Nordic Ecolabelling for

Printing companies and printed matter

Version 7.0 • date – date

CONSULTATION

Nordic Ecolabelling

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041, Printing companies and printed matter, version 7.0, 13 August 2026

Contact information

In 1989, the Nordic Council of Ministers decided to introduce a voluntary official ecolabel, the Nordic Swan Ecolabel. These organisations/companies operate the Nordic Ecolabelling system on behalf of their own country's government. For more information, see the websites:

Denmark

Ecolabelling Denmark

www.svanemaerket.dk

Iceland

Ecolabelling Iceland

www.svanurinn.is

Finland

Ecolabelling Finland

www.joutsenmerkki.fi

Norway

Ecolabelling Norway

www.svanemerket.no

Sweden

Ecolabelling Sweden

www.svanen.se

1 Summary

Nordic Swan Ecolabelled criteria for printing companies and printed matter have been revised from generation 6 to 7. The primary environmental impact of printed matter is associated with the production of paper[1] and other printing substrates such as plastic, metal, wooden boards, and textiles. Key environmental impact also includes energy consumption in the printing service, the use of chemicals, efficient resource utilization, and recycling of printed matter. The criteria contain requirements in those areas.

To obtain the Nordic Swan Ecolabel, printing companies must meet strict requirements for sourcing responsibly produced paper and other non-paper printing substrates, as well as for ensuring energy efficient operations throughout their printing service. Environmental impact is further reduced through the use of chemicals that comply with stringent environmental and health standards, as well as by ensuring the recyclability of printed materials—thereby supporting a circular economy.

Key focus areas of the revision include introducing a new requirement for the use of rigid substrates with good recycling properties, strengthening the requirement for minimum share of purchased ecolabelled/inspected paper, revising the energy requirement and simplifying as well as adding new point requirements.

The main changes proposed in the revised criteria are:

- Strengthen the requirements for minimum share of purchased ecolabelled/inspected paper from min. 60% to 70%
- Introducing a new requirement for min. 40% share of purchased rigid substrates with good recycling properties
- Strengthen the requirement for total annual energy use for most printing technologies
- Reducing the number of point requirements from a total of 11 to 9 as well as simplifying the point structure from a total of 59 to 14 points. Several requirement limits for obtaining points have been made more strict
- Introducing new point requirements for use of rigid substrates with good recycling properties as well as energy improvement measures.
- Introducing a new procedure for guiding customers of printed matter on end-of-life and waste sorting of purchased printed matter.

For an overview of the changes in this revised generation 7, see the table in the next section 1.1.

[1] Kowalska, M., Donatello, S. & Wolf, O. EU ecolabel criteria for printed paper, stationery paper, and paper carrier bag products – Final technical report. Publications Office of the EU, 2021. DOI: 10.2760/37534.

1.1 Changes compared to previous generation

Table 1: Overview of changes to criteria for Printing companies and printed matter generation 6 to 7

Req. gen. 7	Req. gen. 6	Same req.	Change	New req.	Comments
Definition of the Product group		X			Editorial change done
O1 Type of printing company		X			Editorial change done
O2 Suppliers of printing service		X			
O3 Chemical finishing suppliers		X			
O4 Printing substrates		X			Editorial change done. Information on total annual purchase of rigid substrates has been added the requirement
P1 Paper substrates			X		Strengthened The point-scale has been changed. To get point at least 90% of the total annual purchase of substrates must be paper.
O5 PVC-free substrates		X			
O6 Inspected and Ecolabelled paper substrates			X		Strengthened Share of inspected or ecolabelled paper has been strengthened from min. 60% to 70%
P2 Inspected and Ecolabelled paper substrates			X		Strengthened The point-scale has been changed. To get point at least 75% of the annual purchase of paper must be inspected or ecolabelled
O7 Rigid substrates with good recycling properties				X	New requirement Min. 40% of the annal purchase of rigid substrates must have good recycling properties
P3 Rigid substrates with good recycling properties				X	New point requirement To get point at least 45% of the annal purchase of rigid substrates must have good recycling properties
O8 Fabrics/textiles		X			
O9 Wood based board/panels		X			
O10 Paper-based packaging		X			
O11 Chemicals		X			
O12 Consumption of VOC		X			
O13 Energy use			X		Strengthened The requirement limit for energy use has been strengthened for some of the printing technologies

P4 Energy use				X	New point requirement At least 1 of the energy efficiency measures must have been implemented. Possible to obtain 2 points if two of the listed energy improvement measures must have been implemented at the printing company
P5 CO_2 calculations		X			
O14 Plastic packaging used for protection of printed matter		X			
O15 Waste management system		X			
P6 Wastepaper			X		Editorial change done The point-scale has been changed but the individual printing technology limits remain unchanged
P7 Unsorted waste			X		Strengthened The point-scale has been changed. To get point the annual quantity of mixed waste must be less than 15 kg per purchased tonne substrate.
P8 Purchase of Ecolabelled products and services			X		Editorial change done The point-scale has been changed. To get point minimum one of the listed ecolabelled products and services must be annually purchased.
P9 Use of Swan logo on printed matter			X		Strengthened The point-scale has been changed. To get point minimum 20% of the annual number of order produces must be Nordic Swan ecolabelled
O16 Strategic goals and reduced environmental impact			X		Expanded with new procedure for guiding customers of printed matter on end-of-life and waste sorting of purchased printed matter
O17 Customer complains				X	Replaces the former requirements O15-O19 in generation 6
O18 Traceability				X	Replaces the former requirements O15-O19 in generation 6
O19 Follo-up on license		X			
O20 Obligatory point score requirement			X		Strengthened The number of possible total points have been adjusted from 59 to 14. The obligatory point score requirement has been adjusted from 19 to 6 points.
Special requirements concerning the Nordic Swan ecolabel logo on the printed matter					
O21 Paper		X			
O22 Paper board for signage, display and retail point of sale/purchase				X	Editorial change done Paper board for signage have received a separate requirement - part of O22 paper board/corrugated in generation 6
O23 Board/corrugated board for packaging		X			
O24 Textile and panels		X			

O25 Printing inks, toners, vanishes and adhesives		X			
O26 Lamination and PVC		X			
O27 Fragrance		X			
O28 Printing suppliers and finishers		X			
O29 Traceability		X			
Requirements removed from the criteria					
	P3 Content of recycled materials				Removed
	P4 Mono substrates				Removed
	P5 Recycled materials and mono substrates				Removed
	P6 Consumption of VOC				Removed
	O15 Organisation and responsibility				Removed
	O16 Documentation				
	O17 Changes and non-conformities				
	O18 Training				
	O19 Consumer information				
	O20 Legislation and regulations				Removed

2 Environmental communication guideline for Nordic Swan Ecolabelled printing companies and printed matter

Nordic Swan Ecolabelled printing companies

Nordic Swan Ecolabelled printing companies have reduced environmental and climate impact throughout the lifecycle through procurement of sustainably produced paper and reduced energy consumption. Environmental impact is also reduced by the use of chemicals that meet strict requirements and do not hinder the recycling process of the printed matter – this promotes circular economy.

A Nordic Swan Ecolabelled printing company:

- Meets strict requirements for use of paper - At least 70% of the printing companies' total annual consumption of paper meets strict requirements for wood raw material, chemicals, energy and emissions to air and water.
- Has limited use of PVC. At least 90% of the printing company's total annual consumption of substrates does not contain PVC or PVC coating.

- Meets requirements for maximum annual energy use at the printing company and thereby contribute to a reduced climate impact.
- Meets strict requirements for chemicals which are harmful to the environment and/or human health.
- Reduces emissions of volatile of compounds (VOC).
- Promotes circular economy through strict recyclability requirements for paper printed matter and through requirements for managing production waste.

Nordic Swan Ecolabelled printed matter

Nordic Swan Ecolabelled printed matter has reduced environmental and climate impact throughout the lifecycle through sustainably produced paper and other substrates printed on, and reduced energy consumption. Environmental impact is also reduced by the use of chemicals with low environmental toxicity that do not hinder the recycling process of the printed matter – this promotes circular economy.

A Nordic Swan Ecolabelled printed matter:

- Is printed on substrates that meets strict requirements for e.g. raw materials, chemicals, emissions and energy use.
- Meets strict requirements for chemicals which are harmful to the environment and/or human health.
- Does not contain PVC or fragrance.
- Is designed to support recycling e.g. printing inks, toners, ink, vanishes and adhesives must prove repulp- and deinkability and any non-paper product part in the printed matter is easily removable. This promotes circular economy

3 What can carry the Nordic Swan Ecolabel?

Product group definition

The Nordic Swan Ecolabel applies to a **printing company's*** production of **printed matter which also includes conversion of printed matter**. Printing material used by the printing company must comprise **paper/paper-based substrates** or **substrates other than paper** in accordance with requirement O1. The **printing methods** must be one or several of the following: Conventional offset (sheet fed offset, heatset, coldset) water less offset, flexography and digital printing (incl. **digital wide format printing**).

An applicant is not prevented from offering use of printing methods or production of printed matter that at are not covered by these criteria, see list below. These may not be marketed as part of the Nordic Swan Ecolabelled printing services. It must be clear, transparent and explicitly defined what is covered by the Nordic Swan Ecolabelled printing services.

Nordic Ecolabelling also includes:

<u>Packaging printing companies (only produce packaging):</u>

Where a company operates multiple production lines for the manufacture or printing of packaging, only those lines producing transport, postal, and e-commerce packaging are included within the scope of this application. Production lines used for primary (sales), and secondary (grouped) packaging are explicitly excluded from these criteria. The applicant

must document the specific substrates and chemicals used on the production lines covered by the application. Furthermore, the applicant's total energy consumption must be allocated to the production lines included in the application. This allocation shall be based on the tonnage of substrates purchased or used.

Paper envelopes:

Envelopes with and without flexographic printing on the inside are covered by the printing method envelope flexography in this document. Envelopes with printing on the outside are encompassed by e.g., offset printing of envelopes or digital printing.

Conversion of paper to paperboard/corrugated board:

The production process used by manufactures (converters) of paper board/corrugated board used as inspected printing material in Nordic Swan Ecolabelled printing companies.

Printed matter without printing:

Printed matter without printing (e.g., post-it notes or note pads without printing) is encompassed by the same printing method as that used for printing the cover or another part of the printed matter.

Other:

Subject to agreement with Nordic Ecolabelling, printing companies may exempt the production of certain types of printed matter involving a specially demanding production process (e.g., security printing and questionnaires of pharmaceutical industry).

In this case, the printing company must have clearly divided production processes and marketing guidelines for what is Nordic Swan Ecolabelled and what is not.

All converting, printing, or finishing operations applied to the printed matter shall fulfil the respective requirements.

The product group does **not** include the following printing methods/technology and types of printed/converted matter:

- Films used to illustrate the printing plates - repro.
- Letterpress printing, gravure printing, non-digital screen printing and 3D printing.
- Packaging printed on/converted from other substrates than paper such as plastic or metal
- Production and printing of primary and secondary packaging,
- Printing on packaging for liquid foods. Separate ecolabelling criteria exist for these.
- Printing on textiles produced for clothing and accessories or furnishing fabrics, i.e., textiles produced for use and interior decoration in the home or in cars/boats, such as towels, bedding, curtains, tablecloths, rugs, cushions, duvets, and upholstery (both for private and public use). Separate Ecolabelling criteria exist for these.

  Printing on textile for advertising such as signs, banners, roll ups and Point of Sale (POS) is however part of these criteria.

- Printing on tissue paper (serviettes, kitchen rolls, toilet paper and similar products). Separate ecolabelling criteria exist for these.
- Printing on disposables for food and beverages. Separate ecolabelling criteria exist for these.

** **Bold** highlighting indicates that the term is explained in the section Terms and definitions.*

3.1 Justification of the product group definition

The product group encompasses printing companies and printed matter. A printing company is a business providing printing of printed matter as a substantial part of its business. Licences to become a Nordic Swan Ecolabelled printing company cannot be issued to publishers and advertising agencies as their purpose is not to provide printing services. Printing is a process involving the processing of printing material to produce printed matter and encompassing printing on printing materials and/or finishing/converting. The processing consists of an image, pattern, picture, text, or the like being printed on paper or some other printing material.

The criteria focus both on the overall environmental profile of the printing company as well as on the environmental profile of the individual item of Nordic Swan Ecolabelled printed matter.

As in generation 6 of the criteria, the printing methods must be one or several of the following: Conventional offset (sheet fed offset, heatset, coldset) water less offset, flexographic printing, flexographic envelope production, and digital printing. Digital printing includes several different techniques such as wide format-, inkjet-, indigo-, screen- and dye-sublimation printing.

Printed matter includes:

- Newspapers, advertising matter, journals, catalogues, books, leaflets, brochures, pads, posters, loose-leaf's, business cards, folders, ring binders with paper contents, labels, and the like.
- Envelopes and other converted printed matter.
- Stationery and office supplies, such as notebooks, exercise books, notepads, etc. that are sold by wholesalers or via the retail trade, are also classed as printed matter.
- Paper-based transport, postal, and e-commerce packaging are included within the scope of, however not primary- and secondary packaging as well as packaging for food contact.
- Banners, billboards, signs, posters, roll-ups, window/vehicle graphics and other point of sale (POS) material typically produced using wide format digital printing technology.

In case of roll-up stands, printed canvas on a wooden frame and other similar products, only the material carrying the information is regarded as printed matter. Other parts such as the metal stand or wooden frame are not covered by requirements in the criteria.

Digital wide format printing is part of the criteria which means that printed matter also includes banners, billboards, signs, posters, roll-ups, and window/vehicle graphics also known as (POS=point of sale material).

Envelope production itself is performed on a flexographic printing machine which often prints on the inside of the envelope. As envelopes generate more wastepaper than, for instance, notepads and leaflets, which are also printed using the flexographic method, Nordic Ecolabelling introduced its own points limit for envelope production (flexographic envelope production).

Envelope producers must also select this category even if they produce envelopes that neither bear print on the inside or outside. As regards printing on the envelopes using offset technology the printer must use envelope offset. If the printer uses digital printing machines, then the ordinary digital printing method must be selected.

Manufacturing of inspected paper board/corrugated board applies to the process of converting paper to paper board/panels or corrugated cardboard. The conversion process involves gluing together a minimum of two paper grades (such as gluing together liner and fluting or liner and paper cell core) and e.g., also the process of cutting, trimming and bending the board. Inspected paper board/corrugated board can be used as an inspected printing material in Nordic Swan Ecolabelled printing companies.

Manufacturers of inspected paper board/corrugated board (converters) that also print on the converted paper board/corrugated board must apply and comply with the criteria for Nordic Ecolabelling printing companies and printed matter to use the Nordic Ecolabel Swan logo on the final transport packaging.

An applicant is not prevented from offering use of printing methods or production of printed matter that at are not covered by these criteria. These may not be marketed as part of the Nordic Swan Ecolabelled printing services. Also, printing companies may exempt the production of certain types of printed matter involving a specially demanding production process (e.g., security printing and questionnaires in the pharmaceutical industry).

One of the primary functions of primary and secondary packaging is to inform the consumer as well as support brand presentation. Use of the Nordic Swan logo on the produced packaging may lead to confusion about what the logo applies to - the product inside the packaging or the packaging itself. Production and print on primary- and secondary packaging is therefore excluded in these criteria. Transport, postal, and e-commerce packaging is however included within the scope of the criteria.

Paper-based packaging designed for non-food contact made of paper and board is always recyclable. However, packaging designed for non-food contact is often produced in combination with other materials such as plastic which raise challenges int the recycling process. Therefore, packaging made of non-paper material is excluded in these criteria to support the concept of a circular economy.

Printing companies using film/film production are excluded from the criteria. Film in repro is an old repro technology (use of both developing and fixing baths) which has been replaced by computer to plate, CTP).

Letterpress printing, non-digital screen printing and 3D printing are also excluded from the criteria. Letterpress is an old method which, in practice, has been replaced by offset. Non-

digital screen printing uses much more ink (often done manually) compared to the digital process performed on inkjet printers. 3D printing produces 3D solid objects by building up the objects layer by layer. 3D printing is not regarded as printed matter, as the primary function of the printed objects is not that of an "information carrier".

Printing companies printing on tissue paper, disposals for food, packaging for liquid food (food contact) and textile produced for clothing and accessories or furnishing fabrics are not eligible for a Nordic Ecolabelling licence. Separate ecolabelling criteria exist for these.

4 How to read this criteria document

The criteria for Printing companies and printed matter comprise a combination of obligatory requirements and point score requirements. The letter "O" and a number indicate obligatory requirements. These requirements must always be fulfilled. The letter "P" and a number distinguish point score requirements. Each requirement of this type gives a point score. These scores are then totalled. A minimum total score must be achieved to fulfil the licence constraints.

The text describes how the applicant shall demonstrate fulfilment of each requirement. There are also icons in the text to make this clearer. These icons are:

- Upload
- Requirement checked on site

To be awarded a Nordic Swan Ecolabel licence:

- All obligatory requirements must be fulfilled.
- A minimum point score of 6 must be achieved (6 out of 14). Use table 17 in requirement O20 to calculate the points score.

Before a license is issued, the Nordic Ecolabelling organization will normally pay an inspection visit to the applicant and/or the manufacturer. If necessary, multiple inspection visits can be made.

All information submitted to Nordic Ecolabelling is treated confidentially. Suppliers can send documentation directly to Nordic Ecolabelling, and this will also be treated confidentially.

5 Requirements and justification of these

This chapter includes requirements and background information for the specific requirements.

Definitions

Terms	Definition
Algicides	Chemicals designed to prevent the growth of algae and the like in recirculating systems in print production.
Azo dyes	A large group of synthetic dyestuffs containing one or more nitrogen double bond (azo) groups as its chromophore.
Energy threshold value	The Energy threshold values is based on data from Nordic Swan Ecolabelling licensees. The requirement for energy consumption includes all the printing company's purchased energy in kWh per tonne of purchased substrate per year.
Brokers	Companies that primarily sell printed matter opposite to publishing houses and advertising agencies that usually do not provide printing services as a substantial part of their business.
Chemical products used in the finishing of substrates other than paper	Finishing means surface treatment of the substrate of which coating/varnishing/adding adhesives is added to the surface of the substrate to improve printing properties. Requirements for chemical products used in finishing are set in requirement O6. The requirement does not apply to chemical products used in the actual manufacturing of substrates such as additives used in the manufacturing of foils or laminates or boards.
Chemicals used for coating used in the production of paper board/corrugated board	Chemical coating is a covering applied to the surface of the paper board/corrugated board such as colour, varnish, or a coating to obtain waterproof or antistatic properties.
Converted printed matter	Converted printed matter means paper, board, or non-paper substrates, either printed or unprinted, used, for example, to protect, handle or store items and/or notes, for which the converting process is an essential part of the production process, e.g., envelopes, stationery paper products, packaging containers or marketing displays, see also converting process.
Converting process	A process whereby a material is processed into a converted product. Conversion is a post-press activity that involves making a flat printed press sheet into a three-dimensional object, see also converted printed matter.
Corona treatment	Corona treatment (sometimes referred to as air plasma) is a surface modification technique that uses a low temperature plasma to impart changes in the properties of a surface. A corona treating system is designed to increase the surface energy of plastic films, foils, and paper in order to allow improved wettability and adhesion of inks, coatings and adhesives. As a result, the materials treated will demonstrate improved printing and coating quality, and stronger lamination strength.
CRM substances	Carcinogenic, Germ cell mutagenicity, Reproductive toxicity category 1 A or B or category 2.
Digital wide format printing	Wide format printers (large format printers) are generally accepted to be any computer-controlled printing machines (printers) that support a maximum print roll width of between 18" (inches) and 100". Printers with capacities over 100" wide are considered super wide or grand format. Wide format printers are used to print banners, posters, trade show graphics, wallpaper, murals, backlit film, vehicle image wraps, electronic circuit schematics, architectural drawings, construction plans, backdrops for theatrical and media sets, and any other large format artwork or signage. Wide format printers usually employ some variant of inkjet or toner-based technology to produce the printed image. See also Printed matter.
EDTA	Ethylenediaminetetraacetic acid.

Energy consumption	Energy encompasses all the printing company's purchases of electricity, district heating, fuel for stationary combustion plants etc., calculated as kWh of purchased energy on an annual basis per tonne of purchased substrate. This encompasses the entire production process in the form of pre-press, printing, and finishing, as well as other subprocesses/functions at the printing company, such as chemical stores, paper and product stores, ventilation, lighting, internal treatment of water and emissions as well as support functions, such as offices, toilets, changing rooms and other common areas. This parameter does not include fuel, if any, used for the printer's own vehicles. Energy produced in-house from e.g., sun, wind and thermal heating will not be included, since it has not been purchased.
Energy Management Systems	An energy management system (EnMS) defines energy policy, objectives, energy targets, action plans and processes. The EnMS supports the achievement of a company's overall goals providing an organisational basis for improved energy and carbon efficiency through the measurement, monitoring, control, and improvement activities.
Envelope	For the purposes of this document, a cover made of paper in which letters are sent. The paper is folded and glued along the sides or, on smaller envelopes, diagonally on the rear side. Many envelopes have printed areas on the inside surfaces in order to conceal the contents.
Flexible printing substrates	Flexible substrates are thin, pliable materials that can bend, roll, twist, or conform to surfaces without breaking. Common materials are paper plastic films, laminates, foils, textiles/fabrics and rubber.
Foil for foil printing	Foil printing is a speciality printing process which uses heat, pressure, and metallic paper (foil). The technique is an application of metallic or pigmented foil on to a solid surface by applying a heated die on to the foil.
Functional unit	The functional unit is defined as one tonne purchased/used substrate.
Halogenated organic solvent	Halogenated organic solvent means an organic solvent which contains at least one atom of bromine, chlorine, fluorine, or iodine per molecule.
Inspected paper	Inspected printing paper is paper without a Nordic Swan Ecolabelled licence but fulfils certain criteria set by Nordic Ecolabelling. Paper is a registered item for a specific use that has been approved for use in Nordic Swan Ecolabelled printing companies and used in printing of Nordic Swan Ecolabelled printed matter. Requirements for inspected printing paper are set in the paper module for inspected pulp and paper.
Inspected paper board/corrugated board	Inspected paper board/corrugated board applies to conversion of paper to packaging such as corrugated cardboard, cardboard, and solid board. The conversion process involves gluing together a minimum of 2 paper grades. Inspected paper board/corrugated board is board without a Nordic Swan Ecolabelled licence but fulfils certain criteria set by Nordic Ecolabelling. Paper board/corrugated board is a registered item for a specific use that has been approved for use in Nordic Swan Ecolabelled printing companies and used in printing of Nordic Swan Ecolabelled printed matter. Requirements for inspected paper board/corrugated board are set in the paper module for inspected pulp and paper. (For the consultation see Appendix 6.)
Laminating	Lamination means adhering a layer of plastic (polyethylene, polymerized acrylics, vinyl's, styrenes, among others) to a paper material mainly to increase product durability (i.e., barrier properties or mechanical resistance).
Mesh	A polyester material that allows the air to blow through. There are crisscrossed fibres that can been seen through to some extent, but it still has a printable surface. They are commonly displayed on construction fences or sports fences. Mesh can be coated with vinyl or PVC.

