000/60/EC
 - Directive 2008/105/EC on Priority Substances
 - Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration
- c) Japan's Water Pollution Control (Law No. 138 of 1970 and latest amendment by Law No. 75 of 1995)

D.2 ANNEX VIII of 2000/60/EC

The indicative list of the main pollutants is listed in Annex VIII of 2000/60/EC.

- a) Organohalogen compounds and substances which can form such compounds in the aquatic environment.
- b) Organophosphorous compounds.
- c) Organotin compounds.
- d) Substances and preparations, or the breakdown products of such, that have been proved to possess carcinogenic or mutagenic properties or properties which can affect steroidogenic, thyroid, reproduction or other endocrine-related functions in or via the aquatic environment.
- e) Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances.
- f) Cyanides.
- g) Metals and their compounds.
- h) Arsenic and its compounds.
- i) Biocides and plant protection products.
- j) Materials in suspension.
- k) Substances which contribute to eutrophication (in particular, nitrates and phosphates).
- l) Substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.).

D.3 Substance list described in 2008/105/EC

- a) Council Directive 82/176/EEC of 22 March 1982 on limit values and quality objectives for mercury discharges by the chlor-alkali electrolysis industry
- b) Council Directive 83/513/EEC of 26 September 1983 on limit values and quality objectives for cadmium discharges
- c) Council Directive 84/156/EEC of 8 March 1984 on limit values and quality objectives for mercury discharges by sectors other than the chlor-alkali electrolysis industry
- d) Council Directive 84/491/EEC of 9 October 1984 on limit values and quality objectives for discharges of hexachlorocyclohexane
- e) Council Directive 86/280/EEC of 12 June 1986 on limit values and quality objectives for discharges of certain dangerous substances included in List I of the Annex to Directive 76/464/EEC

D.4 Substance list described in 2006/118/EC

- a) List I; organohalogen, mercury and its compounds, cadmium and its compounds, mineral oil and hydrocarbons, cyanide
- b) List II; zinc, copper, nickel, chromium, lead, selenium, arsenic, antimony, molybdenum, titanium, tin, barium, beryllium, boron, uranium, vanadium

D.5 Substance list in Japan's water pollution control

The values added to the brackets show the limit values to be allowed in the law. See [Table D.1](#).

Table D.1 — Limits for hazardous substances in Japan's water pollution control

Hazardous substances	Limit values	Hazardous substances	Limit values
cadmium	< 0,003 mg/l	1,1,1-trichloroethane	< 1 mg/l
cyanides	N.D.	1,1,2-trichloroethane	< 0,006 mg/l
lead	< 0,01 mg/l	Trichlorethylene	< 0,01 mg/l
chromium(+6)	< 0,05 mg/l	Tetrachlorethylene	< 0,01 mg/l
arsenic	1 mg/l	1,3-dichloropropene	< 0,002 mg/l
chromium(+6)	1,5 - 5 mg/l	Thiuram	< 0,006 mg/l
arsenic	< 0,01 mg/l	Simazine	< 0,003 mg/l
mercury and its substances	< 0,000 5 mg/l	Thiobencarb	< 0,02 mg/l
Alkyl mercury	N.D.	benzene	< 0,01 mg/l
PCB	N.D.	selenium	< 0,01 mg/l
Dichloromethane	< 0,02 mg/l	nitrogen for nitrate and nitrite	< 10 mg/l
Carbon tetrachloride	< 0,002 mg/l	Fluorine	< 0,8 mg/l
1,2-dichloroethane	< 0,004 mg/l	Boron	< 1 mg/l
1,1-Dichloroethylene	< 0,1 mg/l	1,4-dioxane	0,05 mg/l
cis-1,2-dichloroethylene	< 0,04 mg/l		

Annex E (informative)

Examples of waste regulations and laws

E.1 For better prevention and suppressing environmental pollution

There are many laws and regulations created to prevent and suppress environmental pollution from printed product waste. By incorporating the viewpoints of laws and regulations of other countries into the design and production of printed matter, it should be possible to create printed products with better environmental performance. Summarised examples of laws and regulations are provided for information in this annex.

NOTE These examples are not substitutes for the relevant regulations in the cited geographies.

E.2 Directive 94/62/EC on packaging and packaging waste

Directive (94/62 / EC) aims to increase recycling, and sets the target values for reuse, recovery and recycling in order to reduce waste. The examples of the targets are as follows.

- a) between 50 % as a minimum and 65 % as a maximum by weight of packaging waste will be recovered or incinerated at waste incineration plants with energy recovery
- b) 60 % as a minimum by weight of packaging waste will be recovered or incinerated at waste incineration plants with energy recovery
- c) the following minimum recycling targets for materials contained in packaging waste will be attained:
 - i. 60 % by weight for glass;
 - ii. 60 % by weight for paper and board;
 - iii. 50 % by weight for metals;
 - iv. 22,5 % by weight for plastics, counting exclusively material that is recycled back into plastics;
 - v. 15 % by weight for wood.
- d) The metals Pb, Hg, Cd, Cr6+ shall not be contained more than 100 ppm/(1 packaging unit).

E.3 Japanese law (112 of 1995)

The perspective of Japanese law (112 of 1995) is completely different from the EU directive. It restricts the content of environmental pollutants on the premise that wastes are released into the environment. The list of the pollutants and limit values is as follows. However, recycling of glass containers, PET bottles, plastic containers etc are obliged apart from the list.

Table E.1 — Example of the list of hazardous substances in Japanese law (112 of 1995)

Hazardous substances	Limit values	Hazardous substances	Limit values
alkyl mercury	N.D.	1,2-dichloroethane	0,04 mg/l - 0,4 mg/l
mercury	0,005 mg/l - 0,05 mg/l	1,1-Dichloroethylene	1 mg/l - 10 mg/l
cadmium	0,09 mg/l - 0,3 mg/l	cis-1,2-dichloroethylene	0,4 mg/l - 4 mg/l
lead	0,3 mg/l - 1 mg/l	1,1,1-trichloroethane	3 mg/l - 30 mg/l
organic phosphorus	1 mg/l	1,1,2-trichloroethane	0,06 mg/l - 0,6 mg/l
chromium(+6)	1,5 mg/l - 5 mg/l	1,3-dichloropropene	0,2 mg/l - 0,02 mg/l
arsenic	0,3 mg/l - 1 mg/l	thiuram	0,06 mg/l - 0,6 mg/l
cyanides	1 mg/l	simazine	0,03 mg/l - 0,3 mg/l
PCB	0,003 mg/l - 0,03 mg/l	thiobencarb	0,2 mg/l - 2 mg/l
trichlorethylene	0,1 mg/l - 1 mg/l	benzene	0,1 mg/l - 1 mg/l
tetrachlorethylene	0,1 mg/l - 1 mg/l	selenium or selenium compounds	0,3 mg/l - 1 mg/l
dichloromethane	0,2 mg/l - 2 mg/l	1,4-dioxane	0,5 mg/l - 5 mg/l
carbon tetrachloride	0,02 mg/l - 0,2 mg/l	dioxins	100 pg/l - 3 ng/l