Mono substrate	Mono substrate (other than paper) consists of the same material such as PE- or PP foil, PC or PS board or polyester. Substrates containing adhesives (outer layer of adhesives) such as films/laminating films or substrates coated with another material (such as PVC) are not considered to be a mono substrate. Mono substrates coated with ink are how ever considered to be a mono substrate.
Non-flexible printing substrates (rigid substates)	Non-flexible, or rigid, substrates are stiff materials that cannot bend or deform without breaking or permanently damaging the material. Common materials are paper-/fibre boards, wood-based panels, boards of plastic (PE, PC, PP and PET), foam boards, metal panels (aluminium) and glass panels. Paper is not defined as rigid substrates.
Orders produced	A production order is an order issued within a company to produce a specific quantity of material within a certain timeframe.
Packaging	EU Packaging and Packaging Waste Regulation (PPWR) – Regulation (EU) 2025/40 - Primary (sales) packaging – directly contains the product - Secondary (grouped) packaging – groups multiple units -Tertiary (transport) packaging – used for handling and transport It is only possible to Nordic Swan Ecolabel Tertiary (transport) packaging, e-commerce- and postal packaging.
Paper/paper printed matter	A printing material assessed by Nordic Ecolabelling and the EU Ecolabel's criteria for graphic/printed paper, e.g., printing paper, copying paper, newspaper, cardboard, paper board etc. Also, paper board/corrugated board assessed by Nordic Ecolabelling.
PC	Polycarbonate.
Practising company	The business that performs the actual printing operation.
Printed matter	Printed matter is the result of the processing of a printing material. Printing includes pre-press, press, and post press operations. The processing consists of an image, picture, pattern, text, or the like being printed on paper or some other printing material. In addition to printing, the processing may include finishing, consisting of various forms of mechanical processing, such as folding, stamping and cutting or various forms of assembling, using glue, staples, stitches, and the like. In the case of some printed matter, the processing is confined to finishing, i.e., it does not undergo a printing process (for example, some notepads and envelopes). Printed matter includes: - Newspapers, advertising matter, journals, catalogues, books, leaflets, brochures, pads, posters, loose-leafs, business cards, folders, ring binders with paper contents, labels, and the like. - Envelopes and other converted printed matter. - Stationery and office supplies, such as notebooks, exercise books, notepads, etc. that are sold by wholesalers or via the retail trade, are also classed as printed matter. - Paper-based packaging made of paper/cardboard (wood pulp). - Banners, billboards, signs, posters, roll-ups, window/vehicle graphics and other point of sale (POS)/point of purchase (PUR) material typically produced using wide-format digital printing techniques. In case of roll-up stands, printed canvas on a wooden frame and other similar products, only the material carrying the information is regarded as printed matter. Other parts such as the metal stand or wooden frame are not covered by requirements in the criteria.
Printing company/ Printing house/Printers	A business providing printing services, where printing constitutes a substantial part of its business. Printing is done by traditional printing companies, but also by photocopying centres and other businesses carrying out printing. There may also be printing companies that do not do the actual printing themselves (brokers). Typical printing companies are sheet fed offset printers, rotary printers, heatset printers, newspaper

	printers, magazine printers, packaging printers, envelope printers, board printers, label printers, flexographic printers, and digital printers (including wide format printers), but also manufacturers of envelopes and packaging as well as manufacturers of other products encompassed by the term printed matter in this document. Printing may also include finishing. Publishing houses and advertising agencies are not regarded as printing companies as they do not provide printing services as a substantial part of their business.
Printing methods	Conventional offset (sheet fed offset, heatset, coldset,) water less offset, flexographic printing and digital printing. Digital printing is printing where print data is imaged directly on the printing system without an intermediary printing form. Examples of types of digital printers: - Laser printers (electrophotography). This includes monochrome copier/printers along with colour copier/printers from multiple sources, and some digital presses. - Inkjet printers. This includes desktop printers, addressing printers in-line with finishing operations, wide format printers and high-quality proofing printers, as well as some digital presses. - Thermal transfer and hot melt ink printers. This includes thermal wax and hot stick printers. - Dye sublimation printers. This includes some colour proofing devices and 'photo quality' continuous tone printers. - Nanography: new technology being developed by Landa, uses WB nanoink of 10nm (less pigment, better resolution).
Production chemicals	Collective term for chemical products used during production. It can refer to chemical additives, auxiliary chemicals, and process chemicals. Production chemicals apply to the following chemical categories: - Chemicals for form production (repro). - Printing ink, toners, and Inks. - Varnishes. - Adhesives. - Washing agents, incl. washing agents used for ordinary cleaning of printing machines. - Damping solutions additives (e.g., alcohol, IPA). - Algicides. - Foil for foil printing and laminates applicable to printed paper used in production to printed matter. - Adhesives used in manufacturing of paper board/corrugated board. - Chemicals used for coating in manufacturing of paper board/corrugated board.
PS	Polystyrene.
Purchased substrates/ Consumption of substrates	The number of tonnes of substrates purchased by the printing company per year. Quantities of substrates not purchased by the printing company, but used in production, must be added. The printer may, by arrangement with Nordic Ecolabelling, omit substrates supplied by the customer where special circumstances apply. If consumption of substrates is assessed on an annual basis, storage differences must be corrected for.
Recycled material	Recycled material is defined in accordance with ISO 14021. "Pre-consumer": Material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it. Nordic Ecolabelling considers rework, regrind or scrap, which cannot be reused directly in the same process, but requires a reprocess (e.g., in the form of sorting, re-melting and granulation) before it can be reused, to be pre-consumer material. This is regardless of whether it is done in-house or externally.

	"Post-consumer/commercial" is defined as material created by households or commercial, industrial, or institutional facilities in the role of end users of a product which can no longer be used for the intended purpose. This includes return of material from the distribution chain.
Release papers/-liners	Release papers/-liners are papers or films coated with a release agent (silicone) and are used in a wide range of applications such as for protection of adhesive surfaces of various adhesive products and protecting of printing surface.
Repro chemical	Repro chemicals used for form production which could include process outside repro, e.g., developing of printing forms in the printing press. Examples on chemicals are algicides, plate developer, gumming agents for the production or protection of offset plates and chemicals to produce flexographic plates. Plate cleaners and other corresponding chemicals are regarded as washing agents and thus, not included in the category of chemicals for printing form production. Repair material is not included in this category of chemicals.
Rigid substrates	See non-flexible printing substrates
Rules of Rounding	General rule of rounding e.g., 0,5 go up, so 4,5 rounds up to 5.
Substrate	Any surface or material on which printing is done.
Substrates other than paper - used as printing substrate	Other substrates than paper is often divided into flexible and rigid substrates. Flexible substrates such as foils and laminates often consist of plastic such as PVC, vinyl, PP, PE, and PET, while textiles and canvas most often are used for banners and posters. Typical rigid substrates are thick plastic, board, wood, metal, or glass which is often used for signs. Rigid substrates may consist of one material but are often composed of several types of material forming a composite. Labels made from plastic or containing a release liner plastic-based film sheet are also considered to be substrate other than paper.
Supplier	Enterprise that supplies products (goods or services) to the printing company. The definition is based on the definition in ISO 9000:2000.
Total consumption of substrates	See Purchased substrates.
Waste paper	All paper from production in the printing company that does not end up in the finished printed matter that the customer receives or that is supplied for temporary storage in a store (e.g., at the printing company). Wastepaper includes shavings or cutting waste, waste from starting runs in the print works and the bindery (e.g., running-in in connection with folding, gluing, stitching), wastepaper generated during printing and bookbinding operations, wastepaper from paper storage (discarded unprinted paper) and leftover paper in rolls or other unused paper for printing. Wastepaper does not include discarded and stored printed matter that The Nordic Swan Ecolabelled printing company has produced and received payment for. Packaging waste and used paper rolls are not classed as wastepaper. Sold newspapers, magazines etc. that are returned to the printing company from stores for recycling can be excluded if amounts are known or alternatively, can be estimated. Where the printing house carries out finishing processes on behalf of another printing house, the amount of wastepaper produced in those processes shall not be included in the calculation.
VOC	Volatile organic compounds (VOC) are defined in accordance with European Commission's Directive 2010/75/EC on the limitation of emissions of volatile organic compounds with vapor pressure > 0.01 kPa at 20°C. See also VOC consumption.
VOC consumption	Number of kilograms of VOC used on an annual basis based on the quantities purchased/received. Washing agents, dampening solution additives, printing inks and other chemicals may contain VOC. Some washing agents consist entirely of VOC. Storage differences can be corrected for. The Nordic Ecolabelling Portal shows how much VOC is present in the various chemicals. When calculating VOC emissions,

	printing companies disposing of this under controlled conditions may deduct the VOC disposed of from their VOC consumption in accordance with Appendix 5 in the criteria document. This, for instance, applies to printing companies that clean outgoing air for VOC (typically heatset printers). In the case of heatset the correction must take account of the result of measurements of point releases of VOC.
Wood-based panels/boards	Typical wood-based panels/boards are chipboard, fibreboard (including MDF and HDF panels), OSB (Oriented Strand Board), veneer plywood and veneer boards. The requirements also include corresponding products made of bamboo. Wood-based panels/boards does not include boards made of wood pulp (paper).

5.1 Description of the product/service

O1 Type of printing company

- The printing company must give a brief account of the number of printing machines, the type of machine or model (e.g., heat set press, flexography machine, flatbed), size (e.g., number of ink and varnish units), format (e.g., sheet size) and machines for prepress and potential finishing services.
- At least 50% of the printing company's turnover must originate from paper printed matter, printed Nordic Swan- or EU Ecolabelled textile or Nordic Swan Ecolabelled construction and facade panels manufactured using printing methods encompassed by the criteria.

Please be aware of the following possibilities:

This applies to printing companies that use **a single** printing method:

- In cases where the printing company primarily prints on paper: If the consumption of substrate other than paper constitutes a maximum of 5% of the total paper consumption, these substrates other than paper is exempted from the criteria, However, chemicals used in printing on substrates other than paper must still comply with the requirements.

This applies to printing companies that **use multiple** printing methods:

- In cases where a printing company only prints on paper: If the paper consumption for a single printing method constitutes a maximum of 5% of the total paper consumption, this method can be included as part of a larger method in the printing company.

*Example: If the printing company is using 50 tons of paper (sheet fed offset) and 2 tons of paper (digital printing) then the digital printing method can be included in the sheet fed offset method because (2/52) * 100= 3,8%.*

- In case where the printing company primarily prints on paper: If the turnover from printing on substrates other than paper constitutes a maximum of 5% of the printing companies' turnover for printing on paper (alternatively 5% of the total paper consumption), this printing method/substrates other than paper is exempted from the criteria. However, chemicals used in the exempted printing method must be includes as part of a larger method in the printing company.

Example: If the printing companies' turnover for printing on paper constitutes 50.000 Euro and the turnover for printing on substrates other than paper constitutes 2000 Euro, this

*printing method/quantity of substrates other than paper is exempted from the criteria because (2000/50000) * 100 = 4%.*

- Packaging printing companies (exclusively produce packaging):

  The packaging printing company must give a description of all production lines as well as categories of packaging produced (sales, grouped and transport packaging.

  Where a company operates multiple production lines for the manufacture or printing of packaging, only those lines producing transport, postal, and e-commerce packaging are included within the scope of this application. Production lines used for primary (sales) and secondary (grouped) packaging are explicitly excluded from these criteria. The applicant must document the specific substrates and chemicals used on the production lines covered by the application. Furthermore, the applicant's total energy consumption must be allocated to the production lines included in the application. This allocation shall be based on the tonnage of substrates purchased or used to produce transport, postal, and e-commerce packaging.

- A brief description of the number of printing machines, the type of machine or model (e.g., heat set press, flexography machine), size (e.g., number of ink and varnish units), format (e.g. sheet size), machines for pre-press and potential finishing services.
- Information on the printing company´s total turnover as well as turnover from paper printed matter, printed Nordic Swan- or EU Ecolabelled textile or Nordic Swan Ecolabelled construction and facade panels.
- If exemption for 5% paper consumption or 5% substrate other than paper is a used; documentation for the total consumption of tonnes of substrate (paper and substrates other than paper, respectively) for each individual printing method and information on turnover from paper- and substrate other than paper printed matter.

Background to O1 Type of printing company

As in generation 6, a minimum of 50% of the printing company's turnover must derive from printed matter printed on paper substrates. In this generation, the choice of substrates has been expanded to also include Nordic Swan- or EU Ecolabelled textiles[2] or Nordic Swan Ecolabelled construction and facade panels[3].

The minimum requirement of 50% is introduced for reasons of credibility, as the potential environmental impacts of paper production in a life cycle perspective including impacts of the printing house and those associated with printed paper products are well known and analysed. The same applies to the production of Nordic Swan- or EU Ecolabelled textiles or Nordic Ecolabelled construction and facade panels.

This 50% must be calculated based on the printing company's turnover from printing. Consequently, turnover from other activities, such as layout work, web design, etc., does not count. This is because the criteria cover printing, for which reason it is not credible for a

[2] Both the Nordic Swan Ecolabel and the EU Ecolabel have criteria for textile that includes several relevant print substrates such as polyester or canvas. Visit the relevant national websites for information on labelled textiles.
[3] The product group includes several relevant print substrates such as wood-based panels/boards. Visit the relevant national websites for information on labelled construction and façade panels.

Nordic Swan Ecolabelled printing company to market other activities as being Nordic Swan Ecolabelled.

In cases where the paper consumption or consumption of substrate other than paper for a single printing method is low (maximum 5%) compared to other printing methods, this method can either be included as part of a larger method in the printing company or exempted (only the substrate other than paper, not the chemicals) from the criteria.

5.2 Suppliers

The applicant must document the supplier requirements for the printing company, i.e. not for each individual printing method.

O2 Suppliers of printing services

At least 75% by weight of all printing on substrates in-house by the printing company and printing of the printing company's printed matter externally by suppliers, must be by Nordic Swan Ecolabelled printing companies.

In case of brokers (printing companies that do not do the actual printing themselves), at least 95% by weight must be by Nordic Swan Ecolabelled printing companies.

The percentages must be calculated based on total consumption of substrates (tonnes) in-house and consumption of substrates (tonnes) by suppliers on an annual basis or based on an assessment using financial figures.

- List of external suppliers of printing services and a specification of the quantities (tonnes of paper annually) sent to print suppliers.
- Calculation showing compliance with the requirement.

Background to O2 Suppliers of printing services

The requirement for suppliers is the same as in previous generation 6. However, the requirement on brokers (suppliers of printing services) has been made more stringent, increasing from 75% to 95% by weight in generation 6. Nordic Ecolabelling has experienced an increasing interest from brokers, who does not actually engage in the printing process to produce the printed matter themselves, to be Nordic Swan Ecolabelled, i.e., companies that primarily sell printed matter opposite to publishing houses and advertising agencies that usually do not provide printing services as a substantial part of their business. To ensure that the brokers do not choose to collaborate with a printing company with less focus on the environment, almost all (min. 95% by weight) printing must be by Nordic Swan Ecolabelled printing companies.

O3 External chemical finishing services (book binding)

At least 90% by weight of the annual tonnes of substrates done by external chemical finishing services must be assessed by Nordic Ecolabelling. For an external chemical finishing service to be inspected and available for the printing company, the external chemical finishing service must document compliance with the requirement using Appendix 3.

Chemical finishing involves adhesives, varnishing, foil printing or laminating, as well as washing agents used for ordinary manual cleaning of print finishing machines used by the chemical finishing service. All chemicals must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1.

The percentage share is calculated based on the total number of tonnes of substrates done by externally inspected finishing services/annual ton substrates done by external chemical finishing services.

Be aware of special requirements regarding out-of-house finishing of Nordic Swan Ecolabelled printed matter in requirement O28.

Suppliers of mechanical finishing services are not encompassed by this requirement.

- List of external chemical finishing services (book binders) and a specification of the quantities (tonnes of substrate annually) sent to print suppliers.
- Calculation showing compliance with the requirement.

Background to O3 External chemical finishing services (book binding)

This requirement is unchanged compared to generation 6. External chemical finishing services in these criteria encompasses adhesives, varnishing, foil blocking or laminating on printed matter or its packaging. As a new addition in generation 6 of the criteria, washing agents used for ordinary cleaning of print finishing machines, have also been included, as these chemicals are covered by the requirements applicable to chemicals at the printing company. All chemicals used at the external chemical finishing service must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1.

Production chemicals for in-house chemical finishing at the printing company still must comply with the chemical requirements in O11 chemicals i.e., requirements in Appendix 1.

5.3 Printing substrates

The requirements O4 to O9 apply to all printing substrates purchased annually by the printing company. The requirements for substrates are divided into specific requirements for:

- O4-O5 All substrates
- O6 Paper substrates
- O7-09 Substrates other than paper

O4 Printing substrates

The printing company must state all printing substrates purchased annually including trade name, supplier, quantities, and grades.

The description shall include calculation of:

- the total number of tonnes of substrates purchased annually.
- the total number of purchased tonnes of substrates of paper and substrates other than paper, respectively.
- The total number of purchased tonnes of **rigid substrates** other than paper
- the total consumption of tonnes of substrate (paper and substrates other than paper, respectively) for each individual printing method.

Substrate weight given as grams per m² (g/m²) must be converted to tonnes in relation to total purchase/use of meter substrate annually.

Substrates of paper also includes cardboard /corrugated board.

If relevant, provide a description how potential adjustment of stock difference is carried out.

If a printing company uses a certain paper grade in several printing methods, the volumes for paper, may be estimated in relation to printing methods, respectively.

If envelopes are printed on offset machines, envelopes shall be included as part of the sheet offset method (and not calculated as a separate method). If packaging is printed, then the packaging must be included as part of the printing method used.

- List of trade names, grades, suppliers, and amount of paper substrates purchased annually.
- List of trade names, type of substrates, suppliers, and number of substrates other than paper purchased annually.
- Specify the total consumption of tonnes of substrate (paper and substrates other than paper, respectively) for each individual printing method.
- Upload reports/lists from suppliers of substrates detailing the quantities, type of substrate and grades purchased annually.

P1 Printing substrate

The printing company is awarded 1 point if at least 90% of the total annual purchase of substrates is paper.

- The documentation must consist of a calculation in accordance with the requirement above and reports/lists from the suppliers of substrates stating type/material/quantities purchased annually, see O4.

Background to O4 and P1 Printing substrates

The requirement for printing substrates has been slightly adjusted in generation 7 adding a new requirement for information on the total number of purchased tonnes of rigid substrates other than paper. The information is needed in requirement O7 rigid substrates other than paper.

The functional unit in the criteria is purchased tonnes of substrate. Nordic Ecolabelling therefore needs to get information on the total number of tonnes of substrates purchased annually as well as the total number of purchased tonnes of substrates of paper and substrates other than paper, respectively.

Not all types of substrates are traded in weight (kg or tonnes) but in area or square meter. In these cases, the product must be weighed or estimated.

In most cases the paper grades are supplied in a format suitable for the printing method in question. Information about which formats have been supplied to which printing company is typically held by paper wholesalers. Printing companies using both sheet-fed offset, and digital printing may cut up some of the sheet-fed offset paper and use it for digital printing, and the printing company may estimate the quantity in such cases.

The printing company may be awarded 1 point depending on the proportion of purchased paper in relation to total purchase of tons substrates annually. The requirement is introduced for reason of credibility, as the potential environmental impacts in a life cycle perspective of paper production including the printing house impacts and those associated with printed paper products are well known and analysed in contrast to substrates other than paper. The paper industry is undergoing a development towards a greater share of printing on other substrates than paper e.g. plastic based film/laminates, textiles and composite panels. Data from NSE printing companies shows, that on average 5-10% of the printing is done on non-paper substrates and the share is expected to increase within the next 3 years. The requirement level of min. 90% paper is based on data from NSE printing companies in generation 6 of the criteria.

O5 Share of PVC-free substrates

Maximum 10% of the printing company's annual consumption of substates may contain PVC or PVC coating.

- List of trade names, type of substrates, suppliers, and number of substrates other than paper purchased annually. See O4.
- The documentation must consist of a calculation in accordance with the requirement above and reports/lists from the suppliers of substrates stating type/material/quantities purchased annually.

Background to O5 PVC-free substrates

This requirement is unchanged compared to generation 6.

PVC-based substrates are widely used in the signage and advertising printing industry due to good properties such as excellent printability, weather resistance and mechanical strength. PVC is being used as rigid PVC panels, PVC films, PVC coatings on other type of substrates and PVC flex/mesh banners[4],[5]. However, PVC has several problematic issues such as recycling challenges, waste management issues and well as use of hazardous chemical additives[6].

The marked for PVC-free alternatives is increasing within all categories of substrates and Nordic Ecolabelling sees a huge potential for switching to these alternatives such as polypropylene (PP), polyester (PET), polyethylene (PE), or coated paper-based boards. Theses substrates offer excellent print performance, strong durability, and improved recyclability compared to traditional PVC. For banners and soft signage, PVC-free polyester fabrics provide a lightweight, long-lasting, and fully recyclable alternative suitable for both indoor and outdoor applications.

[4] Kortlægning af kemikalier i forbrugerprodukter med genanvendt plast. Rapport nr. 203, September 2025, Miljøstyrelsen
[5] Survey conducted by GRAKOM (2019) for Nordic Ecolabelling. The survey was conducted on the Danish marked and focused on the use of print substrates and technologies.
[6] Chemical Recycling of PVC: From Laboratory Promise to Industrial Reality - Features - The Chemical Engineer

Nordic Ecolabelling recognises that the PVC industry has made significant progress over the past decade in reducing climate and health impacts. However, the use of PVC in printing substrates remains problematic for several reasons:

Recycling challenges: Although PVC is recyclable and systems are being developed, collecting, sorting and processing PVC without contaminating new products with harmful legacy chemicals is still difficult. Effective take-back systems for PVC-printed matter are not yet fully in place across the value chain.

Waste management issues[7]: Emissions from incineration have decreased, but not all Nordic countries allow PVC to be incinerated. In Denmark, PVC must be sorted for recycling, yet soft PVC printed matter are hard to recycle and often end up in landfills, where additives may leach into the environment. Nordic Ecolabelling does not wish to certify products that are landfilled.

Hazardous additives: While the most harmful phthalates are restricted in the EU, other environmentally and health-hazardous additives (e.g., plasticizers, stabilizers) are still permitted in PVC and other plastics. Ongoing ECHA work on restricting PVC and its additives reflects these concerns[8].

PFAS use in chlorine production: Although mercury cells are no longer used in Europe, the membrane technology that replaced them relies on PFAS. The extent of PFAS emissions during membrane use and disposal remains insufficiently understood.

5.3.1 Paper

O6 Inspected and Ecolabelled paper

At least 70% of the printing company's total annual consumption of paper must be inspected or ecolabelled. In this calculation, Nordic Swan Ecolabelled paper has a weight of 1, inspected paper 0.9 and EU Ecolabelled paper 0.8[9].

*Example: If 60% inspected paper is used in addition to 10% Nordic Swan Ecolabelled paper and 10% EU Ecolabelled paper, the calculation will be as follows: 60*0.9 + 10*1.0 + 10*0.8 = 72%*

A paper quality can only count once (the highest weighting applies if, for instance, the paper is both Nordic Swan Ecolabelled and EU Ecolabelled at the same time).

- List of trade names, indication of inspected or Ecolabelled paper, grades, suppliers, and amount of paper substrates purchased annually. See O4.
- The documentation must consist of a calculation in accordance with the requirement above and reports/lists from the suppliers of paper substrates stating tradenames, grades, suppliers, and amount of paper substrates purchased annually.

[7] PVC waste treatment in the Nordic countries
[8] "REACH Restriction Support – Investigation Report on PVC and PVC Additives (Appendix F)"
[9] Comparative analysis of requirements in Nordic Swan Ecolabel and EU ecolabels criteria for paper, see BD_gen5_appendix 1.Requirement for inspected paper, see appendix 1_BD_basic module_gen3.

P2 Inspected/ecolabelled paper

The printing company is awarded:

- 1 point if at least 75% of the of the printing company's total annual consumption of paper is inspected/ecolabelled paper.
- 2 points if at least 80% of the printing company's total annual consumption of paper is inspected/ecolabelled paper. The calculation is done in O6.

Background to O6 and P2 inspected/ecolabelled paper

The requirement regarding inspected and Ecolabelled paper has been made more stringent in generation 7, but the structure remains the same. The proportion of the printing companies' total annual consumption of inspected and ecolabelled paper has been changed from 60% to 70% (O6). The printing company is awarded 1 or 2 points if at least 75%/ 80% of the printing company's total annual consumption of paper is inspected/ecolabelled paper (P2). The possibility of obtaining 1 or 2 points gives flexibility for the printing companies to ern points.

Manufacturing of paper is the main environmental and resource-related burden in the life cycle of printed matter, as described in section 3. The strengthening of the requirement is in line with the LCA findings. The limit of at least 70% is based on data from Nordic Swan Ecolabelled printing companies.

As in generation 6 of the criteria, Nordic Swan Ecolabelled[10],- inspected- and EU Ecolabelled paper[11] is weighted with different factors based on an overall assessment of the level of requirements. The primary difference between Nordic Swan- and EU Ecolabel is requirement levels for energy use, stringent threshold values for emission to air/water and emission of AOX. As a result, Nordic Swan Ecolabelled paper is weighted with a factor of 1, Inspected paper with a factor of 0.9 and EU Ecolabelled paper with 0.8. If a paper type carries both marks, the highest weighting factor may be applied.

The levels of requirements are assessed by comparing the new Nordic Swan Ecolabelled criteria for copy and printing paper, generation 5, the Paper products - Basic Module, generation 3 (inspected paper) and the EU Ecolabel requirement levels for graphic paper[12].

5.3.2 Other substrates than paper

The requirements in this chapter comprise substrates other than paper e.g., plastic, textile, aluminium, composite- and wood-based panels.

O7 Rigid substrates with good recycling properties

The requirements applies if the consumption of rigid, non-flexible materials, account for more than 5% of the printing company’s total annual consumption of substrates.

[10] Nordic Swan Ecolabelled criteria for copy and printing paper, generation 5.
[11] EU Ecolabelled criteria for Graphic Paper EU, adopted 11 January 2019.
[12] http://ec.europa.eu/ecat/category/en/3/copying-and-graphic-paper

Rigid substrates

At least 40% of the printing company's total annual consumption of rigid substrates used for signage, displays and retail point of sale/purchase (POS/POP), must have good recycling properties*.

*Materials with good recycling properties means: Rigid substrates made of wood fibre (paper-/wood fibre board), mono-materials such as wood, PE, PP, PET, PS and aluminium. Materials with poor recycling properties: Composite rigid substrates (consist of two or more distinct materials), as well as substrates containing PVC or PUR foam.

Definition of rigid (non-flexible) and flexible materials, see terms and definitions.

- List of rigid substrates, suppliers and number of rigid substrates purchased annually. See O4.
- The documentation must consist of a calculation in accordance with the requirement above and reports/lists from the suppliers of rigid substrates purchased annually.

P3 Rigid substrates with good recycling properties

The printing company is awarded:

- 1 point if at least 45% of the printing company's total annual consumption of rigid substrates have good recycling properties.
- 2 points if at least 50% of the printing company's total annual consumption of rigid substrates have good recycling properties.

Background to O7 and P3 rigid substrates with good recycling properties

New proposed requirement in generation 7 of the criteria.

Developments in the graphic industry show an increasing interest for printing in substrates other than paper such as plastic, fabric/textiles, metal, and wood[13],[14]. Compared with paper, there is relatively limited knowledge about these materials—particularly regarding their production processes, environmental impacts, and circular-economy potential.

Dialogue with the graphics industry shows that a wide variety of materials are used in rigid substrates for signage and displays. This large variation in materials and their compositions creates significant challenges for the recycling industry[15]. Nordic Ecolabelling sees a strong potential in stimulating printing companies to choose substrates with good recycling properties such as rigid substrates made from wood fibre (paper-/wood fibre board), mono-materials such as wood, PE, PP, PET, PS and aluminium. The potential for shifting between flexible plastic substrates e.g. film, laminate and foil is less clear, as a large proportion of theses substrates contains adhesives, release liners, coatings and PVC. Therefore, this requirement only covers rigid substrates. PVC is addressed in a separate requirement.

[13] Survey conducted by GRAKOM (December 2018-January 2019) for Nordic Ecolabelling. The survey was conducted on the Danish marked and focused on the use of print substrates and technologies.
[14] 2018 Intergraf economic report.
[15] Dialog with Stena Recycling and Rang sells 2019.

Overview of commonly used types of substrates and their recyclability properties is shown in the table below.

The requirement level of min. 40% annual consumption of rigid substrates with good recycling properties is based on dialog with the industry (licensees and suppliers of substrates).

Table 2: Overview of the commonly used types of substrates (other than paper) - materials used in the substrates - typical chemicals used in the processing of the substrates and general recyclability of different types of substrates/materials. Based on dialog with waste management industry in Scandinavia.

Type of substrates	Substrates and materials	Processing of the substrates	Waste and potential for recyclability	
Film/foil and laminated (flexible materials)	Plastic: PVC, Vinyl, PE, PP, PET, PU (polyurethane) Release liner: Silicone coated PE or paper	-Transparent or -Coating of front materials in different colours (often white) (Gloss, Matt, semi Matt), UV-coating -Adhesive (permanent, removable)	Mono plastic without adhesive	Good
			Foil and laminates with adhesive	Problematic
			Soft PVC and vinyl	Problematic
			Silicone coated PE or paper	Problematic
Textile (flexible materials)	Same material: 100% polyester Canvas Cotton	Without coating May be coated with vinyl or PVC	Mono materials with/without print	Good
			Materials coated with vinyl/PVC	Problematic
	Composite: PE/cotton, PET/cotton	May be coated with vinyl or PVC	Materials coated with vinyl/PVC	Problematic
Signs made from rigid materials	Composite: Alu composite (core in PE, PUR, PS, PVC) Paper composite (core in PE, PUR) Release liner: Silicone coated PE or paper	Front material may be coated in different colours or varnishes	Composite	Problematic
			Alu composite	Possible to recycle Alu
			Silicone coated PE or paper	Problematic
	Same material: Wood, paperboard, metal (Alu), Acrylic, PS, PC, PET, PP, Styrene PUR and PVC	May be coated in different colours or varnishes	Mono materials with/without print	Good
			PUR foam Hard and soft PVC	Problematic

O8 Fabrics/textiles (e.g. polyester, canvas)

The requirement applies to printing on fabrics/textiles used for advertising such as roll-ups, banners or signs. Printing on clothing- and furniture textile is not part of this ecolabelling criteria. See terms and definitions.

At least 50% of the printing company's total annual consumption of fabrics /textile substrates (e.g., polyester, canvas) must be Nordic Swan- or EU Ecolabelled, Oeko-TEX 100 certified or GOTS certified.

Mesh is not regarded as fabrics/textiles.

- List of fabrics/textiles, suppliers, and number of fabrics/textiles purchased annually. See O4.
- The documentation must consist of a calculation in accordance with the requirement above and reports/lists from the suppliers of fabrics/textiles purchased annually.

Background for O8 Fabrics/textiles

The requirement is unchanged in generation 7 of the criteria. Fabrics used for printing are typically manufactured from plant-based materials such as cotton (canvas) or synthetic materials such as polyester or polyamide. If the printed fabric is intended for outdoor use, it is typically coated with vinyl or PVC. Fabrics are typically used for banners, roll-ups, display systems, flags or signs and the primary fabrics used are 100% polyester.

Textile production impacts the environment in many ways. An LCA study from 2016[16], that also included the environmental impact from chemicals, concludes that the greatest environmental impact from textiles is linked to the actual production of the textile.

The global textile industry uses many different labels focusing on the environment, health and working conditions.

Some of the brands are what are known as type 1 eco-labels[17], such as the Nordic Swan, the EU Ecolabel and GOTS[18]. Here, the entire life cycle of the product is assessed, and the requirements are set for the life cycle steps where relevant and possible. Other brands such as OEKO-TEX standard 100[19] focus on the content of chemicals in the finished product.

Dialogue with suppliers/distributers of fabrics/textiles to the printing industry shows that OEKO-TEX 100 certified fabrics are widely used in the market. OEKO-TEX works with 4 classes according to the textile's future utilisation. Class IV refers to decoration materials. GOTS, Nordic Swan and EU ecolabelled fabrics are also available on the market.

The requirement on at least 50% certified fabrics/textiles (50% of the printing companies' total annual consumption of declared fabrics) is based on the wide distribution of labelled fabrics (especially OEKO-TEX 100 certified fabrics) on the market. The requirement of 50% makes it possible for the printing company to print on a limited amount of non-certified fabrics. The trivial limit in requirement O6 of up to 10% of the printing company's total annual consumption of substrates is exempted from the requirement, makes it possible for the printing company to print on a limited amount of PVC/vinyl coated fabrics. **Mesh** is not regarded as fabric/textile.

[16] Advancing life cycle assessment of textile products to include textile chemicals, Chalmers University of Technology 2016.
[17] Type 1 eco-labels are based on the ISO 14024 standard and set requirements to the relevant environmental parameters.
[18] https://www.global-standard.org/the-standard/general-description.html, visited August 2019.
[19] https://www.oeko-tex.com/en/, visited August 2019.

O9 Panels/boards made of wood

The requirement applies to wood-based panels/boards such as chipboard, fibreboard (including MDF and HDF panels), OSB (Oriented Strand Board) and veneer boards. The requirements also include corresponding products made of bamboo.

At least 50% of the printing company's total annual consumption of panels/boards must be;

- Nordic Swan Ecolabelled or
- FSC- or PEFC certified.

Panels/boards must comply with Nordic Ecolabelling's list of prohibited and restricted tree species*.

** The list of prohibited and restricted tree species is located on the website: https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/*

- List of panels/boards made of wood, suppliers, their certification, and number of panels/boards made of wood purchased annually. See O4.
- The documentation must consist of a calculation in accordance with the requirement above and reports/lists from the suppliers of panels/boards of wood purchased annually.

Background to O9 Panels/boards made of wood

The requirement is unchanged in generation 7 of the criteria. Wood-based panels such as chipboard, fibreboard (including MDF and HDF panels), OSB (Oriented Strand Board) and veneer boards are an important resource used for producing printed matter, especially signs.

The requirement that at least 50% of the printing companies' total annual consumption of declared panels/boards made of wood must be FSC- or PEFC certified or Nordic Swan Ecolabelled is based on the wide distribution of labelled panels/boards made of wood on the market.

Manufacturing of wood-based panels represents, like paper manufacturing, the main environmental and resource-related burden in the life cycle of printed matter, as found in most LCA studies analysed. One of the main environmental impacts in the manufacturing of wood-based panels is deforestation and potential loss of biodiversity from sourcing of raw materials[20].

The requirement for fibre raw material follows Nordic Ecolabelling's general forestry requirements[21]. Nordic Ecolabelling's forestry requirements focus on sustainable forestry and traceability of the wood raw material. By requiring that the wood raw material comes from FSC and PEFC certified forestry, Nordic Ecolabelling supports the drive towards more sustainable forestry. The requirement for FSC or PEFC-certified panels/boards makes it easier for the printing company to document the requirement, as it can demand and use labelled FSC/PEFC wood-based panels.

Several tree species are restricted or not permitted for use in Nordic Swan Ecolabelled products. The list of prohibited species contains species on CITES list. The restricted tree species origin mostly from tropical forests and the reason for restriction is either that they are

[20] https://www.nordic-swan-ecolabel.org/criteria/construction-and-facade-panels-and-mouldings-010/ , visited March 2026.
[21] https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/

endangered, or they are key species in Intact Forest Landscape (IFL) areas. These species can be used in Ecolabelled products, if certain strict condition on origin, certification and traceability is met. The manufacturer of panels/boards of wood must document compliance with the requirement using Appendix 2.

Nordic Ecolabelling criteria for Panels and mouldings for interior use and criteria for exterior panels covers several types of panels/boards made of wood.

5.4 Paper-based packaging

The requirement only applies to paper-based packaging manufactured (as a whole) in the printing company.

O10 Paper based packaging

The following applies to paper-based packaging manufactured (as a whole) in the printing company:

- The non-paper product parts of paper-based packaging such as metal clips, tape, or plastic covers, shall be easily removable (according to CEPI/FEFCO guidelines[22]) to ensure that those components will not hinder the recycling process.
- Avoid plastic labels if possible and use direct print or paper labels. If a window is needed, then provide clear instructions for consumers to remove window film before recycling.
- PVC used in tape, must not be used.
- Paper or board laminated on both sides must not be used.
- Wax or latex coatings must not be used.

The printing company shall demonstrate compliance with the requirement by duly completing the declaration in Appendix 4.

Background to 010 Paper-based packaging

The requirement is unchanged in generation 7. The requirement for paper-based packaging supports and improves the recyclability of paper-based packaging products in the paper recycling process.

Paper-based packaging is already a successful option due to a currently functioning, self-sustaining, economically viable recycling loop.

The requirement is applied to paper-based packaging manufactured as a whole at the printing company.

On a European average, paper and board packaging has the highest recycling rate. According to EUROSTAT[23], the current recycling rate for paper-based packaging was 87%. The biggest potential for improvement in paper recycling lies in the development of separate

[22] https://www.cepi.org/wp-content/uploads/2020/10/Cepi_recyclability-guidelines.pdf.
[23] https://www.cepi.org/statement-the-packaging-market-is-moving-from-plastics-to-paper-behind-it-is-an-untold-story-of-decades-of-improvement-in-design-and-recycling/#:~:text=The%20EU's%202019%20Single%20Use%20Plastics%20Directive,of%20the%20largest%20and%20best%2Dknown%20companies%20globally .

collection[24]. While separate collection should be further promoted, the aspect of increasing the functional properties of paper-based packaging should always consider the end-of-life fate of the product to optimise its recyclability. It is therefore important to raise awareness of the recyclability potential in the design phase of paper-based packaging. Communication between actors in the value chain is key in order to ensure accurate fulfilment of the legal requirements and to further increase the recycling of paper through design, innovation and investment.

In essence, paper and board are recyclable. Their combination with other materials, which is sometimes necessary to provide certain functions of packaging, can raise challenges in the recycling process such as plastic parts/films/labels, metal parts, wax/latex coatings, or use of specific adhesives.

Plastic films used in lamination act as a barrier to the penetration of water in the recycling process, causing low re-pulpability. This leads to loss of fibres and hence low yield from the recycling process. Double lamination leads to even less re-pulpability. Therefore, laminates shall only be used when it is necessary to provide a certain packaging function, and where used, the lamination or plastic labels shall be easily removable to ensure that those components will not hinder the recycling process. Paper laminated on both sides must not be used as it is not recyclable in today's recycling/de-inking mills.

PVC used in tape must not be used as it leads to adverse environmental impacts, see O6.

Wax or latex coatings are primarily being used in packaging with food contact. Typical waxes are different types of silicone or latex coatings and are used to protect the paper when exposed to water. However, wax, or latex coated paper is not recyclable in today's recycling/de-inking mills and therefore excluded in the requirement.

Printing inks, varnishes, adhesives, and other types of chemicals also affect the recyclability of paper-based packaging, and the manufacturer of the packaging therefore must be aware of the chemical requirements O11.

The requirement supports the overall CEPI recycling guidelines for paper-based packaging[25].

5.5 Chemical requirements

The chemical requirements apply to the following categories of production chemicals:

- Chemicals for form production (repro).
- Printing inks, toners, inks.
- Varnishes.
- Adhesives.
- Washing agents, including washing agents used for ordinary cleaning of printing machines.
- Dampening solution additives (e.g., alcohol).
- Algicides.

[24] www.impactpaperec.eu, visited December 2019.
[25] http://www.cepi.org/recyclability_guidelines, visited December 2019.

- Foils for foil printing and laminates applicable to printed paper used in the production of printed matter.
- Adhesives used in manufacturing of paper board/corrugated board.
- Chemicals used for coating in manufacturing of paper board/corrugated board.

Production chemicals used by the printing company must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1. The requirement also applies to production chemicals used in finishing by the printing company. The requirements are applied regardless of the type of printing method.

For a chemical to be assessed by Nordic Ecolabelling the **chemical manufacturer or supplier** must demonstrate compliance with the chemical requirements in Appendix 1.

O11 Chemicals

The printing company must report all production chemicals used annually in the production of printed matter (inclusive internal finishing), providing documentation regarding the product's tradename, function, supplier, and the quantities purchased in kg.

All production chemicals used by the printing company must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1.

Production chemicals that are purchased separately and added to production chemicals at the printers must also be included.

If a production chemical is used in relation to more than one printing method, the printing company may add up the quantities in the relevant category across the printing methods and on this basis calculate fulfilment of the triviality limits (e.g., adhesives).

Adjustments can be made for chemicals purchased/received during the year, but which has not been used, by uploading stocktake figures at the end of the year for the individual chemical.

Exemptions apply to:

- Production chemicals classified as Repr. 1, H360 and/or Repr. 2, H361 and/or STOT RE1 H372 due to the presence of photoinitiators and/acrylates, may only be used in closed printing systems such as digital printing, where there is no direct contact/exposure between worker and the chemical. Traditional UV offset where the UV ink is transferred from open cans/pumped to an ink tray/application roller is considered an open system.
- Addressing with ink is exempted from the requirement. For addressing ink, a safety data sheet complying with the standards set out in Annex II of REACH (Regulation 1907/2006/EC) or other technical data sheet must be enclosed.

Trivial limits:

Up to 5% by weight of the quantity of production chemicals in each category and printing method purchased during the year can be exempted from the chemical requirements in Appendix 1. For printing inks, adhesives and varnishes an alternative triviality limit of 10 kg per annum and per category applies for which the requirements do not have to be met.

The trivial limits do however **not** apply to;

- washing agents classified as Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412 or H413.
- printing inks, toners, ink, varnishes, and adhesives used in printed matter that will bear the Nordic Ecolabel logo, see requirement O25 and O28.

- Complete list of production chemicals, specifying tradename, function, supplier, and the quantities purchased annually in kg.
- Upload reports/lists from suppliers detailing trade names and the quantities purchased annually. Upload calculations to explain any adjustments based on stock counts.
- Exemption due to presence of photoinitiators and/or acrylates (UV): Description of the application system and how workers are protected from exposure.
- For addressing ink. enclose safety data sheet/product specification must comply with the standards set out in Annex II of REACH (Regulation 1907/2006/EC).
- Declaration from the chemical manufacturer/supplier. Appendix 1 must be used.

Background to O11 Chemicals

The requirement is unchanged in generation 7.

The requirement is divided into a general part applicable to all chemicals and a specific part containing requirements as to individual categories of chemicals.

Washing agents classified as Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412 or H413, are not exempted from the 5% trivial limit, as there are alternatives that are not classified as hazardous to the aquatic environment.

As in generation 6 of the criteria ink used for addressing is exempted from the requirement as the ink may contain problematical substances. Ink for addressing must meet certain requirements that allows the print to be read on the scanner. Ink used for addressing is typically used on newspapers or envelopes which distributed by address.

Production chemicals classified as Repr. 1, H360 and/or Repr. 2, H361 and/or STOT RE1 H372 due to the presence of photo initiators and/or acrylates is exempted the requirement. However, the exemption only applies if the classified production chemical is used in a closed printing system such as digital printing, where there is no direct contact/exposure between worker and the chemical. This means that the exemption does not apply to classified production chemicals used in open printing systems such as UV offset.

Nordic Ecolabelling aims for the health and environmental impacts of chemical products used in Nordic Swan Ecolabelled services and in the manufacture of Nordic Swan Ecolabelled products to be as low as possible. Requirements are therefore among other things set to the classification of chemical products, which is also a general chemicals requirement in several Nordic Swan Ecolabelling criteria. Chemical products classified as carcinogenic, mutagenic, reprotoxic, very toxic, toxic, hazardous for the environment, specific organ toxic and respiratory or skin sensitisation must not be used in Nordic Swan Ecolabelled printing companies and in the manufacture of Nordic Swan Ecolabelled printed matter.

5.6 Emissions to air

The requirement for emissions to air only applies to emissions of **volatile organic compounds (VOC)** at the printing company.

The requirement is based on the consumption of chemicals encompassed by O11 (washing agents, printing inks, alcohol, other dampening solution additives, etc.) depending on the content of VOC and depending on whether there are systems for the collection/destruction of VOC.

If the printing company sells recycled VOC or removes VOC from outgoing air with the aid of, for example, incineration (e.g., heatset) or removes or sells VOC by some other controlled means (e.g., condensation in connection with certain digital printing facilities with wet toner), these quantities may be deducted from the quantities purchased/received.

See Appendix 5 for guidelines and examples on how to calculate emission of VOC.

O12 Consumption of VOC

The printing company's annual VOC consumption (kg VOC/tonne purchased substrate) must be less than or equal to the threshold value listed in table 3 below. The permitted VOC consumption varies depending on the printing method. If the printing company uses multiple methods of printing, the threshold values is calculated as a weighted value which is defined according to the consumption of substrate in different printing methods.

*Example of calculation of the threshold value using multiple methods of printing. If a printing company is using 500 tons of substrate (sheet fed offset) and 300 tons of substrate (digital printing) the weighted threshold values are calculated as: Calculated threshold value: (500/800) * 7 + (300/800) * 5 = 6.25 kg/ton purchased substrate per year.*

Table 3: Threshold value - VOC consumption (kg/purchased substrate) for different printing methods

Printing method	Threshold value - VOC consumption (Kg/tonne purchased substrate)
Sheet fed offset	7
Digital printing	5
Coldset, newspapers	1
Coldset, forms	3.5
Coldset rotation (except newspaper and form printing)	1.5
Heatset rotation	3
Flexographic printing	1
Envelope production with flexography	1

See the special instructions for calculating VOC emissions for inter alia heatset printing in Appendix 5.

- Calculation showing that the requirement is met and reports/lists from the suppliers of substrates stating type/material/quantities purchased annually. See O11.

Background to O12 Consumption of VOC

The requirement on consumption of VOC is unchanged in generation 7 of the criteria. The overall limit for VOC consumption at the printing house has been changed from 9 kg

VOC/tonne substrate to new stricter limits depending on the printing methods. The biggest relevance and potential for minimizing the consumption of VOC is within sheet fed offset, heatset, coldset and digital printing.

Usually, no production chemicals containing VOC are used in flexographic printing, so the threshold value of 1 kg VOC/substrate is set as an "attention" limit for the development of future chemicals. The strengthening of the requirement is in line with the LCA findings. The threshold values are based on data from Nordic Swan Ecolabelled printing companies.

The calculation of VOC emissions for heatset printing has been adjusted in order to simplify and clarify the VOC calculation.

Printing companies have considerable opportunities to reduce or replace the use of chemicals containing VOC, thereby reducing the environmental impact. VOC emissions can also be reduced by using different technology that either destroys or recycles VOC.

Printing companies using wet toner technologies (inkjet or indigo presses), heatset or solvent ink need to implement technology that either destroys or recycles VOC in order to comply with the requirement.

Emissions of volatile organic compounds mainly originate from the use of organic solvents and alcohol in dampening solutions. Heatset inks contain mineral oils which are considered to be VOC when they reach the afterburner. Washing agents and the dampening solution, include isopropyl alcohol (IPA) which contributes by 95% to photochemical ozone formation.

The main source of VOC emissions in the printing house is the pressroom where three main points of VOC emissions are identified as follows:

- Inks: Many of them are solvent based. Their evaporation dries the ink on the substrate. The amount of solvent emitted from the drying ink varies from 5%, in a non-heat-set lithographic process, to 100% in flexographic and heat-set.
- Cleaning: Excess ink in presses must be removed to ensure the inks do not dry on the rollers and ink wells. Often the chemicals used for cleaning contain high percentages of solvents.
- Fountain solution: This is used in lithographic printing to ensure that oil does not stick to the non-image area of the blanket. Traditionally, isopropyl alcohol is used to control the properties of the fountain solution. The use of IPA makes the fountain solution the primary source of VOC emissions in lithographic facilities.

5.7 Energy

The requirement for **energy consumption** includes all the printing company’s purchased energy in kWh per **tonne of purchased substrate per year**. The printing company must report purchased fuels for stationary combustion plant and purchased energy in the form of electricity, district heating/cooling etc.

O13 Energy use

The applicant shall report the printing company´s total annual energy consumption per tonne of purchased substrate.

The printing company's energy consumption must be less than or equal to the applicable threshold value for total energy use per tonne of purchased substrate. The permitted energy use varies according to the printing method and size of the printing companies, see table 4 below.

Energy consumption shall be calculated based on invoices received from suppliers of electricity, fuel, and heating and shall relate to the quantity of substrates purchased by the company on an annual basis.

If the printing company uses multiple printing methods, the applicable threshold value shall be calculated as a weighted average based on the proportion of substrate consumed by each printing methods.

For further information, see appendix 5

Table 4: Threshold values - energy consumption (kWh/purchased substrate) for different printing methods

Printing method	Threshold value - Energy consumption (kWh/ton purchased substrate)
Sheet fed offset	1700
Digital printing	3200
Coldset, newspapers	800
Coldset, forms	1000
Coldset rotation (except newspaper)	650
Heatset rotation	900
Flexographic printing (except envelope production)	350
Envelope production with flexography	600

The energy content of various fuels and district heating is specified in Appendix 5.

Exemptions apply to:

- For printing companies in Iceland, geothermal energy used for heating is not included in the reported energy consumed.
- Printing companies that only carry out braille printing are exempt from the requirement. However, the printing companies shall state the printing company´s annual total energy consumption per tonne of purchased substrate.

- Calculation and documentation (invoices from suppliers of electricity, fuel, and heating) showing compliance with the requirement.
- In case of no individual energy measurement (e.g., a printing companies who live in rented buildings): Calculation and documentation from a competent energy specialist with relevant knowledge on energy savings in buildings and/or printing techniques to calculate/estimate/verify the printing companies' annual consumption of electricity.

Background to O13 Energy use

The requirement on energy use has been adjusted and amended in generation 7 of the criteria. Next to production of substrates energy use at the printing company, together with chemicals used during the production phase, are the most important contributors to the environmental impact of production stage, see section 3.

The result of a major European project[26] on energy efficiency in the printing industry shows that there is potential for energy savings at the printing companies especially within the areas of e.g., lighting, compressed air, ventilation, or space heating. The proposed threshold values reflect the identified potential to strengthen the energy performance requirement. Experience from licensing generation 6 as well as yearly compliance check (2024 data) shows that several former licensed printing companies as well as existing licensed printing companies have problems meeting the threshold values while others meet the requirements. This indicates a potential for strengthen some of the specific printing method threshold values.

As in generation 6, the requirement is designed with individual threshold values for each printing technologies. Technology-specific threshold values reflect the inherent differences in energy use between printing methods and ensure that all technologies meet a defined minimum performance level based on ambitious and yet achievable expectations.

Printing companies that only carry out braille printing are exempt from the requirement. This is partly because this form of printing is used to a limited extent and that it is a slow printing process (small editions) compared to other printing methods. However, the printing companies shall state the printing company´s annual total energy consumption per tonne of purchased substrate.

Iceland’s heating infrastructure is unique in a European context. Approximately 90–95% of buildings and businesses are connected to geothermal district heating systems[27]. Including geothermal heating as a conventional energy input would misrepresent its environmental impact. Geothermal energy used for heating in Iceland is therefore not included in the reported energy consumed.

P4 Energy use (obligate point requirement)

The printing company must have implemented/fulfil **at least 1** of the energy efficiency measures listed in the table below.

The printing company is awarded up to 2 points depending on which energy efficiency measures listed below have been implemented in the printing company. Possible to select several energy efficiency measures in the table below.

[26] Energy Management Standardization in printing industry (EMSPI) conducted in 2014-2017. https://www.emspi.eu/index.html, visited May 2019.
[27] https://orkustofnun.is/en/hitaveitur-hva%C3%B0gerumvi%C3%B0

Table 5: Energy efficiency measures

Energy efficiency measures	Points
The company's total annual energy consumption per ton of purchased substrate is 15% below the applicable threshold specified in O13 e.g. less than 1445 kWh/ton if you are a sheet fed offset printing company (1700*0,85)	2
Being certified according to an energy management system, for example: • ISO 50001 • ISO 50002 • ISO 14001 (must contain an energy review corresponding to part 6.3 of ISO 50001 upon recertification)	1
Have undergone an energy audit according to • EN 16247 within the last 3 years. • the national implementation of the Energy Efficiency Directive (DIRECTIVE 2012/27/EU, article 8) within the last 4 years.	1
Based on the energy audit (EN 16247) the company has conducted an energy action plan with specific energy saving targets.	1
At least 10% of the total annual electricity consumption comes from self-generated electricity generation from solar panels.	1
100% of the company's vehicles are powered by electricity, HVO100 or hydrogen.	1
Recover waste heat from compressors, machinery or dryers for space- or water heating	1
100% of the purchased electricity is ecolabelled according to Bra Miljöval, EKO Energy or similar*	1

** Ecolabels for electricity are assessed according to the guidelines which are located here (link). Bra Miljöval and EKOEnergy are assessed and approved.*

t̄ Documentation for implemented energy efficiency measures at the printing company.

Background to P4 Energy use

New requirement in generation 7. Printing companies typically have a diverse energy profile, combining electricity-intensive production, heat-generating processes, building services, and transport. Implementing energy efficiency measures - such as energy management certification, on-site energy generation from solar panels, waste heat recovery, and the use of electric vehicles—significantly reduces a printing company's environmental impact. Therefore, it's obligated for the printing company to have implemented/fulfil **at least one** of the energy efficiency measures listed in the table.

The printing companies may be awarded up to 2 points depending on which energy efficiency measures have been implemented in the printing company.

A flexible point system for specific energy efficiency measures supports the obligate energy requirement by encouraging continuous improvement, innovation and investments in energy efficient measures at the printing company.

The listed energy efficiency options address this complexity from complementary angles: structured management (energy management systems and audits), targeted implementation (action plans with measurable targets), technical optimisation (waste heat recovery and on-site solar generation), and low-carbon energy supply (renewable electricity procurement and fossil-free vehicles). While each measure delivers different types and levels of energy or emissions reductions, together they reflect best practice across operational, technical, and organisational dimensions. Taken as a whole, these options ensure that energy efficiency

improvements are achievable for printing companies regardless of size, technology mix, or production focus, while supporting continuous improvement and long-term sustainability in the printing sector.

The Nordic Ecolabelling wants to promote electricity production with as low environmental impact as possible. There are different certification schemes that ensure that the renewable electricity production fulfils some minimum environmental requirements. Normally, the schemes are based on EU's guarantees of origin for renewable electricity, but above that they ensure extra environmental values.

To gain this point, it is not enough to purchase "only" renewable electricity, but the electricity must be certified by a certification scheme approved by Nordic Ecolabelling according to Nordic Ecolabelling's criteria for ecolabelled electricity.

P5 CO_2 calculation

The printing company is awarded 1 point if it is certified to calculate the climate impact of the printing company or individual graphic products under the following conditions:

- The CO_2 calculation tool is in compliance with ISO 16759 and the GHG Protocol[28], such as ClimateCalc[29]. Prerequisites and boundaries underlaying the CO_2 calculation tool must be described.
- The calculation/calculation tool must be certified and verified by independent third-party.
- If the printing company intends to communicate its CO_2 calculations, it must be made clear which emissions sources, CO_2 factors, prerequisites and boundaries have been used in the calculation.

- Description of the CO_2 calculation tool in accordance with the requirement.
- Valid certificate from ClimateCalc or similar system/tool.
- Example on how the printing company communicate its CO_2 calculations on printed matter.

Background to P7 CO_2 calculation

The requirement is unchanged in generation 7 of the criteria. The printing company may be awarded 1 point if it is certified to calculate the climate impact of the printing company or individual graphic products. The requirement supports the growing interest from the graphics industry to be able to de print, sell and deliver climate neutral printed matter. The Graphic industry has developed a graphical tool for calculation the carbon footprint of both the printing company and specific printed matter. ClimateCalc is based on the international Greenhouse Gas Protocol and the ISO 16759 standard for carbon calculation of greenhouse gas emissions of printed products. Prerequisites and boundaries underlaying the CO_2 calculation tool must be described.

[28] https://ghgprotocol.org, visited November 2020.
[29] https://eu.climatecalc.eu/ (visited 7/6-2019).

There are other certification tools for calculation of the carbon footprint such as Carbon Footprint Calculator[30] or Berkeley´s Cool Climate Calculator[31], but these tools have not been evaluated by Nordic Ecolabelling according to the requirements.

Nordic Ecolabelling has no controllability on how the CO_2 calculations are performed (what data is used) and the calculation/calculation tool must therefore be certified and verified by independent third-party. If the printing company intends to communicate its CO_2 calculations, it must be made clear which emissions sources, CO_2 factors prerequisites and boundaries have been used in the calculation. Plastic packaging used for protection of printed matter.

O14 Plastic packaging used for protection of printed matter

Plastic packaging must not contain PVC.

By plastic packaging is meant packaging that is used for protection and collation of individual/units of printed matter during storage, transport, and distribution.

🔑 Declaration from the printing company that the requirement is met. Appendix 4 may be used.

Background to O14 Plastic packaging used for protection of printed matter

The requirement is unchanged compared to generation 7 of the criteria. The requirement applies to plastic packaging used for protection and collation of individual/units of printed matter during storage, transport, and distribution.

Lamination e.g., adhering a layer of plastic (polyethylene, polymerized acrylics, vinyl's, styrene’s, among others) to a paper is not part of this requirement. Requirements for lamination/film lamination are subjected to the chemical requirement (O11).

PVC is sometimes used in plastic packaging. PVC and other halogenated plastics are excluded from Nordic Swan Ecolabelled products since they lead to adverse environmental impacts in waste handling and contain substances with adverse health effects. Information on PVC see O5.

5.8 Waste

The requirement for waste applies to the printing company. The requirement consists of a mandatory requirement for a waste management system and the possibilities for the printing company to be awarded points depending on amount of wastepaper and waste sorting.

O15 Waste management system

The printing company shall have in place a system for handling waste which addresses and documents the measures taken to reduce the amount of solid and liquid waste, including wastepaper, waste from substrates other than paper, ink waste, cleaning agent solution and dampening solution waste as defined by local or national regulatory authorities.

[30] https://www.carbonfootprint.com/calculator.aspx, visited November 2020.
[31] CoolClimate Calculator (berkeley.edu), visited November 2020.

The system shall be documented and shall include information on at least the following procedures:

- handling, collection, separation and use of recyclable materials from the waste stream.
- handling, collection, separation, and disposal of hazardous waste, as defined by the relevant local and national regulatory authorities.
- how the individual fractions are handled (internal or external reuse, recycling, energy use, landfilling or other).

T The printing company shall provide a waste minimization and management plan.

If the printing company is environmentally certified (ISO 14001, EMAS) or has an environmental licence from the authorities, it will be sufficient for the waste plan to be uploaded from the system together with the environmental management certificate/environmental licence.

T Documentation of waste disposal, e.g., invoices or an annual statement from the waste disposal operator.

Background to O15 Waste management system

The requirement on waste management system remains the same as in the previous version. The requirement both aims to reduce the amount of waste generated during production of printed matter and increase attention paid to the waste fractions.

A waste management system is a valuable tool that ensures control over the material flow, and drives to waste prevention, and preparing for reuse, recovery, recycling, and safe disposal. One of the limiting factors to implementing a comprehensive waste management strategy is the availability of possible routes for waste treatment either internally or externally. This especially applies to substrates other than paper such as plastic, textiles and composites. Although it is possible to achieve a zero waste to landfill target, this requires access to end markets which should be developed over time and will vary depending on local infrastructure and demand. Therefore, no specific waste treatment routes are required in the criteria.

The revised criterion requires applicants to develop a comprehensive waste minimization and management plan that addresses all type of waste generated at the printing company. This will serve to further increased awareness of the quantities of waste that are formed and can be used as documentation of some of the measures for which points are awarded in the area of waste.

P6 Wastepaper

The printing company is awarded 2 points if the quantity of wastepaper is less than the threshold values listed in table 6 below for each individual printing method.

If the printing company uses multiple methods of printing the threshold values is calculated as a weighted value which is defined according to quantity of wastepaper.

Example of calculation of the threshold value using multiple methods of printing.

*If a printing company is using 500 tons of paper substrate (sheet fed offset) and 300 tons of paper substrate (digital printing) the weighted threshold value is calculated as: Calculated threshold value: (500/800) * 25 + (300/800) * 18 = 22,7%.*

Calculate the wastepaper percentage for the printing method based on the weight specified on the invoice from the recipient of wastepaper, or by weighing the wastepaper at the printing company in relation to paper consumption on an annual basis. Wastepaper generated in connection with external finishing must also be included in the calculation.

Wastepaper from external finishing covers wastepaper from finishers encompassed by O3 as well as wastepaper from finishers that only perform mechanical finishing treatment.

If all finishing is performed externally, the wastepaper of the printing company must be multiplied by 2 to produce a figure for total wastepaper, unless the printer can show that some other figure applies for wastepaper generated by external bookbinders.

Table 6: Threshold values - Average wastepaper %

Printing method	Threshold value - wastepaper (%)
Sheet fed offset	25
Digital printing	18
Coldset, newspapers	10
Coldset, forms	17
Coldset rotation (except newspaper and form printing)	18
Heatset rotation	21
Flexographic printing	11
Envelope production with flexography	15

- Calculation and documentation for the annual quantity of wastepaper in accordance with the requirement.
- A copy of invoices or annual report from the recipient documenting the quantity of wastepaper disposed, or details on how the wastepaper was weighed.

Background to P6 Wastepaper

Unchanged compared to generation 6. As mentioned earlier the main impact of a printed product is sourced back to the paper production process. Finding ways to reduce paper waste can therefore present opportunities for printers wanting to become more efficient, engage in more sustainable production and lower costs.

Nordic Ecolabelling demands that wastepaper is calculated based on weight. The printer must either weigh the wastepaper itself or obtain information about weight from those who collect the wastepaper.

Nordic Ecolabelling has observed up to 30-40% wastepaper at both offset printers and digital printers. Since paper accounts for a major part of the cost of producing an item of printed matter, it is of major significance to both the environment and the economy.

The difference in values is one of the reasons why Nordic Ecolabelling operates with different points for different printing methods. This gives an incentive to make improvements for each printing method.

The threshold values for the different printing methods are based on average wastepaper-data from license holders and related ecolabelling schemes such as the EU Ecolabel[32] and Blue Angel[33].

Wastepaper generated in connection with external finishing must also be included in the calculation.

If the printing company uses multiple methods of printing the threshold values is calculated as a weighted value which is defined according to quantity of wastepaper.

P7 Unsorted waste

The printing company is awarded 1 point if the annual quantity of mixed waste* is less than 15 kg per purchased tonne substrate.

**Mixed waste: unsorted/mixed collections of materials that typically is collected for incineration or land fill.*

If household waste is separated, it is excluded from the calculation.

- The printing company shall provide a description of the calculation in accordance with the requirement as well as an annual specification or the like from the recipient documenting the quantity of mixed waste (kg).

Background to P7 Unsorted waste

The requirement is unchanged compared to generation 6 of the criteria.

The requirement underlines the importance of the waste hierarchy in supporting the transition to the circular economy, starting with an increase in prevention, preparation for reuse and recycling of waste, and minimizing waste disposal in particular through reduction of landfilled waste.

Data from Nordic Ecolabelled licensees shows a considerable variation between the printing company's proportion of unsorted waste. Printing companies that print on materials other than paper tend to have a higher proportion of unsorted waste than printing companies that print on paper. Composite substrates, e.g., substrates that contain a minimum of two or several different types of materials are typically disposed of for incineration or land fill. Mesh or digital printing films are often coated with soft PVC or vinyl. Currently, soft PVC materials cannot be disposed of for recycling[34] and therefore end up as mixed waste/unsuitable for recycling. Substrates coated with foils or films, or different kinds of packaging also ends up as mixed waste.

The printing company has the possibility (in dialogue with customers) to choose substrates which can be recycled in today's waste recycling systems, thereby lowering the proportion of mixed waste.

[32] https://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html, visited August 2019.
[33] Basic Criteria for Award of the Environmental Label for Printed matter (RAL-UZ 195) of Blue Angel. January 2015.
[34] Anna Fråne ett al.: PVC waste treatment in the Nordic countries, Nordic Council of Ministers 2019.

5.9 Ecolabelled products and services

The requirement awards the printing company's purchase of ecolabelled products and services This requirement has been included to increase awareness of green purchasing policies.

P8 Purchase of Ecolabelled products and services

The printing company is awarded up to 2 points depending on the annual use of ecolabelled products and services. The products or services are listed in the table below:

Table 7: Examples of points

Ecolabelled products or services	Points
100% by weight of used rags or 90% by weight of used work clothes is cleaned/laundered at a Nordic Swan Ecolabelled textile service	1
At least 90% by weight of the work clothes used in production are Nordic Swan Ecolabelled or EU ecolabelled	1
100% use of Nordic Swan Ecolabelled cleaning Services	1
At least 100% by weight of industrial tissue paper used in the printing process (does not include for example hand drying in toilets and the like) is Nordic Swan- or EU ecolabelled	1
100% use of Nordic Swan Ecolabelled industrial cleaning and degreasing agents	1
100% use of Nordic Swan Ecolabelled biofuels in either company vehicles or for heating company buildings	1

- The printing company shall provide a description of the calculation in accordance with the option for scoring points outlined above.
- Documentation for use/purchase of ecolabelled products and services.

Background to P8 Purchase of Ecolabelled products and services

Nordic Ecolabelling rewards the use of ecolabelled of products or services relevant to the production of printed matter, thus contributing to reducing the environmental impact of the life cycle of printed matter. Using Nordic Swan ecolabelled products and services in an effective way to make more sustainable choices as these certified products/services are designed to reduce environmental impact throughout their entire lifecycle. The possibility of obtaining 1 or 2 points gives flexibility for the printing companies to earn points.

5.10 Use of Nordic Swan logo on printed matter

The requirement awards the printing company's use of the Nordic Swan logo on printed matter. This requirement has been included to increase the awareness at the printing company, and among the printing industry's customers, to use the log on printed matter.

P9 Use of Nordic Swan logo on printed matter

The printing company is awarded 1 point if minimum 20% of

a) the annual number of orders produced is using the Nordic Swan logo on printed matter or
b) the annual share (tons) of printed matter is using the Nordic Swan logo.

*Example using alternative a: If the printing company manufactures 150 production orders a year and 30 of the production orders are Nordic Swan Ecolabelled printed matter, the printing company is awarded: (30/150) * 100 =20% = 1 point*

- Calculation in accordance with the option for scoring points outlined in the requirement.

Background to P9 Use of Nordic Swan logo on printed matter

The requirement supports the printing companies' ability to use the Nordic Swan logo to a greater extent than they do today. Nordic Swan Ecolabelled printed matter (logo on printed matter) must comply with stricter requirements compared to printing company level requirements, e.g. absolute requirement limits and no trivial limits. All paper and printing inks, toners, inks, varnishes, and adhesives used in a Nordic Swan Ecolabelled printed matter must be ecolabelled or accessed by Nordic Swan ecolabel.

The requirement shall be calculated based on the annual number of orders produced and which can be labelled, e.g., printed on paper, transport packaging, textile, and construction/facade panels. A production order is defined as an order issued within a company to produce a specific quantity of material within a certain timeframe.

Some printing companies only produce a small number of orders using the Nordic Swan logo, but these can even though make up a very large proportion of the printing company's annual volume of printed matter. The calculation can therefore also be calculated as share (tons) of printed matter using the Nordic Swan logo in relation to total tons of printed matter.

5.11 Strategic goals to reduce the environmental impact

O16 Strategic goals to reduce environmental impact

The printing company

- must have procedures showing how it works with strategic goals to reduce environmental impact in the production of printed matter such as mapping energy efficiency measures, focus on production chemicals (content of VOC, reduction of VOC), design of printed matter in order to minimize waste or dialogue with suppliers regarding use/selection of substrates with low environmental impact. The goals shall be quantitative and time-based, and they shall be determined by the management. The strategic goals must be assessed at least once a year by management.
- must have procedures for guiding/advising customers on end-of-life and waste sorting of purchased printed matter i.e. in connection with the customer's order for printed matter or upon delivery of the finished printed matter.

- Enclose procedures for policy or equivalent documentation of the manufacturer's work with environmental goals, showing fulfilment of the requirement. Minutes from the management's annual assessment on complying with strategic goals.

- Enclose procedures for guiding/advising customers on end-of-life and waste sorting of purchased printed matter

Background to O16 Strategic goals to reduce the environmental impact

It is required that the printing company has routines for working continuously with strategic goals to reduce environmental impact in its production of printed matter. There are many definitions of sustainability.

For example, the UN's sustainable development goals[35] encompass a broad spectrum of environmental goals such as clean energy and climate action as well as goals for economic growth, hunger, poverty, health, education, equality, peace, and justice.

The requirement supports the printing company´s work with strategic goals that may also lie outside the Nordic Ecolabel requirements, such as many of the UN sustainable development goals. This may, for example, take the form of mapping energy efficiency measures, or dialogue with subcontractors to reduce environmental impact in raw material production, or the design in the final product.

The printing company must develop its own strategic goals to reduce environmental impact in its production of printed matter. However, the goals must be quantitative and time-based, and they shall be determined by the management. Annually, the printing company (the management) must follow up on its strategic goals to reduce environmental impact in requirement O19. It is not an absolute requirement for the printing company to meet its goals, but the requirement ensures that the company management must assess its strategic goals on an annual basis at least. This way, the concrete environmental work in the company can be documented and thereby lead to real environmental gains.

The printing company must develop procedures for guiding/advising customers on end-of-life and waste sorting of purchased printed matter. When printing companies enters info dialog with customers about waste sorting of purchased printed matter (end-of life) customers are encouraged to/become aware of how to sort and return printed matter.

5.12 Licence maintenance

The purpose of the licence maintenance is to ensure that fundamental quality assurance is dealt with appropriately.

O17 Customer complaints

The licensee must guarantee that the quality of the Nordic Swan Ecolabel product or service does not deteriorate during the validity period of the licence. Therefore, the licensee must keep an archive over customer complaints.

Note that the original routine must be in one Nordic language or in English.

- ⭱ Upload your company's routine for handling and archiving customer complaints.

Background to 17 Customer complaints

Nordic Ecolabelling requires that your company has implemented a customer complaint handling system. To document your company's customer complaint handling, you must

[35] https://www.un.org/sustainabledevelopment/sustainable-development-goals/, visited November 2019.

upload your company's routine describing these activities. The routine should be dated and signed and will normally be part of your company's quality management system.

If your company does not have a routine for customer complaint handling, it is possible to upload a description of how your company perform these activities. During the on-site visit, Nordic Ecolabelling will check that the customer complaint handling is implemented in your company as described. The customer complaints archive will also be checked during the visit.

O18 Traceability

The licensee must be able to trace the Nordic Swan Ecolabel products in the production. A manufactured / sold product should be able to trace back to the occasion (time and date) and the location (specific factory) and, in relevant cases, also which machine / production line where it was produced. In addition, it should be possible to connect the product with the actual raw material used.

You can upload your company's routine or a description of the actions to ensure traceability in your company.

- Please upload your routine or a description.

Background to O18 Traceability

Nordic Ecolabelling requires that your company has implemented a traceability system. To document your company's product traceability, you must upload your company's routine describing these activities. The routine should be dated and signed and will normally be part of your company's quality management system.

If your company does not have a routine for product traceability, it is possible to upload a description of how your company perform these activities. During the on-site visit, Nordic Ecolabelling will check that the product traceability is implemented in your company as described.

O19 Follow-up of license

The printing company shall ensure that the requirements of the criteria are met during the validity period of the licence. At least once a year (within 6 months of closing the books) a review of operations shall be made on at least the following areas:

- Substrates, requirements O4 to O9
- Chemicals, requirement O11.
- VOC, requirements O12.
- Energy, requirement O13.
- Follow up on strategic goals to reduce environmental impact O16.

Nordic Ecolabelling may request reports from the internal review and examine a selection, or all, of the requirements. Information on a compliance check is given in advance.

- Routine for monitoring licence.

Background to O19 Follow-up of license

The requirement has been adjusted to the new structure. As in generation 6, the printing company must review its operations and overall compliance with the criteria every year.

The review must focus on the requirements which have a huge impact on the fulfilment of requirements: Requirements for the annual use of substrates, chemicals, including consumption of VOC and energy use.

Nordic Ecolabelling would like to help the printing companies in both working on and focusing on their strategic goals to reduce environmental impact in the production of printed matter. By doing so, printing companies are obliged to evaluate their goals at least once a year and hopefully meet the objectives. The printing companies must set specific quantitative and time-based goals for themselves. Nordic Ecolabelling thus has no requirements for the strategic goals or whether the printing company fulfils its own goals.

5.13 Summary of points

O20 Mandatory requirement points scored

The printing company must score at least 6 points.

The table below summarises the point score requirements and how many points can be earned for each requirement.

Table 8: Points total

Point score requirements	Points achieved	Maximum number of points
P1 Printing substrates		1
P2 Controlled and Ecolabelled paper		2
P3 Rigid substrates with good recycling properties		2
P4 Energy efficiency measures		2
P5 CO2 calculation		1
P6 Wastepaper		2
P7 Unsorted waste		1
P8 Ecolabelled products and services		2
P9 Use of the Nordic Swan Ecolabel logo on printed matter		1
Total		14

- Summary of points in line with the table above.

Background to O20 Mandatory requirement points scored

To ensure the greatest possible potential for product development and innovation and thus usability of the criteria, combined with a low environmental impact overall, a points system has been created. This means that if a printing company is ahead in one area, it can perform less well in other areas if the printing company has a low environmental impact overall.

On top of the obligatory requirements, the printing company must score at least a total of 6 points in the point score requirements. This can be attained through a high share of inspected/ecolabelled paper, rigid substrates with good recycling properties-, energy efficiency measures, material efficiency and use of the Nordic Swan logo on printed matter – or by putting initiatives in place in other areas as set out above.

The maximum number of points in each point score requirement (P1-P9) is weighted from the LCA findings in section 3. Areas with a high environmental impact from a life cycle perspective are weighted by a factor of 2 (up to a maximum of 2 points), while areas with lower impact are assigned 1 point.

The total points requirement is an important requirement as it is a requirement that most clearly distinguishes printing companies on the market with the best environmental performance from the rest. Nordic Ecolabelling judges that there is great potential for improvement as there is a very wide spread of environmental performance and as the industry is developing rapidly towards new digital printing techniques and printing substrates.

6 Special requirements concerning the use of the Nordic Swan Ecolabel logo on printed matter

The following requirements apply to printed matter that will bear the ecolabel. Inserts in magazines and daily papers, for example, need only meet the requirements if the Nordic Swan Ecolabel logo also appears on the insert.

Please be aware that a special packaging mark for Nordic Swan Ecolabelled transport-/postal-/web shop packaging must be used. Guidelines for the use and placement of the mark have also been developed.

Graphical guidelines for Nordic Swan Ecolabelled transport-/postal-/web shop packaging can be found at https://www.nordic-swan-ecolabel.org/4a42a1/contentassets/956d503409fb4a6bb1bb38762bb78da5/nse-guidelines-printed-matter_041_printing-companies-and-printed-matter-041_english.pdf

O21 Paper

The paper substrate used in the Nordic Ecolabelled printed matter must consist of inspected or Nordic Swan Ecolabelled paper.

Other non-paper parts such as metal bars and -clips or plastic covers must not exceed 10% of the total weight of the Nordic Swan Ecolabelled printed matter.

In the case of stationery and office supplies such as books, folders, ring binders, notepads and forms, other non-paper parts must not exceed 20% of the total weight of the Nordic Swan Ecolabelled printed matter.

The non-paper product parts of stationary paper product such as metal bars or plastic covers shall be easily removable to ensure that those components will not hinder the recycling process.

Inserts that are fixed are considered part of the printed matter.

- Upload a copy of the duly completed and signed Appendix 4.

O22 Paper board for signage, displays and retail point of sale/purchase (POS/POP)

The paper board must consist of 100% paper substrates.

The paper substrate used in the Nordic Swan Ecolabelled printed paper board matter must consist of 100 % inspected or Nordic Swan Ecolabelled paper or inspected board/corrugated board.

- Upload a copy of the duly completed and signed Appendix 4.

O23 Board/corrugated board for packaging

It is only possible to use the Nordic Swan Ecolabel logo on packaging defined as transport-/postal-/web shop packaging* produced from paper substrate.

The packaging must be commercial/product-neutral in terms of the product(s) inside the packaging e.g., no print/pictures showing/describing the actual product in the packaging. However, company brand/logo/name may be displayed on the packaging.

- The paper substrate used in the Nordic Swan Ecolabelled printed transport-/postal-/web shop packaging must consist of inspected or Nordic Swan Ecolabelled paper or inspected board/corrugated board.
- Other non-paper parts such as tape or metal clips must not exceed 5% of the total weight of the Nordic Swan Ecolabelled printed transport-/postal-/web shop packaging.
- The non-paper product parts such as tape or metal clips shall be easily removable (according to CEPI/FEFCO guidelines[36]) to ensure that those components will not hinder the recycling process.
- Labels must not be used.
- PVC used in tape, must not be used.
- Wax, latex coatings or lamination must not be used.

Inserts that are fixed and made of the same inspected board, are considered part of the printed packaging. Packaging fillers or non-fixed insets is however not part of the Nordic Swan Ecolabelled product.

** Tertiary packaging/transport packaging facilitates the protection, handling, and transportation of a series of sales units or secondary packaging in order to group everything into unit loads during transit. This type of packaging is rarely seen by the consumer.*

Postal- and web shop packaging: postal packaging is a form of single trip packaging used for shipping products, goods, or orders from B2B or B2C whereas web shop packaging often is returnable.

- Upload a copy of the duly completed and signed Appendix 4.

O24 Textile and panels

The textile used in the Nordic Ecolabelled printed matter must consist of either:

- Nordic Swan- or EU-Ecolabelled textiles or
- OEKO-TEX 100 certified textile made from 100% Post-Consumer Recycled polyester (rPET).

[36] https://www.cepi.org/wp-content/uploads/2020/10/Cepi_recyclability-guidelines.pdf .

The recycled polyester must be certified according to Recycled Claim Standard (RCS), Global recycled standard or equivalent certification standard.

The panel used in the Nordic Ecolabelled printed matter must consist of:

- Nordic Swan Ecolabelled panels for interior- or exterior use

Other materials such as metal clips or plastic covers must not exceed 10% of the total weight of the Nordic Swan Ecolabelled printed matter.

If case of printing on Nordic Swan Ecolabelled acoustic panels, or if the acoustic panels is used as a basis for a printed textile matter, the printing must not have a negative effect on the primary function of absorbing sound waves.

In case of roll-up stands, printed canvas on a wooden frame and other similar products, only the material carrying the information is regarded as printed matter.

Upload a copy of the duly completed and signed Appendix 4.

O25 Printing inks, toners, inks, varnishes, and adhesives

All printing inks, toners, inks, varnishes, and adhesives used in the Nordic Swan Ecolabelled printed matter must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1.

The printing company must ensure that any printing inks, toners, inks, varnishes, and adhesives which are exempt from requirement O11 are not used in the Nordic Swan Ecolabelled printed matter.

Upload a copy of the duly completed and signed Appendix 4.

O26 Lamination and PVC

Nordic Swan Ecolabelled printed matter must not contain PVC.

Lamination shall only be used to increase the durability of products with a life span of at least 1 year, for example, books, binders, folders, exercise books, calendars, notebooks, and diaries.

Lamination shall not be used in magazines.

Double lamination shall not be used in any product.

Upload a copy of the duly completed and signed Appendix 4.

O27 Fragrance

Fragrance/scent must not be added to Nordic Swan Ecolabelled printed matter (e.g., scented varnish). Packaged product samples with fragrance, attached to an item of printed matter, or removable scratch samples, are not encompassed by this.

Upload a copy of the duly completed and signed Appendix 4.

O28 Printing suppliers and finishers (book binders)

All printer suppliers used in the production of printed matter that is to bear the Nordic Swan Ecolabel must be licensed to use the Nordic Swan Ecolabel. All external finishers encompassed by O3 must have been inspected.

Upload a copy of the duly completed and signed Appendix 4.

O29 Traceability

If only part of the output of the printing company is Nordic Swan Ecolabelled, orders bearing the Nordic Swan Ecolabel must be marked clearly to enable them to be separated from other orders. Information must also be displayed disclosing:

- name of paper and paper grades, board or corrugated board, textile, or panels.
- names on printing inks, toners, inks, varnishes, or adhesives.
- subcontractors used.
- how the Nordic Swan Ecolabel logo is reproduced on the items of printed matter (e.g., with the aid of order notes or order bags).

T Upload a copy of the duly completed and signed Appendix 4.

Background to requirements applicable to ecolabelled products

The printing company must fulfil special requirements applicable to Nordic Swan Ecolabelled printed matter. These requirements have been selected from a credibility perspective and based on the expectations that the reader/user has of Nordic Swan Ecolabelled printed matter.

The Nordic Swan logo can be used on either Nordic Swan or EU Ecolabelled textiles, OEKO-TEX 100 certified textile made from 100% Post-Consumer Recycled polyester (rPET) or Nordic Swan Ecolabelled panels for interior- or exterior use. The rPET must be certified according to Recycled Claim Standard (RCS), Global recycled standard or equivalent certification standard to verify the origin of the yarn/fibers.

As is the case for paper, a minimum of 90% of the total weight of the Nordic Swan Ecolabelled printed matter must consist of Nordic Swan or EU-Ecolabelled textiles, OEKO-TEX 100 certified textile made from 100% Post-Consumer Recycled polyester (rPET) or Nordic Swan Ecolabelled panels for interior- or exterior use.

Both printing on textiles for advertising and print directly on panels made from wood, for example, are typically used as point of sale (POS) material. In the case of roll-up stands, printed canvas on a wooden frame and other similar products, only the material carrying the information is regarded as printed matter. Other parts such as the metal stand or wooden frame are not covered by the requirements in the criteria. Other parts such as the metal stand or wooden frame are not covered by requirements in the criteria. However, the Nordic Swan Ecolabel logo must as a rule not be placed on the metal stand or wooden frame since confusion may arise about what the Nordic Swan Ecolabel applies to.

The paper substrate used in the Nordic Ecolabelled printed packaging must consist of inspected or Nordic Swan Ecolabelled paper or inspected board/corrugated board. Other non-paper parts such as tape or metal clips must not exceed 5% of the total weight of the Nordic Swan Ecolabelled printed packaging. To ensure repulp ability wax, latex coatings, lamination, or labels must not be used on the packaging. Also, the non-paper product parts such as tape or metal clips shall be easily removable (according to CEPI/FEFCO guidelines). Finally, PVC used in tape must not be used due to adverse environmental impacts in waste handling, see O5 regarding PVC. Food and beverage packaging cannot use the Nordic Swan Ecolabel logo/not covered by these criteria.

Transport-/postal-/web shop packaging as a printed matter is not a traditional Nordic Swan Ecolabelled product, since here it is the actual packaging that is Nordic Swan Ecolabelled, and not the product inside the packaging. Nor is it the full packaging considering both the amount of packaging, and the filling inside that is Nordic Swan Ecolabelled. To make this clear to the consumers, a special packaging mark for Nordic Swan Ecolabelled transport-/postal-/web shop packaging must be used. Guidelines for the use and placement of the mark have also been developed.

Graphical guidelines for Nordic Swan Ecolabelled transport-/postal-/web shop packaging can be found at https://www.nordic-swan-ecolabel.org/4a42a1/contentassets/956d503409fb4a6bb1bb38762bb78da5/nse-guidelines-printed-matter_041_printing-companies-and-printed-matter-041_english.pdf

When the Nordic Swan Ecolabel is used the license number shall be included.

The requirements applicable to ecolabelled products have been amended in several ways to ensure that the products do not hinder the recycling process of the labelled printed matter, and contain chemicals which are harmful to the environment and human health:

- Any non-paper product parts of stationary paper product such as metal bars/clips or plastic covers shall be easily removable to ensure that those components do not hinder the recycling process.
- Lamination shall only be used to increase the durability of products with a life span of at least 1 year, for example, books, binders, folders, exercise books, calendars, notebooks, and diaries. Lamination shall not be used in magazines. Double lamination shall not be used in any product.
- All printing inks, toners, inks, varnishes, and adhesives must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1.

Nordic Swan Ecolabelled printed matter must not contain PVC or fragrance.

7 Environmental impact of Printing companies and printed matter

You will find more detailed information on the RPS in section 7.2 and a summary of the RPS in chapter 1, “Summary”. RPS and MECO schema was updated during the evaluation of the criteria in 2025.

7.1 RPS scheme

Life cycle stages	Area and assessment of R, P, S (high, medium or low)	Comments
Raw materials		
	Sourcing of paper-based substrates R: High P: High S: High	R: The cultivation and extraction of wood raw materials are linked to deforestation, biodiversity- and social issues. R: The production of paper is associated with high use of wood raw materials, energy, chemicals and emissions to air and water. P: There is a potential to reduce impact by choosing wood raw material and paper that are sustainably source and manufactured. S: The traceability of sourced wood raw materials and paper is high if certified (FSC/PEFC wood) and ecolabelled paper are used. High RPS for using type 1 eco-labelled papers that set strict requirements to: -high share of certified (FSC/PEFC fibers) -energy consumed during the pulp and paper production -emissions to air and water from paper production - use of non-CRM classified-, toxic-, hazardous to the environment chemicals.
	Sourcing of textile/fabric substrates and wood-based panels R: High P: High S: High	High RPS for using for using type 1 eco-labelled textile. Typical types of textiles used for printing is cotton, polyester, synthetic fibre materials. High RPS for using credible forest management certified wood-based panels such as FSC/PEFC.
	Sourcing of other substrates other than paper such as plastic and composite materials R: High P: Medium S: Medium	High R for printing companies using substrates that consist of wood-based materials or mono-materials as these materials can be recycled opposite to composite substrates or substrates containing PVC. Mono substrates are often better because they can be recycled easily as a single material, keeping them in a closed loop, while composite materials are hard to separate and usually end up as waste instead of becoming new raw material. Due to the substrates intended use (durability/function/weight) the choice of alternative substrates can be limited in specific situations e.g. expose to very wet weather. Also, not always possible for the printers to get exact information on the composition of the substrates therefore medium P and S.
Production/distribution		
	Use of chemicals in the printing process R: High P: Medium S: High	High R, medium P and high S for excluding or limiting the use of CRM classified-, toxic-, hazardous to the environment chemicals, VOC and problematic constituents such as EDTA, PFOS related substances (fluorinated compounds), heavy metals, aromatic amines.

		There is potential and steerability to reduce harmful substances in and/or emissions from inks/toner/varnishes/cleaning products. For some types of chemicals/chemical groups/technics e.g. UV toner/inks, there are limited opportunities to substitute for environmental better alternatives, therefore overall medium P. These requirements ensure that workers are less exposed to potentially harmful chemicals.
	Use of energy in the printing company R: High P: Medium S: High	Printing operations are energy-intensive, relying on e.g. presses, dryers, compressors, lighting, and heating up buildings. P: Lower energy use directly reduces electricity and fuel consumption, thereby lowering the environmental impact. Due to overall decline in demand for printed matter in the Nordic/EU the marked faces financial limitations to implement energy-saving measures. P is therefore medium. S: Printing companies typically monitor their energy use on monthly basis (utility bills from energy suppliers), KPI tracing or by sub-metering or digital monitoring. Large companies work with Energy Management systems and energy certification. Steerability for reporting energy data is therefore high.
	Recyclability for use of printing inks, varnishes, toner, inks, adventives, packaging and laminates (for use on printed paper) R: High P: High S: High	High RPS for securing that sustainable printed matter must be produced in such a way that it does not hinder the reuse of the fibres in recycling. An important prerequisite here is the de-inkability of the printed matter. Some types of printing ink and varnishes e.g. UV ink/varnished, flexographic printing inks and digitally printed matter can cause problems in de-inking.
	Effective use of paper-based substrates R: High P: Medium S: High	R: Production of paper is a very important contributor to the environmental impact of printed matter. Efficient use of paper substrates and reduced cut-off waste are therefore important to reduce environmental impact. P: Printing companies are focusing on efficient use of paper substrates and reducing waste. However, it is normal that the customers pay for the entire paper and not just the printed matter, so the incitement to reduce waste is challenged. The printing companies is also getting paid for paper waste going to recycling. Potential for the printers to guide the customers to chois of paper dimensions and design of printed matter. The potential is therefore medium. S: Paper waste/cut-offs are a valuable raw material for the paper industry, and this waste fraction is being collected by waste companies for recycling. The steerability for setting a requirement for paper efficiency/waste is therefore high.
Use phase		

End of life		
	Recyclability of printed matter R: High P: Medium S: Medium	R: The ability to recirculate printed matter is essential to reducing environmental impact, ensuring resource efficiency, maintaining economic viability, and aligning with circular economy goals. Substrates made of mono-materials (e.g. paper-only, single polymer) are more compatible with current recycling streams and preserve material value. Composite substrates are harder to separate, reducing recycling yields and often resulting in downcycling or disposal. PVC layers/liners/coatings are frequently incompatible with paper/plastic streams. P: Printing companies can select and recommend printing substrates that offer improved recycling properties, particularly for signage. By advising customers on material choices such as paper-based substrates or mono-substrates printers can improve the circularity of printed signs. Due to the substrates intended use (durability/function/weight/price) the choice of alternative substrates can be limited in specific situations e.g. expose to very wet weather. Also, not always possible for the printers to get exact information on the composition of the substrates therefore medium P and S.

7.2 Environmental impact of the printing company and printed matter

The product group printing companies and printed matter comprises different printing technologies and print on different types of substrates but with a uniform function, i.e., to produce printed matter. To assess the different printing technologies and types of printing substrates, the functional unit is defined as one tonne purchased/used substrate.

Nordic Ecolabelling assesses a product's environmental impact throughout its life cycle. To achieve environmental benefits, Nordic Ecolabelling must be able to set requirements that are relevant for the environment.

To identify the most important aspects of the system for printing companies and printed matter, an MECO[37] and an RPS analysis were performed.

The MECO analysis are based on several LCA studies[38][39]. Based on the MECO analysis, the RPS analysis was used to pinpoint the environmental issues that are most relevant (R) in the life cycle of the products and to assess the potential (P) which exists for reducing adverse effects on the environment.

[37] MECO stands for the assessment of Materials, Energy, Chemicals and Other characteristics and describes the principal environmental impacts during the products' life cycle phases.
[38] Antonios Konstantas et.all (November 2018): Revision of European Ecolabel Criteria for printed paper products (Preliminary report), European Commission, Joint Research Centre (JRC), Seville, Spain).
[39] https://www2.mst.dk/Udgiv/publications/2006/87-7052-173-5/html/kolofon_eng.htm#resume .

At the same time, it is important to examine how manufacturers can make changes to the products (steerability = S) that will trigger the potential for environmental improvements. This section describes the key findings of the RPS analysis.

The RPS for printing companies and printed matter is found for the following areas:

- Production of paper and other printing substrates is the main contributor to the environmental impact; therefore, the selection and the manufacturing of paper and other printing substrates must be considered in the Nordic Ecolabelling criteria.
- Use of chemicals in the production of printed matter including
  - generation of volatile organic compounds (VOC).
  - use of chemicals that do not hinder the recycling process of the printed matter.
- Use of energy in the production of printed matter.
- Recyclability of printed matter (documented repulpability and deinkability)
- Waste management - effective use of substrates/raw materials thereby reducing the amount of waste.

Use of paper and other printing substrates

Most LCA studies[40] conclude that the main impact of a printed product is sourced to the paper production. Raw materials (paper substrate) have on average an impact contribution between 28%–78%. In most of the impact categories, this high proportion is sourced to the high paper content in the final product. Impacts from paper are mostly caused by the energy consumption in the paper mills (representing up to 70% of raw materials impacts for some studies) while the remaining 30% is mainly caused by fibre supply (biodiversity impact) and to a minor extent by consumption of other resources, such as water.

Requirement concerning consumption of sustainable produced paper are therefore highly relevant (R) and both the potential (P) and steerability (S) for setting requirements for the use of Nordic Swan- and EU Ecolabelled paper in the printing company or printed matter are high.

Digital printing, however, is far from being limited to paper-based substrates[41][42]. New digital printing and ink technologies are suitable for almost any surface such as plastic, metal, glass, wooden boards and even textiles. Such thorough studies in LCA for other print substrates have not been conducted in the same way as they have for paper. But there is reason to assume that other substrates than paper broadly have a similar distribution from an LCA perspective. Grakom[43] has made assessments and calculations for selected plastic substrates using ClimateCalc[44]. These calculations show that these substrates even make a greater LCA contribution than paper substrates.

[40] Antonios Konstantas et.all (November 2018): Revision of European Ecolabel Criteria for printed paper products (Preliminary report), European Commission, Joint Research Centre (JRC), Seville, Spain).
[41] https://www.fespa.com/en/news-media/features/wide-format-printing-key-factors-for-sustainability-success , Visited April 2019.
[42] Viluksela P. et all (2010): Environmental performance of digital printing - Literature study. VTT2010.
[43] Survey conducted by GRAKOM (December 2018-January 2019) for Nordic Ecolabelling. The survey was conducted on the Danish marked and focused on the use of print substrates and technologies.
[44] www.climatecalc.eu.

As is the case with paper, there is high RPS for using Nordic Swan- and EU Ecolabelled textile or boards/panels in the printing company or in the printed matter.

The great variety of substrates other than paper means it is both relevant (R) to set requirements for the use of recycled material or use of substrates that consist of one type of material to ensure recycling, and that this offers great potential (P). Requiring information on the composition of the substrates will strengthen steerability (S). This is in line with the EU strategy for plastics in a Circular Economy[45].

Use of energy in the production of printed matter

Alongside production of substrates, printing also has an important environmental contribution both regarding energy consumption and the use of chemicals. Energy savings have an important role to play in reducing environmental impact and thus also global warming and climate change. Great potential for energy savings at the printing companies is especially found within the areas of e.g., lighting, compressed air, ventilation, or space heating[46].

There is a high relevance (R) and medium potential (P) for limiting the energy consumption of production of printed matter. Most printing companies are focusing on their energy consumption and have good data on their energy consumption. The steerability (S) for setting absolute requirements for the consumption of energy (both the use of electricity and energy for heating) is therefore good for most types of printing companies.

Use of chemicals in the production of printed matter

As mentioned above the use of chemicals is an important contributor to the environmental impact of production of printed matter. Nordic Ecolabelling aims for the health and environmental impacts of chemicals used in Nordic Swan Ecolabelled services and in the manufacture of Nordic Swan Ecolabelled products to be as low as possible. There are high RPS for excluding or sometimes restricting the use of chemicals classified as carcinogenic, mutagenic, or toxic to reproduction (CMR), toxic- or hazardous to the environment. A clear environmental advantage for vegetable inks in comparison with mineral-based inks cannot however be stated in most of the cases[47].

Printing is also related to the generation of volatile organic compounds (VOCs). The emissions of volatile organic compounds mainly originate from the use of organic solvents and alcohol in dampening solutions. There is high RPS for reducing emissions of VOCs in the production of printed matter.

Recyclability and de-inkability

Recyclability is crucial for the environmental performance of paper. Recyclability in turn is linked to repulp ability and de-inkability[48]. De-inking on an industrial scale is highly complex since it needs to consider and address diverse types of inks, and to remove impurities and unwanted substances. The key de-inking steps are the detachment of the ink film from the paper, ink fragmentation and removal from the pulp slurry.

[45] https://ec.europa.eu/environment/waste/plastic_waste.htm, visited January 2020.
[46] Energy Management Standardization in printing industry (EMSPI) conducted in 2014-2017. https://www.emspi.eu/index.html, visited May 2019.
[47] European Printing Inks Association. ENVIRONMENTAL IMPACT OF PRINTING INKS. March 2013.
[48] http://pub.ingede.com/en-GB/methods/, visited October 2019.

Requirements that ensure that the use of printing inks, toners, inks, varnishes, and adhesives does not hinder the recycling process are therefore highly relevant (R) and have potential (P) for improvement for several types of inks. A requirement for repulpability- and de-inkability test strengthens the steerability (S).

Waste management

Production of printing substrates is the main contributor to the environmental impact, and it is therefore highly relevant (R) that use of the substrates/raw materials is efficient, thereby reducing the amount of waste. This is in line with the EU's new circular economy package[49] which aims to use resources instead of depleting them further. The main cornerstones are the redevelopment of natural capital, the minimization or elimination of toxic substances and the avoidance of waste through careful recycling process design.

By setting requirements that rewards minimization of wastepaper, unsorted waste and rewards substrates consisting of recycled material or consisting of only one material, the criteria stimulate and contribute to the circular economy in the graphics industry.

[49] https://ec.europa.eu/environment/circular-economy/, visited October 2019.

MECO scheme

	Raw materials (substrates & inputs)	Production (printing & finishing)	Use / Service life	End-of-life (EoL / Recycling)	Transport
M — Materials	Typical raw materials[50]: • Graphic paper • Paperboard/corrugated board • Recycled paper grades • PE/PP film • PET film • Polyester textile/soft signage • Wood panels (FSC/PEFC) • Aluminium (primary/recycled) Substrates typically dominate upstream impacts, especially for paper-based printed matter.	Wastepaper (indicative[51]): • Sheet-fed offset: 17–23% • Heatset: 13–16% • Envelope converting: 19% • Digital: 7% Waste rates often rise as print volumes decline because make-ready waste becomes a larger share of total output, especially for analogue printing technologies. Digital printing is generally more flexible for short runs and can reduce set-up waste.	Durability may be environmentally relevant where a longer service life reduces the likelihood of replacement or reprinting.	• Mono-material products are generally easier to sort and recycle into cleaner material fractions. • Laminates and composite or sandwich structures, including foamed cores, are often difficult to separate and may therefore end up as mixed waste or energy recovery. • PVC layers or films can be incompatible with some recycling streams and may therefore limit material recovery or end up as mixed waste. • Aluminium foil laminates and aluminium composites can be difficult to separate, even though aluminium itself is recyclable. • Non-paper parts, attachments and mixed-material constructions can complicate sorting and reduce recycling quality.	Inbound transport is primarily based on diesel road freight, with occasional petrol use for vans. Typical fuel intensity is around 1.5–3.0 L per 100 t·km (approximately 0.015–0.030 L/t·km).

[50] Kowalska, M., Donatello, S. & Wolf, O. *EU ecolabel criteria for printed paper, stationery paper, and paper carrier bag products – Final technical report*. Publications Office of the EU, 2021. DOI: 10.2760/37534.

[51] Share of paper waste generated during printing/converting incl. finishing, relative to paper purchased/used. Note that the figures are taken from the JRC work underpinning the revision of the EU Ecolabel criteria (data reported by ecolabel licence holders, supplemented with benchmark/threshold values). They are used here only as indicative orders of magnitude for wastepaper by printing technology and do not necessarily represent the wider market, since the underlying dataset is limited and results depend strongly on product mix and run length.

E — Energy & emissions	Per-kg substrate factors (baseline intervals[52]): • Paper, graphic: 41–62 MJ/kg, 0.8–1.5 kg CO_2e • Paperboard/corrugated: 11–33 MJ/kg, 0.5–1.0 kg CO_2e • Paper (recycled): 11–20 MJ/kg, 0.45–0.75 kg CO_2e • PE/PP film: 80–101 MJ/kg, 2.2–3.7 kg CO_2e • PET film: 81–88 MJ/kg, 3.3–3.9 kg CO_2e • Polyester textile: 104–127 MJ/kg, 4.9–6.7 kg CO_2e • Wood panels: varies strongly by panel type/density • Aluminium (primary): 145–230 MJ/kg, 10–28 kg CO_2e • Aluminium (recycled): 8–11 MJ/kg, 0.6–0.8 kg CO_2e Approx. 60–70% of total CO_2e[53]	Printing energy (benchmarks[54]): • Coldset news: 365 kWh/t • Flexo: 486 kWh/t • Rotogravure: 864 kWh/t • Heatset: 965 kWh/t • Sheet-fed offset: 1253 kWh/t • Digital: 2799 kWh/t Energy use per tonne can vary widely and often increases at lower production volumes, especially for analogue printing technologies, because fixed site energy is spread over fewer tonnes. Values also depend on job mix, run length and ink coverage. Approx. 20–30% of total CO_2e	For most printed matter, the use phase has little or no direct energy demand. Environmental relevance is mainly linked to functional lifetime and whether a short service life leads to replacement or reprinting. Approx. 0 % of total CO_2e	Recycling often gives higher net energy and CO_2 benefits than energy recovery because it can displace primary material production, although results depend on material quality and local conditions. Savings can be substantial, for example for recycled aluminium compared with primary aluminium and for recycled paper compared with virgin paper. Energy recovery is more typical for composites, contaminated fractions or materials that are difficult to recycle, and usually gives smaller net benefits. Approx. 5–10% of total CO_2e	Indicative road transport CO_2 emissions are around 60–120 g CO_2/t·km (tailpipe), depending on vehicle type, load factor, fuel and distance. Approx. 1–5% of total CO_2e

[52] Factors based on ecoinvent v3.12 (APOS), ReCiPe 2016 midpoint (H) no LT and CED (HHV)

[53] Indicative estimate only. At lower print volumes, the production phase may become relatively more important because make ready waste and fixed energy use are distributed over fewer printed units. The relative importance of production may also vary by printing technology, with older analogue technologies often showing higher impacts for short runs than newer technologies.

[54] Values are orientation figures based on energy data reported to Nordic Ecolabelling (sample of 68 printing companies). They are derived from annual site energy use (electricity meter), including administration and normal building operation, and then allocated to printing methods using a market-average distribution in the Nordic Print Portal; representativeness for the broader market is uncertain.

C — Chemicals	Problematic chemistry in raw materials (examples; depends on substrate and formulation): • SVHC or other high-hazard substances under CLP, including CMR substances • Heavy-metal pigments or impurities (e.g. Cd, Cr(VI), Pb, Hg) • Azo dyes that can release restricted aromatic amines • APEO surfactants • Halogenated organic substances, such as PFAS or chlorinated paraffins/solvents • Preservatives and biocides (e.g. isothiazolinones, IPBC, bronopol) • PVC in films or coatings may also be environmentally relevant, including for end-of-life	Relevant chemical hotspots in production include VOC emissions from IPA (alcohol), wash and cleaning solvents, and certain adhesives, inks or coating systems. Process water emissions can also be relevant, for example metals in gravure-related processes, as well as COD/BOD and surfactants depending on the chemicals used and the production process.	Potential user exposure may in some cases relate to substances retained in the finished product, especially for articles with prolonged or repeated skin contact. Skin sensitisation may therefore be relevant for certain substances used in inks, coatings, adhesives or finishing chemicals, depending on formulation and residual presence in the final product.	Certain coatings, laminates, inks, adhesives and added non-paper components can impair de-inkability, repulpability or adhesive removability and may therefore reduce recycling performance. De-inking ≥ 51 (EPRC, INGEDE M11) and adhesive removability ≥ 71 (EPRC, INGEDE M12); repulpability via PTS-RH 021/97 or ATICELCA 501 acceptable. PVC and other halogenated plastics may also be problematic in waste handling due to adverse environmental impacts associated with incineration and landfill, including the release of dioxins.	Transport-related pollutants include NO_x, $PM_{2.5}$ and PM_{10} from exhaust and brake or tyre wear, and in some cases VOC. For marine transport or older fuel qualities, SO_x may also be relevant depending on sulfur content. Levels depend on vehicle technology, after-treatment and fuel quality.
O — Other	Sustainable forestry and fibre sourcing are environmentally relevant, including certified fibres and deforestation-related risks. Biological materials such as wood, cotton, viscose and plant-based binders can be associated with land use change, indirect land use change and biodiversity impacts. Metal extraction can cause habitat loss, tailings and water impacts, as well as high embodied energy.	VOC emissions mainly arise from dampening-solution alcohol (IPA), cleaning and wash solvents, and solvents or mineral oils in certain inks, especially in heatset processes. Wastewater can also be relevant in some processes, for example rotogravure, where metals such as Cr and Cu linked to cylinder processes may occur. Other wastewater parameters depend on the chemicals used and local permit requirements.	Functional performance and fitness for use may be environmentally relevant where inadequate quality increases the likelihood of rejects, replacement or reprinting.	Landfilling of paper and other biodegradable fractions can generate methane; waste routing therefore affects the overall GHG profile.	The significance of transport depends on supply chain structure, transport distance, mode of transport, load factor, and the weight and volume of the printed product.

Sources for MECO

1. Kowalska, M., Donatello, S. & Wolf, O. EU ecolabel criteria for printed paper, stationery paper, and paper carrier bag products – Final technical report. Publications Office of the EU, 2021. DOI: 10.2760/37534.
2. Share of paper waste generated during printing/converting incl. finishing, relative to paper purchased/used. Note that the figures are taken from the JRC work underpinning the revision of the EU Ecolabel criteria (data reported by ecolabel licence holders, supplemented with benchmark/threshold values). They are used here only as indicative orders of magnitude for wastepaper by printing technology and do not necessarily represent the wider market, since the underlying dataset is limited and results depend strongly on product mix and run length.
3. Factors based on ecoinvent v3.12 (APOS), ReCiPe 2016 midpoint (H) no LT and CED (HHV)
4. Indicative estimate only. At lower print volumes, the production phase may become relatively more important because make ready waste and fixed energy use are distributed over fewer printed units. The relative importance of production may also vary by printing technology, with older analogue technologies often showing higher impacts for short runs than newer technologies.
5. Values are orientation figures based on energy data reported to Nordic Ecolabelling (sample of 68 printing companies). They are derived from annual site energy use (electricity meter), including administration and normal building operation, and then allocated to printing methods using a market-average distribution in the Nordic Print Portal; representativeness for the broader market is uncertain.

8 Future criteria

As part of any future evaluation of the criteria, it will be relevant to consider the following:

- Product definition - new types of printing technologies and types of printed matter such as packaging.
- Printing substrates - further analysis of the environmental impact of substrates other than paper.
- Energy use - energy savings at the printing company.
- Use of chemicals
- Recyclability of the printed matter
- Effective use of substrates - minimize waste

9 Criteria version history

Nordic Ecolabelling adopted generation 7.0 of the criteria for Printing companies and printed matter on XX. The criteria are valid until XX.

10 How to apply and regulations for the Nordic Ecolabelling

Application and costs

For information about the application process and fees for this product group, please refer to the respective national website. For contact information see the beginning of this document.

The application consists of an application form/web form and documentation showing that the requirements are fulfilled.

Licence validity

The Nordic Swan Ecolabel licence is valid providing the criteria are fulfilled and until the criteria expire. The validity period of the criteria may be prolonged or adjusted, in which case the licence is automatically prolonged, and the licensee informed.

Revised criteria shall be published at least one year prior to the expiry of the present criteria. The licensee is then offered the opportunity to renew their licence.

Responsibility for Compliance with Applicable Legislation

When applying for the Nordic Swan Ecolabel, the applicant/licensee confirms compliance with all current regulatory requirements related to both the exterior and interior environment in connection with the production and handling of the product(s) covered by the application. Furthermore, the applicant declares that all applicable regulatory requirements within the Nordic region are met for the product(s). Compliance with these regulations is a prerequisite for obtaining a licence.

On-site inspection

In connection with handling of the application, Nordic Ecolabelling normally conduct on-site inspection visit/-s to ensure adherence to the requirements. Scope and timing of on-site inspection is evaluated per product group and adapted to the specific application situation.

Queries

Please contact Nordic Ecolabelling if you have any queries or require further information. See contact info in the beginning of this document. Further information and assistance (such as calculation sheets or electronic application help) is available. Visit the relevant national website for further information.

Nordic Ecolabelling may decide to check whether Printing companies fulfils Nordic Ecolabelling requirements during the licence period. This may involve a site visit, random sampling, or similar test.

The licence may be revoked if it is evident that Printing company does not meet the requirements.

Regulations for the Nordic Ecolabelling of services

To easily identify Nordic Swan Ecolabel services, the licence number and a descriptive sub text shall always accompany the Nordic Swan Ecolabel.

The descriptive sub text for 041 Printing companies, printed matter, envelopes and other converted paper products is as follows:

- For a printing house as a whole: Printing house
- For ecolabelled printed matters produced at an ecolabelled printing house: Printed matter

More information on graphical guidelines, regulations and fees can be found at http://www.nordic-swan-ecolabel.org/regulations

Appendix 1 Chemicals and foils for foil printing and laminates

This declaration is used by suppliers of chemical products, foils for foil printing and laminate used in Nordic Swan Ecolabelled printing companies. The declaration must be completed in the Supply Chain Declaration Portal.

Note that the content of VOC together with item name (product name) and distributor/supplier will be published for printing companies, - either all of them if no confidentiality restriction is chosen and if confidentiality restriction only the companies with special permission.

Please complete the declaration for identification of the material(s)/ chemical(s):

This declaration is based on the knowledge we have at the time of the application, based on tests and/or declarations from raw material manufacturers, bearing in mind that new advances and new knowledge may emerge. Should such new knowledge arise that affects Nordic Ecolabelling's requirements, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.

Nordic Ecolabelling is entitled to seek information on the full chemical composition of the product from the chemical manufacturer/supplier in order, where necessary, to check the content of the product.

Country	Distributor/supplier	Trade name*	Product number, where applicable
Internationally			
Sweden			
Norway			
Iceland			
Finland			
Denmark			

** The trade name may, for example, be a series of inks or some other designation comprising a number of trade names. For example, "Printing ink series xxxx", where xxxx represents a number of variants in the series of printing inks. Information about toner and ink must – in addition to the name of the toner/ink – include details of the machine for which it is used, e.g., Toner xxx for yyy (where yyy is the name of the printing machine).*

- Enclose safety data sheets in accordance with the current statutory requirement in the country of application, e.g., Annex II to REACH (Council Regulation (EC) no. 1907/2006) for all chemical products.

Type of product:

☐ Printing ink and additives:

Printing ink used in offset and flexo printing. Printing ink also includes metallic ink and ink additives that are

☐ Dampening solution additive

mixed into the printing ink. Production aids such as anti-drying agents that are designed to prevent the ink vessel drying out overnight, or spraying powder, are not regarded as ink additives.

- ☐ Toner:

  Toner powder (e.g. used in laser printing, photocopying), dry toner, wet/liquid toner also known as ready-to-use electroInk/liquid electrophotography (LEP). Imaging-oil/-agent, recycle agent, electroInk/primer shall be declared separately.

- ☐ Ink:

  Ink used in digital printing, e.g. Inkjet printing.

- ☐ Varnish
- ☐ Washing agent
- ☐ Laminate applicable for paper/printed paper
- ☐ Chemicals used for coating in manufacturing of paper board/corrugated board:

  Chemical coating is a covering applied to the surface of the paper board/corrugated board such as colour, varnish or a coating to obtain waterproof or antistatic properties.

- ☐ Algicide
- ☐ Adhesive
- ☐ Repro-chemical
- ☐ Foil for foil printing
- ☐ Adhesive used in manufacturing of paper board/corrugated board

Printing method in which the product is used:

- ☐ Sheet fed offset (not envelopes)
- ☐ Heatset rotation
- ☐ Flexographic printing (not envelopes)
- ☐ Coldset rotation (not forms/newspapers)
- ☐ Coldset, newspapers
- ☐ Digital printing/photocopying
- ☐ Coldset, forms
- ☐ Envelope production with flexographic printing

1 General requirements for chemicals

According to Nordic Ecolabelling's overall principles, the Nordic Swan Ecolabel must be a powerful tool that works to phase out substances that are hazardous for the environment and health. Official regulations (classification, labelling, official lists, and regulation) are used to exclude substances and products that are hazardous for the environment and health. As the Nordic Swan Ecolabel is an ecolabel, the requirements in the criteria are more stringent than legislation. This entails that the chemical may be prohibited from Nordic Swan Ecolabelled services and products, even though it is permitted under the authorities' regulations. The precautionary principle is the starting point when substances are suspected of having serious environmental and health impacts.

Requirements in the Nordic Ecolabelling criteria are set e.g., for the classification of chemical products as well as ingoing substances in the chemical product.

Ingoing substances and impurities are defined below, unless stated otherwise in the requirements.

- Ingoing substances: All substances in the chemical product, including additives (e.g., preservatives and stabilisers) in the raw materials. Substances known to be released from ingoing substances (e.g., formaldehyde and arylamine) are also regarded as ingoing substances.
- Impurities: Residuals, pollutants, contaminants etc. from production, including production of raw materials that remain in the chemical product in concentrations less than 1000 ppm (0.100 w-%, 1000 mg/kg).

Examples of impurities are residues of the following: residues or reagents including residues of monomers, catalysts, by-products, scavengers, and detergents for production equipment and carry-over from other or previous production lines.

Background to the requirement

The definition of ingoing substances in the production chemicals is new in generation 6 of the criteria. The definition of ingoing substances is included to explain what is meant by ingoing substances and impurities. The definition is used in all Nordic Ecolabelling's criteria where there is a requirement for use of chemicals.

For ingoing substances, there is zero tolerance e.g., in the requirement for prohibited substances. However, impurities up to 1000 ppm are allowed. Regarding impurities, Nordic Ecolabelling conducted a general evaluation of the limit value for impurities. The conclusion was that the limit value can be raised from 100 ppm to 1000 ppm for specific product groups where the requirement is on a chemical product used in the production of a Nordic Ecolabelled solid article such as printed matter. The definition of impurities, concentration less than 1000 ppm, corresponds to the definition in REACH/CLP.

1.1 Classification of production chemicals

Production chemicals classified according to the risk phrases indicated in the table below must not be used in the production of printed matter.

Foil for foil printing and Laminate applicable for printed matter only must meet the areas for declaration "Prohibited substances", "Residues of heavy metals", Azo dyes" and "laminates used to enhance and protect the printed matter".

Is the production chemical classified in accordance with the table below?

Yes ☐ No ☐ If Yes, please specify:

Classification under CLP Regulation (EC) No 1272/2008		
Classification	**Hazard Class and Category Code**	**Hazard statement**
Hazardous to the aquatic environment	Aquatic Acute 1 Aquatic Chronic 1-4	H400 H410, H411, H412, H413
Hazardous to the ozone layer	Ozone	H420
Acute toxicity	Acute Tox. 1 or 2 Acute Tox. 3	H330, H310, H300 H331, H301, H311
Specific target organ toxicity	STOT SE 1 STOT RE 1	H370 H372
Respiratory or skin sensitisation	Resp. Sens. 1 Skin Sens 1	H334 H317
Carcinogenic*	Carc. 1A or1B Carc. 2	H350 H351
Germ cell mutagenicity*	Muta. 1A or 1B Muta. 2	H340 H341
Reproductive toxicity*	Repr. 1A or 1B Repr. 2 Lact	H360 H361 H362

** The classifications concern all classification variants. For example, H350 also covers classification H350i.*

Note that the manufacturer of the chemical product is responsible for its' classification.

Exemptions:

- Repro chemicals (repro) classified as Aquatic Chronic 2-3 H411 or H412 or Skin Sens 1 H317.
- UV-curing printing inks, UV inkjet inks, UV inkjet varnishes, UV varnishes, UV adhesives and UV primers classified as: Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412 or H413 or Resp. Sens 1 H334 or Skin Sens 1 H317.
- Production chemicals classified as Repr. 1, H360 and/or Repr. 2, H361 and/or STOT RE 1 H372 are exempted if the classification is due to the presence of photo initiators and/or acrylates.

The exemption only applies if the classified production chemical is used/designed to be used in a closed printing system such as digital printing, where there is no direct contact/exposure between worker and the chemical. Traditional UV offset where the UV ink is transferred from open cans/pumped to an ink tray/application roller is considered an open system.

- Production chemicals classified as Skin Sens 1, H317 or Resp. Sens 1, H334 are exempted if used in closed printing systems*

- Flexographic printing ink classified as Skin Sens 1, H317 if the classification is due to the presence of isothiazolinones.
- Algicides classified as Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412, H413 or Resp. Sens 1 H334 or Skin Sens 1 H317.
- Dampening solution additives classified as Resp. Sens 1 H334 or Skin Sens 1 H317 or classified as Aquatic Chronic 2-3 H411 or H412 due to the presence of isothiazolinones or Iodopropynyl Butyl Carbamate (IPBC), if diluted according to the manufacturer's recommended dosage making the solution not classifiable.
- 2-component adhesives classified as Resp. Sens 1 H334 or Skin Sens 1 H317.

** Closed systems include: washing agents, algicides and ink, toner, varnishes used in digital printing.*

- Enclose safety data sheets in accordance with the current statutory requirement in the country of application, e.g., Annex II to REACH (Council Regulation (EC) no. 1907/2006) for all chemical products.

Background to the requirement

The requirement for classification of production chemicals has been updated in relation to CLP and Nordic Ecolabelling's general chemical requirements. This means that several exemptions and trivial limits for specific chemical have been removed in generation 6 of the criteria:

- Washing agents, including washing agents used for ordinary cleaning of printing machines, classified as Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412 or H413, are no longer exempted from the 5% trivial limit (O10), as there are alternatives that are not classified as hazardous to the aquatic environment.
- Cobalt complex dyes in foils for foil printing and waterless offset are no longer exempted from the requirement, as there are alternatives to cobalt as a drying agent.
- According to the ECHA, toluene (CAS No. 108-88-3) has a harmonized classification of H225, H315, H304, H336, H373 and H361d, and is restricted under REACH[55]. Due to the seriousness of the hazard involved, the quantities of toluene involved and its indispensable use in the rotogravure process, it is considered relevant to remove the exemption for toluene-based washing agents and printing ink for gravure printing from the requirement.
- Chemicals containing chrome trioxide and copper sulphate to produce gravure printing cylinders, are also no longer exempted from the requirement. This means that it is not possible to use rotogravure printing under the new generation 6 of the criteria.
- UV-curing inkjet inks are no longer exempted as a whole from the requirement.

After the consultation exemptions has been made for production chemicals classified as Repr. 1, H360 and/or Repr. 2, H361 and/or STOT RE 1 H372 due to the presence of photo initiators and/or acrylates. Photo initiators are compounds that produce radicals when exposed to UV light. These then react with monomers and / or oligomers to initiate polymer

[55] https://echa.europa.eu/en/substances-restricted-under-reach, visited August 2019.

chain growth[56]. They are essential ingredients of all "modern" UV-curable adhesives, inks and coatings, and the industry has not yet found substances that can replace them. However, the exemption only applies if the classified production chemical is used in a closed printing system such as digital printing, where there is no direct contact/exposure to the chemical. This means that the exemption does not apply to classified production chemicals used in open printing systems such as traditional UV offset.

After the consultation exemptions has been made for production chemicals classified as Skin Sens 1, H317 if the classification is due to the presence of isothiazolinones or Iodopropynyl Butyl Carbamate (IPBC). Isothiazolinones are commonly used biocides in a variety of printing-related products. Currently various isothiazolones (MIT – CAS No. 2682-20-4, CMIT/MIT – CAS No. 55965-84-9, BIT – CAS No. 2634-33-5, MBIT – CAS No. 2527-66-4, OIT – CAS No. 26530- 20-1 are used in inkjet printing inks and in pre-press (repro for form production) applications. Several isothiazolones are currently in the review process for CLP harmonised classification as well as PT6 of the BPR and these reviews are anticipated to result in inkjet and other printing products being classified as H317 after the review process. There are currently few alternatives to isothiazolones for these aqueous printing products. See requirement for prohibited substances for limit of isothiazolones in the chemical product.

A later introduced exemption has been made for production chemicals classified as Skin Sens 1, H317 or Resp. Sens 1, H334 if used in closed printing systems (washing agents, algicides and ink, toner, varnishes used in digital printing). This exemption also includes the former exemption for isothiazolinones and IPBC).

IPBC is a fungicide primarily used in printing inks/toners as the sole fungicide to give increased and longer lasting protection against fungal growth. IPBC has become more common to use as an alternative to isothiazolones and classified as H317. See requirement for prohibited substances for limit of IPBC in the chemical product.

An exemption has been made for dampening solution additives classified as environmental hazards (H411 or H412) due to the presence of isothiazolinones or Iodopropynyl Butyl Carbamate (IPBC). Dampening solution additives typically contain biocides which in addition to being allergenic are often also classified as environmental hazards (H411 or H412). These biocides are essential to the performance of these products and cannot readily be substituted. If the solution used is diluted to the point at which it would not be classifiable, had it been encompassed by the rules, there is very little risk of an allergy hazard at the printing company. Therefore, the focus on the manufactures recommended dosage.

Four exemptions remain unchanged compared to generation 5 of the criteria, including UV-curing printing inks classified as Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412 or H413 or Resp. Sens 1 H334 or Skin Sens 1 H317. The reason for this is to support the development of UV-curing inks not classified or containing carcinogenic, mutagenic and reprotoxic (CRM) classified substances.

The requirement to prohibit the use of H304 classified chemicals has been removed in order to simplify the requirement compared to possible new exemptions.

56 https://www.hubergroup.de/fileadmin/Redaktion/Editorial_Content/Documents/INKFORMATION/INKFORMATION_5_en.pdf, visited August 2019.

Mineral oils and distillates with the H304 classification are used as solvents and help to optimise the behaviour of the ink for different printing techniques such as heatset, coldset, indigo and specific ink-types such as wet toner and electro ink.

The risk of the H304 hazard (may be fatal if swallowed and enters airways) means it generally presents no risk unless it is actively inhaled or ingested by workers handling these printing chemicals.

1.2 Prohibited substances

The following substances must not be ingoing substances in chemical products used in the production of printed matter:

Does the production chemical contain the following ingoing substances?

Yes ☐ No ☐ If Yes, please specify:

_____

- EDTA (Ethylenediaminetetraacetic acid) and its salts

An exemption is made for EDTA and its salts if the proportion of EDTA and its salts does not exceed 1% (percentage by weight) in the chemical product.

- Sodium and calcium hypochlorite
- Perfluorinated and polyfluorinated alkylated compounds
- Halogenated organic substances
    - Isothiazolinones may be present in the chemical product at a total level of not more than 500 ppm (0.05% by weight)****.
    - Iodopropynyl Butyl Carbamate (IPBC) may be present in the chemical product at a total level of not more than 2000 ppm (0.2% by weight).
    - Acid products (pH<6) may contain bronopol if the content of bronopol in the final product does not exceed 2500 ppm (0,25% by weight).
    - Halogenated pigments may be used provided the total extractable level of polychlorinated biphenyls (PCB's) does not exceed 50 ppm.
    - Chlorinated phenols may be present in sublimation dye inks if the following threshold values are fulfilled (mg/kg)***:
        - Pentachlorophenol (PCP): 0,05
        - Terachlorophenols (TeCP):0,05
        - Trichlorophenols (TrCP): 0,2
        - Dichlorophenols (DCP): 0,5
        - Monochorlphenols (MCP): 0,5
- Isothiazolinones
    - The chemical product must not contain more than 500 ppm (0.05% by weight) isothiazolinones.
- APEO – alkylphenol ethoxylates and alkylphenol derivatives (substances that release alkylphenols on degradation)

- BHT - butylhydroxytoluene
    - An exemption is made for BHT in UV-curing printing inks, UV inkjet inks, UV inkjet varnishes, UV varnishes and UV primers if the proportion of BHT does not exceed 0.3% (3000 ppm) in the chemical product. If BHT is given a harmonized classification which means that the substance does not meet the requirements of the criteria document, the exception will be waived.
    - An exemption is made for BHT in offset printing inks if the proportion of BHT does not exceed 0.2% (2000 ppm) in the chemical product. If BHT is given a harmonized classification which means that the substance does not meet the requirements of the criteria document, the exception will be waived.
- Substances on the Candidate List*
    - An exemption is made for Diphenyl(2,4,6-trimethylbenzoyl) phosphine oxide (TPO)" with CAS 75980-60-8.
- CMR substances - Carcinogenic, Germ cell mutagenicity, Reproductive toxicity category 1 A or B or category 2
    - An exemption is made for Trimethylolpropane (TMP, CAS no. 77-99-6) classified as Repr. 2, H361.
    - An exemption is made for acrylates, classified as Repr. 1, H360 and/or photoinitiators classified as Repr. 2, H361. (The exemption only applies if the classified production chemical is used/designed to be used in a closed printing system such as digital printing, where there is no direct contact/exposure between worker and the chemical. Traditional UV offset where the UV ink is transferred from open cans to an ink tray/application roller is considered an open system).
    - An exemption is made for methylene diphenyl diisocyanate (MDI) in polyurethane glue (PUR) classified as Carc 2, H351.
    - An exemption is made for Trimethylolpropane triacrylate (TMPTA) with CAS 15625-89-5 classified as Carc 2, H351.
- Substances that have been judged in the EU to be PBT (Persistent, Bioaccumulative and Toxic) or vPvB (very Persistent and very Bioaccumulative)**
- Substances on the EU member state initiative ”Endocrine Disruptor Lists”, List I, List II and List III. See links below:
    - IPBC (3-iodo-2-propynyl butylcarbamate, CAS No. 55406-53-6) is exempted up to 2000 ppm.

List I: https://edlists.org/the-ed-lists/list-i-substances-identified-as-endocrine-disruptors-by-the-eu

List II: https://edlists.org/the-ed-lists/list-ii-substances-under-eu-investigation-endocrine-disruption

List III: https://edlists.org/the-ed-lists/list-iii-substances-identified-as-endocrine-disruptors-by-participating-national-authorities

Regarding List I, II and III: a substance which is transferred to one of the corresponding sublists called “Substances no longer on list”, and no longer appears on any of List I-III, is no longer excluded. The exception is those substances on sublist II which were evaluated under a regulation or directive which doesn’t have provisions for identifying EDs (e.g., the Cosmetics Regulation, etc.). For those substances, ED properties may still have been

confirmed or suspected. Nordic Ecolabelling will evaluate the circumstances case-by-case, based on the background information indicated on sublist II.

** The Candidate List can be found on the ECHA website: http://echa.europa.eu/candidate-list-table*
*** PBT and vPvB in accordance with the criteria in Annex XIII of REACH.*

**** Documentation: valid Oeco Tex - Eco Passport certificate*

***** The 500 ppm limit does not apply to production chemicals classified as:*

a) *Repr. 1, H360 and/or Repr. 2, H361 and/or STOT RE1 H372 due to the presence of photoinitiators designed to be used in closed printing systems such as digital printing and*

b) *Skin Sens 1, H317 and/or Resp. Sens. 1, H334 due to the presence of isothiazoliones, designed to be used in closed printing systems such as digital printing.*

Background to the requirement

The requirement is unchanged compared to generation 6.

The exemption for EDTA and its salts has been made more stringent from a maximum 5% to 1% (percentage by weight) in the chemical product. The 1% limit is based on data for approved chemicals for form production in generation 5 of the criteria. EDTA are complexing agents which are suspected to be capable of mobilising heavy metals in certain environments since they can be complexing agents for these.

Halogenated organic substances have been added to the requirement. Halogenated organic substances may be used in printing inks, paints, coatings, adhesives, or pigments. Halogenated organic substances are volatile organic compounds (VOCs) which are undesirable, since they are typically harmful to health, often non-readily degradable in an aquatic environment and can have negative effects on the earth’s ozone layer. In addition to this, some halogenated organic substances have been classified as carcinogenic.

After the consultation, a limit has been set for the content of isothiazolinones and IPBC in the chemical product. Isothiazolinones may only be present in the chemical product at a total level of not more than 500 ppm (0.05% by weight). The limit is based on data from chemical manufacturers. The 500 ppm limit does not apply to production chemicals classified as Skin Sens 1, H317 and/or Resp. Sens. 1, H334 due to the presence of isothiazoliones, designed to be used in closed printing systems.

When it comes to IPBC, the limit of 2000 ppm (0,2% by weight) is harmonized with requirements in criteria for Nordic Swan Ecolabelled chemical building products. Halogenated pigments may be used provided the total extractable level of polychlorinated biphenyls (PCB's) does not exceed 50 ppm. Bronopol is known to release formaldehyde under certain conditions. In acidic conditions the releasing is negligible and bronopol is therefore allowed in acidic products (pH < 6) if the content of bronopol in the final product does not exceed 2500 ppm.

Butylhydroxytoluene (BHT) has been added to the requirement as BHT is suspected of being a hormonal disruptor, even though it is not on the EU list and is on the guidance list for

self-classification, including CMR properties and harm to the environment[57]. Nordic Ecolabelling is aware of that BHT is used UV-curing chemicals in concentrations above 1000 ppm.

Therefore, BHT in UV-curing printing inks, UV inkjet inks, UV inkjet varnishes, UV varnishes and UV primers can be used if the proportion of BHT does not exceed 0.3% (3000 ppm) in the chemical product. The limit is based on data from chemical manufacturers.

CMR substances are partly restricted via the requirement for classification of 1.1 chemical production chemicals and via the Candidate list, but CMR substances are nonetheless included as a separate item on the list of prohibited substances, in order to make it very clear that they are prohibited.

After the consultation exemptions has been made for Trimethylolpropane (TMP, CAS no. 77-99-6) classified as Repr. 2, H361. Titanium dioxide is a white pigment used in many different types of printing inks, toners, and inks. Trimethylolpropane (TMP) is used to coat titanium dioxide to make the titanium dioxide particles easier to disperse. There are yet no substances that can replace it.

After the consultation exemptions has also been made for acrylates and photo initiators classified as Repr. 1, H360 and/or Repr. 2, H361. UV-curable inks are very reactive materials and are typically classified as Repr. 1 and/or Repr. 2, due to acylates and photo initiators. Photo initiators are commonly used in "modern" UV-curable inks, and the industry has not yet found substances that can replace it. However, the exemption only applies if the classified production chemical is used/designed to be used in a closed printing system such as digital printing, where there is no direct contact/exposure between worker and chemical. This means that the exemption does not apply to classified production chemicals used in open printing systems such as UV offset, PUR or polyurethane glue is supplied as a single or double component glue and is a variant of hot melt glue which hardens permanently by means of a chemical reaction with, inter alia, isocyanates. An exemption is made for methylene diphenyl diisocyanate (MDI) in polyurethane glue (PUR) classified as Carc 2, H351 as there is no substitute for isocyanates in PUR adhesives.

UV-curing inkjet inks, cobalt complex dyes in foils for foil printing and waterless offset, toluene-based washing agents and printing ink for gravure printing and, chemicals containing chrome trioxide to produce gravure printing cylinders are no longer exempted from the requirement.

Endocrine disruptors (EDs) are chemicals that alters the functioning of the endocrine (hormone) system and consequently causes adverse health effects. The hormone system regulates many vital processes in living organisms and when normal signalling is disturbed, adverse effects may arise.

Special concern is raised in connection to effects on reproduction and development and about possible links to increases in public health diseases. While effects in wildlife populations have been confirmed, evidence is pointing to effects also in humans.

Potential endocrine disruptors have properties that might be expected to lead to endocrine disruption.

[57] https://www.foodpackagingforum.org/food-packaging-health/phthalates, visted October 2019.

Currently, endocrine disrupting properties is not a hazard that is classified according to the CLP regulation. Also, harmonised scientific criteria for identification of EDs is missing across different pieces of EU legislation.

Few EDs have been identified in the legislation so far, compared to the numbers of potential EDs. Under these circumstances, Nordic Ecolabelling excludes identified and potential EDs listed by the EU member state initiative “Endocrine Disruptor Lists” at www.edlists.org. In the criteria for printing companies and printed matter, substance listed on any of List I and/or III is excluded. Substances which are moved from List III to the sub list “Substances no longer on list” are exempted. The printing companies are responsible for keeping track of updates on the lists, for their labelled products to comply with the requirement throughout the validity of the licences. Nordic Ecolabelling acknowledges the challenges associated with new substances being introduced on List III. We will evaluate the circumstances and possibly decide on a transition period on a case-by-case basis.

1.3 Volatile organic compounds VOC

The printing company is awarded points depending on the purchased quantity of chemicals consisting of or containing volatile organic compounds (VOC).

Organic compounds are defined in accordance with European Commission´s Directive 2010/775/EC: “volatile organic compound’ means any organic compound as well as the fraction of creosote, having at 293,15 K a vapour pressure of 0,01 kPa (at 20ºC) or more, or having a corresponding volatility under the conditions of use”. This is verified from the safety/technical data sheet from the manufacturer.

If a chemical only partially contains VOC, the weight percentage of the VOC components is indicated as the VOC content. If a washing agent for example contains two VOC components, A and B, and the rest is water: 20% A and 45% B, the VOC content will be 65%.

In the case of wet toner, the manufacturer or supplier must, to simplify the VOC calculation, declare two versions of the same toner using fixed values of 15% and 30%. The lower value (15%) is applied to digital printing machines with condensation followed by recycling.

The higher value (30%) is applied when the equivalent recycling technique is missing. The following should be stated when declaring the wet toner series or a single wet toner e.g.: "Wet toner trade name CMYK version i.ii, Light Magenta, Light Cyan for series X, Y and Z". The word "series" in this example refers to the make of the printing press.

In the case of heatset inks, the manufacturer or supplier must as standard assume that the heatset ink contains 0% VOCs due to heating kiln treatment at the printing company or external incineration under controlled conditions.

In the case of other production chemicals, information verified from safety data sheets must be used (highest value if a range is shown).

Does the chemical contain VOC? Yes ☐ No ☐

If Yes, specify percentage by weight of VOC in the chemical: _____

2 Specific requirements for printing inks, toners, inks, varnishes, foil for foil printing and laminates

2.1 Residues of heavy metals

Dyes or pigments based on antimony, arsenic, barium, cadmium, chromium VI, cobalt, copper, lead, mercury, nickel, or selenium shall not be intentionally used in printing inks, toners, inks, varnishes, foils for foil printing and laminates applicable to printed matter.

Copper in phthalocyanine pigment is exempted from this requirement.

The levels of ionic impurities in the dyes or pigments used must not exceed the following limits:

- Antimony: 50 ppm
- Arsenic: 50 ppm
- Barium: 100 ppm
- Cadmium: 20 ppm
- Chromium VI: 100 ppm
- Cobalt: 500 ppm
- Copper: 100 ppm
- Lead: 100 ppm
- Mercury: 4 ppm
- Nickel: 100 ppm
- Selenium: 20 ppm

Do the printing inks, toners, inks, varnishes, foils for foil printing or laminates applicable to printed matter comply with the requirement?

Yes ☐ No ☐ If No, please specify:

_____

Background to the requirement

The requirement on residues of heavy metals has been adjusted and harmonised with the EU Ecolabel's requirement for metal-based pigments and dyes, including ionic impurities, in the criteria for printed matter[58]. The requirement is absolute – dyes or pigment shall not be based on these metals. There is no limit value for the weight of the relevant metal compound when the requirement is applied.

Furthermore, the list of ionic impurities that are restricted in the dyes has been expanded by the addition of 7 new metals (antimony, arsenic, barium, cobalt, copper, nickel, and selenium).

[58] https://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html, visited June 2019.

The limit values for impurities for barium, chromium VI, copper, lead, and nickel (100 ppm) are identical to the EU ecolabel, while the limit values for impurities in the remaining heavy metals are aligned with Nordic Swan Ecolabels criteria (chemical module) for paper products.

The requirement with respect to ionic impurities in dye products is intended to reduce the presence of the listed metals to those levels of impurity that are considered to be the lowest attainable. The limits are set to make it impossible to add these metals intentionally to dye products.

2.2 Dye products, Amines

Azo dyes, which by reductive cleavage of one or more azo groups may release one or more of the aromatic amines listed in Regulation (EC) No. 1907/2006 Annex XVII, Appendix 8, must not be used.

Do the printing inks, toners, inks, varnishes, foils for foil printing or laminates applicable to printed matter comply with the requirement?

Yes ☐ No ☐ If No, please specify:

_____

Background to the requirement

The requirement has been adjusted to clarify that it concerns azo dyes that by reductive cleavage of one or more azo groups may release one or more of the aromatic amines listed in Regulation (EC) No. 1907/2006 Annex XVII, Appendix 8.

Azo dyes that liberate the aforementioned aromatic amines are no longer offered by dye manufacturers in Europe. However, the same legal requirements regarding azo dyes do not necessarily exist outside the EU and it is therefore important for countries outside the EU to be aware of this.

2.3 Laminates used to enhance and protect the printed paper matter

Laminates/film lamination used to enhance and protect the printed matter must not contain:

- PVC
- Coatings which can have an antiviral-/antibacterial effect

Silver compounds, nano silver and nano gold are also considered antibacterial/-viral substances.

Does the laminate used to enhance and protect printed matter contain PVC or coatings which can have an antiviral-/antibacterial effect?

Yes ☐ No ☐ If Yes, please specify:

_____

Background to the requirement

The requirement has been amended so it is no longer possible to use laminates/film containing PVC to enhance printed paper matter in generation 6 of the criteria. Alternatives

such as laminates made of polyethene and/or polypropylene are available on the market and used by the industry.

For more information on the reason behind the exclusion of PVC, see also O6.

Film laminates offer much more protection than liquid coatings. Plastic films used in lamination act as a barrier to the penetration of water in the recycling process causing low re-pulpability. This leads to loss of fibres and hence low yield of the recycling process.

Due to the Corona virus situation in the world, new "COVID-safe" laminates/film are put on the market. The products are often coated with silver/gold nano compounds or other antibacterial agents to achieve an antibacterial effect. Nordic Ecolabelling believes it is unnecessary to use such coatings due to their damaging impacts on health and environment.

2.4 Recyclability and deinkability - Printing inks, toners, inks, varnishes and adhesives

This requirement only applies to printing inks, toners, inks, varnishes, and adhesives designed and intended to use on paper/paper-based substrates.

Printing inks, -toners, -ink and varnishes:

Oil/solvent based (hydrophobic) printing inks, -toners, -inks and varnishes (e.g., standard offset inks, inks for rotogravure and dry toners) are exempted from this requirement.

Water based (hydrophilic) and crosslinked printing inks, -wet toners, -inks and -varnishes (e.g., flexo, inkjet, liquid toner, UV curable, Liquid electrophotography (LEP) must:

- be tested in accordance with INGEDE’s test method no. 11 and obtain a result of above 0 points in accordance with EPRC's points system for all tested paper types. This corresponds to "Tolerable deinkability" or
- prove repulpable according to PTS method PTS-RH 021/97 or Aticelca 501:2019 evaluation system or
- prove repulpable without any reservations according to a deinking mill or paper recycling plant/mill evaluation system.

Adhesives:

Water based adhesives, non-soluble hot melt adhesives and non-redispersible hot melt adhesives are exempted from this requirement.

Adhesives must:

- be tested in accordance with INGEDE’s test method no. 12 and obtain a result of above 0 points in accordance with EPRC's points system for all tested paper types. This corresponds to "Tolerable deinkability/removability" or,
- prove repulpable without any reservations according to a deinking mill or paper recycling plant/mill evaluation system.

The requirements concerning test laboratories and test instructions, INGEDE testing are stated in section 3 below.

- Water based (hydrophilic) and crosslinked printing inks printing inks, wet toners, inks, and varnishes: The chemical manufacturer/supplier shall provide:

  - the test result of INGEDE test method no. 11 and the point score in accordance with EPRC's points system for all tested paper types or

  - the result(s) of test report(s) proving repulpability according to the PTS method PTS-RH: 021 or ATICELCA 501:2019 evaluation system or

  - declaration from a deinking mill or paper recycling plant/mill proving repulpability without any reservations according to their evaluation system.

- Adhesives: The chemical manufacturer/supplier shall provide the test result of INGEDE test method no. 12 and the point score in accordance with EPRC's points system for all tested paper types or

- Adhesives: declaration from a deinking mill or paper recycling plant/mill proving repulpability without any reservations according to their evaluation system.

Background to the requirement

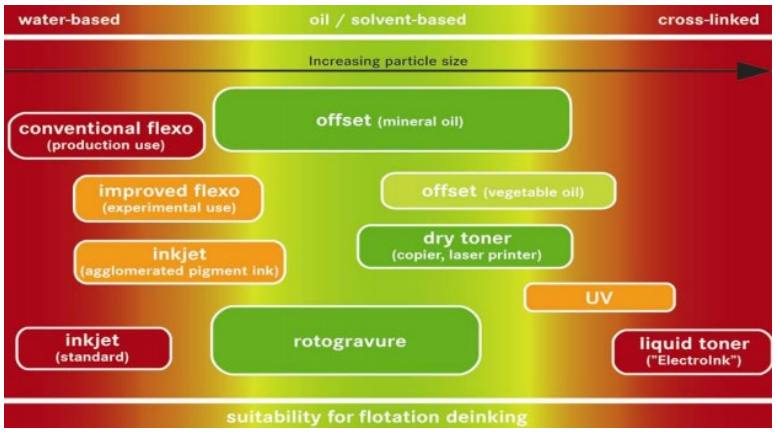
The requirement for recyclability of printing inks, toners, inks, varnishes, and adhesives has been adjusted and amended regarding deinkability testing according to INGEDE[59] and repulpability according to PTC metod PTS-RH 021/97[60] or Aticelca 501:2019[61] evaluation system. In line with the LCA findings, the end-of-life stage of printed matter has notable life-cycle impacts. From a circular economy point of view, repulpability, deinkability and removal of adhesives are crucial for paper recycling.

The deinkability test performed according to INGEDE Method 11 for inks, toners and varnishes simulates pulping and flotation in an alkaline condition on a laboratory scale. The EPRC deinkability assessment is applied to printed graphic products on originally white paper and converts results from INGEDE Method 11 (test method) into the EPRC Deinkability Scorecard[62]. The deinkability of printing inks is proven if the printed matter on which they are used has a positive score according to the EPRC Deinkability Scorecard. However, there are different levels of deinkability which reflect the whiteness of the paper substrate achieved. The Scorecard ranges from -100 to +100, were;

- Good deinkability corresponds to 71-100 Points
- Fair deinkability corresponds to 51-70 Points
- Tolerable deinkability corresponds to 0-50 Points
- The figure below uses colours to reflect the deinkability of different printing technologies. Red colours correspond to a score of below 0 points, (poor deinkability) while green colours correspond to a score of 70-100 (good deinkability).

[59] www.ingede.org
[60] PTS method PTS-RH:021/97 (2012). Identification of the recyclability of paper and board packages and of graphic print products, PTS Heidenau. 2019.
[61] https://www.artigiancarta.net/en/index.php, visited 2020.
[62] ERPC. (2017). Assessment of Printed Product Recyclability.

Figure 1: Deinkability of printed products by printing technology. (INGEDE)



Given that deinking by flotation is mostly efficient in case of hydrophobic printing inks (e.g., standard offset inks, inks for rotogravure and dry toners) these technologies often achieve a positive assessment of their deinkability[63] (they are listed in the Annex of the "Assessment of Printed Product Recyclability, Deinkability Score"[64] as deinkable). Nordic Ecolabelling therefore considered these types of technologies (standard offset inks, inks for rotogravure and dry toners) compliant with the requirement.

However, water based (hydrophilic) and crosslinked printing inks, -toners, -inks and -varnishes i.e., thermochromic[65] along with wet toner and flexographic prints result difficult to be deinked by means of the flotation process. Cross-linked ink particles (e.g., UV, liquid electrophotography (LEP) also known as HP indigo toner, mineral-free oils and landa ink) are often too large for the flotation[66]. UV-curing, most current commercially used inkjet inks are not deinkable. UV printing inks are increasingly being used in flexographic printing where the curing is by UV[67], leading to cross-linking and negative consequences for deinking.

From a circular economy point of view repulpability is very important and therefore the water based (hydrophilic) and crosslinked printing inks, -toners, -inks and -varnishes may alternative (to deinking test) prove repulpable according to PTC method PTS-RH 021/97 or Aticelca 501:2019 evaluation system. Alternative, prove repulpable according to a deinking mill or paper recycling plant/mill evaluation system. Most modern deinking/recycling mills have multiple loops, that include dispersers and bleaching steps and may therefore well be able to handle these types of inks and varnishes.

The PTS-Method PTS-RH: 021/97 and the ATICELCA 501:2019 evaluation system was developed to assess the recyclability of paper and board packaging.

Removal of adhesives is crucial for paper recycling. Adhesives might create stickies that causes problems in paper processing and final paper properties. INGEDE method 12 is the only method currently suitable for making quantitative statements about the behaviour of

[63] Faul, AM. 2010, Quality requirements in graphic paper recycling, Cellulose Chemistry and Technology 44 (10), pp.451-460.
[64] https://www.paperforrecycling.eu/publications/, visited October 2020.
[65] Vukoje, M.,Jamnicki, S. ,Rožić, M. 2016. Nord.Pulp Pap. Res. J., 31, 692.
[66] Alex Fischer, INGENDE: presentation at the 71st Annual Technical Conference Minneapolis, MN 2019.
[67] Sardjeva R and, Koeva E. (2015): Digital printing technologies and possibilities for recycling of printed papers. International Circular of Graphic Education and Research, No. 8, 2015.

adhesive films in the paper recycling process. However, INGEDE method 12 is not suitable for water-based adhesives. Due to the lack of a standardised measurement method, water-based adhesives are exempted from the requirement.

Also, non-soluble hot melt adhesives and non-redispersible hot melt adhesives are exempted from this requirement due to their good deinkability. Thet are listed in the Annex of the “Assessment of Printed Product Recyclability, Scorecard for the Removability of Adhesive Applications"[68], and therefore considered compliant with the requirement.

All other types of adhesives such as pressure sensitive adhesives (PVAs) must

- be tested in accordance with INGEDE method 12 and prove a positive removability scores according to EPRC Adhesive Removal Scorecard or
- a declaration from a deinking mill or paper recycling plant/mill proving repulpability without any reservations according to their evaluation system.

As for printing ink and varnishes, modern deinking/recycling mills have multiple loops and may therefore well be able to handle these types of adhesives.

The test results/declaration may include a specific series of ink toners, -inks, -varnishes and adhesives (e.g., different colours) if the basic chemical property is the same.

3 Analyses and test methods

Testing of quality specifications must be performed by laboratories, which are accredited to the current standard and fulfil the general requirements in the standard EN ISO/IEC 17025 or have official GLP status. A non-accredited laboratory may perform tests if the laboratory has applied for accreditation according to the current testing method, but has not yet been granted approval, or if accreditation is not available for the technical specification or proposed standard. In such cases, the laboratory must prove that it is an independent, competent laboratory.

The chemical manufacturer's analysis laboratory/test procedure may be approved for analysis and testing if:

- Sampling and analysis are monitored by the authorities; or
- The manufacturer's quality assurance system covers analyses and sampling and is certified to ISO 9001; or
- The manufacturer can demonstrate agreement between a first-time test conducted at the manufacturer's own laboratory, and testing carried out in parallel at an independent test institute, and the manufacturer takes samples in accordance with a fixed sampling schedule.

3.1 Test methods for deinkability and recyclability

Printing inks, -toners, -inks, varnishes, and adhesives

DEINKABILITY:

Water based (hydrophilic) and crosslinked printing inks, -wet toners, -inks and -varnishes (e.g., flexo, inkjet, liquid toner, UV curable, Liquid electrophotography (LEP) also known as

[68] https://www.paperforrecycling.eu/publications/, visited October 2020

HP Indigo) must be tested in accordance with INGEDE’s test method no. 11, and obtain a result of above 0 points in accordance with ERPC's points system for all tested paper types. This corresponds to "Tolerable deinkability".

Testing must be performed on two types of paper: uncoated and coated paper. If a type of printing ink is only sold for one or two specific types of paper, it is sufficient to only test the paper type(s) in question.

Adhesives must be tested in accordance with INGEDE’s test method no. 12 and obtain a result of above 0 points in accordance with ERPC's points system for all tested paper types. This corresponds to "Tolerable" removability.

Water based adhesives, non-soluble hot melt adhesives and non-redispersible hot melt adhesives are not to be tested (exempted from this requirement).

Testing must be performed on a type of printed matter that is representative of the adhesive in question.

REPULPABILITY:

Water based (hydrophilic) and crosslinked printing inks, wet toners, -inks and -varnishes (e.g., flexo, inkjet, liquid toner, UV curable, liquid electrophotography (LEP) must prove repulpable according to PTC method PTS-RH 021/97 or Aticelca 501:2019 evaluation system.

Testing must be performed on two types of paper: uncoated and coated paper. It must be stated if the paper is suitable for graphic- or packaging grade.

The test results/declaration may include a specific series of ink toners, -inks, -varnishes and adhesives (e.g., different colours) if the basic chemical property is the same.

Signature

We declare that the requirements have been met and that the information provided is correct. In the event of any change to the composition of the product, that impacts the product's fulfilment of the requirements, a new declaration of fulfilment of the requirements is to be submitted to Nordic Ecolabelling.

We understand that Nordic Ecolabelling will not be responsible for any data that is incorrectly recorded in the Nordic print database as a result of our failure to provide correct information:

Company name:	Date:
Address:	
Telephone:	E-mail:
Signature:	Name in block letters:

Please note that the signatory company will appear in Nordic Ecolabelling Portal unless otherwise stated under distributor/supplier at the top of the form.

Appendix 2 Substrates other than paper

This declaration is used by manufactures/suppliers of **substrates other than paper** used in Nordic Swan Ecolabelled printing companies. The declaration must be completed in the Supply Chain Declaration Portal.

Note that the item name (product name) and distributor/supplier will be published for printing companies, - either all of them if no confidentiality restriction is chosen and if confidentiality restriction only the companies with special permission.

Definition of substrates other than paper:

Substrates other than paper are often divided into **flexible and non-flexible rigid substrates**.

Flexible substrates are thin, pliable materials that can bend, roll, twist, or conform to surfaces without breaking. Common materials are paper, plastic films, laminates, foils, textiles/fabrics and rubber.

Non-flexible, or rigid, substrates are stiff materials that cannot bend or deform without breaking or permanently damaging the material. Common materials are paper-/fibre boards, wood-based panels, boards of plastic (PE, PC, PP and PET), foam boards, metal panels (aluminium) and glass panels.

Complete the declaration for identification of the substrate:

This declaration is based on the knowledge we have at the time of the application, based on declarations from raw material manufacturers or safety data sheet, with reservations for new advances and new knowledge. Should such new knowledge arise that affects Nordic Ecolabelling's requirements, the undersigned is obliged to submit an updated declaration to Nordic Ecolabelling.

Country	Distributor/supplier	Trade name	Product number, where applicable
Internationally			
Sweden			
Norway			
Iceland			
Finland			
Denmark			

- Enclose product data sheet and technical data sheet.

Specify the type of product:

Flexible substrate:

☐ Film/foil

☐ Laminate

☐ Print vinyl

☐ Printing textile/fabrics

☐ Mesh/Frontlit

☐ Other

Non-flexible (rigid) substrate

☐ Board/panel made of wood/paper fibre

☐ Mono substrate made entirely of one type of material

☐ Composite substrate made of several type of materials

☐ Other

If other type of product, specify the product:

---

1 Description of the substrate

Describe type of substrate (e.g., material, composition of materials including any release paper/liner):

1.1 PVC and PVC coating

Apply to both flexible- and non-flexible substrates.

Does the substrate, including release paper/liner, contain PVC or PVC coating?

Yes ☐ No ☐

ī Product information sheet

2 Non-flexible (rigid) substrate

Does the rigid substrate consist of one single material type e.g. only PE, PET, aluminium or paper /wood fibres (cellulose)?

Yes ☐ No ☐

Does the substate contain foam made from polyurethane (PUR)?

Yes ☐ No ☐

ī Product information sheet

3 Fabric/textile and panels/boards made of wood

Applies to substrates of fabric/textile and to substrates of wood-based panels/boards such as chipboard, fibreboard (including MDF and HDF panels), OSB (Oriented Strand Board) and veneer boards. Wood-based also includes corresponding products made of bamboo.

3.1 Substrates of fabrics/textiles

Is the substrate of fabric/textile certified with one of the following label schemes?

- Nordic Swan Ecolabel
- EU ecolabel
- GOTS
- Oeko-Tex 100

Yes ☐ No ☐ If Yes, please specify:

- Valid Nordic Swan Ecolabel, -EU Ecolabel, GOTS or Oeko-Tex 100 certificate or license number and product name.

3.2 Panels/boards made of wood

Applies to wood-based panels/boards such as chipboard, fibreboard (including MDF and HDF panels), OSB (Oriented Strand Board) and veneer boards. Wood-based also includes corresponding products made of bamboo.

Name/tradename and type of panel/board:

Is the panel/board certified with Nordic Swan Ecolabel?

Yes ☐ No ☐

Valid certificate or license number and product name.

Is the panel/board FSC- or PEFC certified?

Yes ☐ No ☐

- Valid FSC/PEFC Chain of Custody certificate from the manufacturer/supplier of FSC or PEFC certified panels/boards or link to valid certificate in FSC/PEFC certificate database.
- Documentation showing that the panels/boards is FSC- or PEFC certified.

Does the FSC- or PEFC certified panel/board contain tree species listed on Nordic Ecolabelling's list of prohibited and restricted tree-species*.

** The list of prohibited and restricted tree species is located on the website: https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/*

Yes ☐ No ☐

Nordic Ecolabelling's list of restricted tree species consists of virgin tree species listed on:

a) CITES (Appendices I, II and III)

b) IUCN red list, categorized as CR, EN and VU

c) Rainforest Foundation Norway´s tree list

d) Siberian larch (originated in forests outside the EU)

Tree species listed on a) CITES (Appendices I, II and III) are not permitted to be used.

Tree species listed on either b), c) or d) may be used if it meets all the following requirements:

- the tree species does not originate from an area/region where it is IUCN red listed, categorized as CR, EN or VU.
- the tree species does not originate from Intact Forest Landscape (IFL), defined in 2000 http://www.intactforests.org/world.map.html.
- the tree species shall originate from FSC or PEFC certified forest/plantation and shall be covered by a valid FSC/PEFC chain of custody certificates documented/controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method. Tree species grown in plantation shall in addition originate from FSC or PEFC certified forest/plantation, established before 1994.

- Declaration from the manufacturer of the panel/board of wood that tree species listed on a-d) are not used in the panel/board made of wood.

If species from the lists b), c) or d) is used:

- The manufacturer of the panel/board of wood are required to present a valid FSC/PEFC Chain of Custody certificate that covers the specific tree species and demonstrate that the tree is controlled as FSC or PEFC 100% through the FSC transfer method or PEFC physical separation method.

- The manufacturer of the panel/board of wood are required to document full traceability back to the forest/certified forest unit thereby demonstrating that;
  - the tree does not originate from an area/region where it is IUCN red listed, categorized as CR, EN or VU;
  - the tree species does not originate from Intact Forest Landscape (IFL), defined in 2000 http://www.intactforests.org/world.webmap.html;
  - For plantations, the applicant/manufacturer/supplier are required to document that the tree species does not originate from FSC or PEFC certified plantations established after 1994.

Signature

We declare that the requirements have been met and that the information provided is correct.

We understand that Nordic Ecolabelling will not be responsible for any data that is incorrectly recorded in the Nordic print database as a result of our failure to provide correct information:

Company name:	Date:
Address:	
Telephone:	E-mail:
Signature:	Name in block letters:

Please note that the signatory company will appear in the Nordic Ecolabelling Portal unless otherwise stated under distributor/supplier at the head of the form.

Appendix 3 Declaration from finishing suppliers (O3)

This declaration is used by chemical finishing suppliers used by Nordic Swan Ecolabelled printing companies. Chemical finishing involves adhesives, varnishing, **foil printing** or laminating, as well as washing agents used for ordinary manual cleaning of print finishing machines used by the chemical finishing service. Suppliers of mechanical finishing services are not encompassed by this requirement. The declaration must be completed in the Supply Chain Declaration Portal.

Note that the item name (name of the chemical finishing supplier) will be published for printing companies, - either all of them if no confidentiality restriction is chosen and if confidentiality restriction only the companies with special permission.

Company name:	
Address:	
Tel:	E-mail:
Name of contact person:	

Chemicals and materials

The finishing supplier must maintain a list of adhesives, varnishing, **foil printing** or laminating, as well as washing agents used for ordinary manual cleaning of print finishing machines used by the chemical finishing service.

All chemicals must be assessed by Nordic Ecolabelling and must fulfil the requirements provided for in Appendix 1 in the Criteria document for printing companies, generation 7.

Addressing with ink is exempted from the requirement. For addressing ink, a safety data sheet complying with the standards set out in Annex II of REACH (Regulation 1907/2006/EC) or other technical data sheet must be enclosed.

List name/trade name of chemical(s): adhesives, varnishing, foil printing or laminating, as well as washing agents used for ordinary manual cleaning of print finishing machines used by the chemical finishing service:

- Demonstrate compliance with the requirement by fulfilling the requirements provided for in Appendix 1 for all chemicals.
- Enclose safety data sheets in accordance with the current statutory requirement in the country of application, e.g., Annex II to REACH (Council Regulation (EC) no. 1907/2006) for all chemical products.

We also confirm that the attached list of chemicals and materials are those used in the business and that we will notify Nordic Ecolabelling in the event of any changes. We confirm that materials containing PVC are not used in paper-based packaging (O9), plastic packaging used for protection of printed matter (013) and that PVC materials (requirement 028) are not used for printed matter to be labelled with The Nordic Swan Ecolabel.

Signature

We declare that the requirements have been met and that the information provided is correct.

We understand that Nordic Ecolabelling will not be responsible for any data that is incorrectly recorded in the Nordic print database as a result of our failure to provide correct information:

Company name:	Date:
Address:	
Telephone:	E-mail:
Signature:	Name in block letters:

Please note that the signatory company will appear in the Nordic Ecolabelling Portal unless otherwise stated under distributor/supplier at the top of the form.

E-mail

Ecolabelling Denmark	info@ecolabel.dk
Ympäristömerkintä Suomi Oy (Finland)	joutsen@ecolabel.fi
Norræn Umhverfísmerking (Iceland)	svanurinn@ust.is
Stiftelsen Miljømerking (Norway)	hei@svanenmerket.no
Miljömärkning Sverige AB (Sweden)	info@svanen.se

Appendix 4 Declaration by the printing company

We hereby confirm that we are in compliance with the following requirements:

Requirement as to paper-based packaging manufactured (as a whole) in the printing company (O10):

- The non-paper product parts of paper-based packaging such as metal clips, tape, or plastic covers, shall be easily removable (according to CEPI/FEFCO guidelines[69]) to ensure that those components will not hinder the recycling process.
- Avoid plastic labels if possible and use direct print or paper labels. If a window is needed, then provide clear instructions for consumers to remove window film before recycling.
- PVC used in tape, must not be used
- Paper or board laminated on both sides must not be used.
- Wax or latex coatings must not be used.

Requirement as to plastic packaging used to protect the printed matter (O14):

- Plastic packaging must not contain PVC.

By plastic packaging is meant packaging that is used for protection and collation of individual/units of printed matter during storage, transport, and distribution.

Requirements as to the use of the Nordic Swan Ecolabel logo on printed matter (O21 - O):

Print on paper:

- The paper substrate used in the Nordic Ecolabelled printed matter must consist of inspected or Nordic Swan Ecolabelled paper.
- Other non-paper parts such as metal bars and -clips or plastic covers must not exceed 10% of the total weight of the Nordic Swan Ecolabelled printed matter.
- In the case of stationery and office supplies such as books, folders, ring binders, notepads and forms, other non-paper parts must not exceed 20% of the total weight of the Nordic Swan Ecolabelled printed matter.
- The non-paper product parts of stationary paper product such as metal bars or plastic covers shall be easily removable to ensure that those components will not hinder the recycling process.

Inserts that are fixed are considered part of the printed matter

[69] https://www.cepi.org/wp-content/uploads/2020/10/Cepi_recyclability-guidelines.pdf

Paper board for signage, displays and retail point of sale/purchase (POS/POP) (O22)

Print of paper board for signage, display or POS:

- The paper board must consist of 100% paper substrates.
- The paper substrate used in the Nordic Swan Ecolabelled printed paper board matter must consist of 100 % inspected or Nordic Swan Ecolabelled paper or inspected board/corrugated board.

Print on paper board/corrugated board (packaging):

Only produced packaging defined as transport-/postal-/web shop packaging* can use the Nordic Swan Ecolabel logo.

The packaging must be commercial/product-neutral in terms of the product(s) inside the packaging e.g. no print/pictures showing/describing the actual product in the packaging. However, company brand/logo/name may be displayed on the packaging.

Food- and beverage packaging can not use the Nordic Swan Ecolabel logo.

- The paper substrate used in the Nordic Ecolabelled printed transport-/postal-/web shop packaging must consist of inspected or Nordic Swan Ecolabelled paper or inspected board/corrugated board.
- Other non-paper parts such as tape or metal clips must not exceed 5% of the total weight of the Nordic Swan Ecolabelled printed transport-/postal-/web shop packaging.
- The non-paper product parts such as tape or metal clips shall be easily removable (according to CEPI/FEFCO guidelines5F[70]) to ensure that those components will not hinder the recycling process.
- Labels must not be used.
- PVC used in tape, must not be used.
- Wax, latex coatings or lamination must not be used.

Inserts that are fixed and made of the same inspected board, are considered part of the printed packaging. Packaging fillers or non-fixed insets is, however, not part of the Nordic Swan Ecolabelled product.

** Tertiary packaging/transport packaging facilitates the protection, handling, and transportation of a series of sales units or secondary packaging in order to group everything into unit loads during transit. This type of packaging is rarely seen by the consumer.*

Postal- and web shop packaging: postal packaging is a form of single trip packaging used for shipping products, goods, or orders from B2B or B2C whereas web shop packaging are returnable. The packaging is usually manufactured from corrugated cardboard.

Please be aware that a special label for Nordic Ecolabelled transport-/postal-/web shop packaging must be used. Guidelines for the use and placement of the label have also been developed. Graphical guidelines for Nordic Swan Ecolabelled transport-/postal-/web shop packaging can be found at: https://www.svanen.se/en/for-licensees/communicate-nordic-swan-ecolabel/

[70] https://www.cepi.org/wp-content/uploads/2020/10/Cepi_recyclability-guidelines.pdf

Print on textiles and panels:

- The textile or panel used in the Nordic Ecolabelled printed matter must consist of Nordic Swan- or EU-Ecolabelled textiles, OEKO-TEX 100 certified textile made from 100% Post-Consumer Recycled polyester (rPET) or Nordic Swan Ecolabelled panels for interior- or exterior use.
- The rPET must in addition be certified according to Recycled Claim Standard (RCS), Global recycled standard or equivalent certification standard to verify the origin of the yarn/fibers.
- Other materials such as metal clips or plastic covers must not exceed 10% of the total weight of the Nordic Swan Ecolabelled printed matter.
- If case of printing on Nordic Swan Ecolabelled acoustic panels, or if the acoustic panels is used as a basis for a printed textile matter, the printing must not have a negative effect on the primary function of absorbing sound waves.

In case of roll-up stands, printed canvas on a wooden frame and other similar products, only the material carrying the information is regarded as printed matter.

Printing inks, toners, inks, varnishes, and adhesives:

- All printing inks, toners, inks, varnishes, and adhesives used in the Nordic Swan Ecolabelled printed matter must be assessed by Nordic Ecolabelling and must fulfil the requirements in Appendix 1.

The printing company must ensure that any printing inks, toners, inks, varnishes, and adhesives which are exempt from requirement O11 are not used in the Nordic Swan Ecolabelled printed matter.

Lamination and PVC:

- Nordic Swan Ecolabelled printed matter must not contain PVC.
- Lamination shall only be used to increase the durability of products with a life span of at least 1 year, for example, books, binders, folders, exercise books, calendars, notebooks, and diaries.
- Lamination shall not be used in magazines.
- Double lamination shall not be used in any product.

Fragrance:

- Fragrance/scent must not be added to Nordic Swan Ecolabelled printed matter (e.g. scented varnish). Packaged product samples with fragrance, attached to an item of printed matter, or removable scratch samples, are not encompassed by this.

Printing suppliers and finishers (book binders):

- All printer suppliers used in the production of printed matter that is to bear the Nordic Swan Ecolabel must be licensed to use the Nordic Swan Ecolabel O2. All external finishers encompassed by O3 must have been inspected.
- If only part of the output of the printing company is Nordic Swan Ecolabelled, orders bearing the Nordic Swan Ecolabel must be marked clearly to enable them to be separated from other orders. Information must also be displayed disclosing:

- name of paper and paper grades, textile or panels;
- names on printing inks, toners, inks, varnishes or adhesives;
- subcontractors used;
- how the Nordic Swan Ecolabel logo is reproduced on the items of printed matter (e.g. with the aid of order notes or order bags).

Signature

We declare that the requirements have been met and that the information provided is correct.

Company name:	Date:
Address:	
Telephone:	E-mail:
Signature:	Name in block letters:
Person in charge of marketing:	Date:
Telephone:	E-mail:
Signature	

In the event of personnel changes, a new confirmation must be submitted to the ecolabelling organisation.

Appendix 5 Energy and VOC

1. Energy use

The applicant shall report the printing company´s total annual energy consumption per tonne of purchased substrate.

Energy consumption shall be calculated based on invoices received from suppliers of electricity, fuel, and heating and shall relate to the quantity of substrates purchased by the company on an annual basis.

Printing companies that sell surplus energy, e.g., in the form of district heating, may deduct the quantity sold.

If the printing company uses multiple printing methods, the applicable threshold value shall be calculated as a weighted average based on the proportion of substrate consumed by each printing methods.

> *Example of calculation of the threshold values using multiple methods of printing. If a printing company is using 500 tons of substrate (sheet fed offset) and 300 tons of substrate (digital printing) the weighted threshold value is calculated as:*
>
> *Calculated threshold value: (500/800) * 1700 + (300/800) * 3200 = 2263 kWh/ton purchased substrate per year.*

Electricity:

If the printing company is unable to document their electricity consumption based on direct settlement with an electricity supplier (e.g., a printing companies who live in rented buildings), the printing company shall either:

- install electricity meters and read off the total annual consumption of electricity, or
- use a competent energy specialist with relevant knowledge on energy savings in buildings and/or printing techniques to calculate/estimate/verify the printing company’s annual consumption of electricity.

Heating/cooling:

If the printing company is unable to document their heating/cooling use on the basis of direct settlement with a supplier (e.g. a printing companies who live in rented buildings), and the printing company does not use electricity for heating, the printing company must calculate their total energy consumption by calculating heat consumption on the basis of the heat consumption of the building and adding this to electricity consumption. The printing company's proportion of the total heat consumption of the building is calculated based on the floor space of the printing company relative to the heated area in the building.

Any floor space that is to be excluded from this calculation must be approved in advance by Nordic Ecolabelling.

> *Example of calculation of heat consumption for a printing company who live in rented buildings: If the printing company has a floor space of 2 000 m^2 and is located in a 50 000 m^2 building with a total heat consumption of 500 000 kWh per year, the heat consumption of the printer will be 500 000*2 000/50 000 =20 000 kWh per year.*

Energy content of fuels and district heating

The table below shows the values for the energy content that must be applied when calculating energy consumption based on purchased/received fuels and district heating. In the case of fuels not included in the table, data provided by the supplier may be used (lower calorific value).

Fuel	Energy content	Unit
Light heating oil	36.0	GJ/m3
Heavy heating oil	38.7	GJ/m3
LPG (gasol)	46.1	MJ/kg
Natural gas	38.9	MJ/m3
Biogas	6.4	kWh/m3
Pellets	10.0	GJ/m3
Woodchips	3.5	GJ/m3
Briquettes	10.0	GJ/m3
Coal	26.5	MJ/kg
District heating		
Water based, 35°C cooling	40.8	kWh/m3
Steam based, condensate at 100°C and normal air pressure	627	kWh/m3

If more specific values are available from the supplier of fuel, e.g. own measured values, these values may be applied instead. The following values may be used as standard values for density if the supplier has not provided the data:

Natural gas: 0.85 kg/m^3N

Light heating oil: 0.89 kg/litres

Heavy heating oil: 0.98 kg/litres

District heating water: 1.00 kg/litres

2. Calculation of volatile organic compound (VOC) emissions:

If the printing company sells recycled VOC or removes VOC from outgoing air with the aid of, for example, incineration (e.g. heatset) or removes or sells VOC by some other controlled means (e.g. condensation in connection with certain digital printing facilities with wet toner or inkjet inks), these quantities may be deducted from the quantities purchased/received.

Below is a general specification of the calculation method for selected printing techniques, but other printing techniques may also be deducted on the said assumption. As an example, certain heatset printing companies collect ink waste and send it for incineration under controlled conditions. Consequently, the quantity of VOC in the ink waste may be deducted if this quantity can be documented. Heatset printing companies must measure emissions of VOC.

Measurements of VOC at heatset printing companies
Measurements of VOC quantities at local emission points must be based on:

- measurements of Non-Methane Volatile Organic Compounds (NMVOV) in mg C/Nm^3 flue-gas after each treatment unit - as required by the authorities for heatset printing companies of a certain size.
  information on annual gas flow with the gas flow during operations (in Nm3/h) and the annual number of hours of operations for each treatment unit.

If measurements of NMVOC are not performed, the European threshold value of 20 mg C/Nm3 may be used as a standard value. To simplify conversion to VOC the printing company must assume that it is oil consisting of hydrocarbons with a typical chain length of C9 - C20. This means that 1 g of VOC will on average correspond to 0.85 g of C.

Heatset with afterburning or flue gas treatment
If a heatset printing company has an integrated afterburner or flue gas treatment, the company may assume as a standard value that 100% of the substances in the printing inks are converted to VOC. Other production chemicals containing VOC must be calculated in accordance with the instructions found here and the results must be added to the VOC consumption.

Digital printing machines and recycling
For digital printing machines with e.g. wet toner or inkjet inks, can weight information be used on the basis of e.g. invoices for sold VOC. The quantity documented by means of e.g. invoices, may be deducted and this applies to all product chemicals excluding wet toner.

For wet toner, two values (VOC) are used in calculation in the Nordic Ecolabelling Portal. The lower value (15%) is applied to digital printing machines having condensation followed by recycling. The higher value (30%) is applied when the equivalent recycling technique is missing.

Example on how to calculate VOC (kg VOC/ton substrate)

Description of parameters (A-G) applicable for the calculation of VOC:

A) Total VOC consumption (Kg)	Value calculated automatically in the Nordic Ecolabelling Portal from consumption of chemicals. Production chemicals (VOC) related to the printing method applicable. Calculation is based on the consumption of production chemical and related to the weight-% VOC in each chemical. Example: 1200 Kg VOC calculated consumption in total from printing method.
B) Total weight (Kg) of chemical waste fraction containing VOC (Kg)	Total amount (Kg) chemical waste related to VOC and printing method if applicable. If not applicable with waste fraction see parameter F (consumption of substrate). Total weight could have components containing 0 weight-% VOC. Example: 40 Kg (Total chemical waste related to printing method).
C) Weight of waste component/ components not containing VOC (Kg)	Example: 10 Kg (waste-) water consumption for printing method.
D) Calculation of VOC remaining in waste fraction	Example: 40 Kg (B) – 10 Kg (C) = 30 Kg (D).
E) Sum VOC (Kg)	VOC waste withdrawn from total VOC. Calculation example: 1200 Kg (A) – 30 Kg (D) = (E) 1170 Kg VOC.

F) Consumption of substrate for printing method (Ton)	Example: Printing method has 400 Ton (F) consumption of substrate.
G) Calculation of VOC value for the printing method (Kg VOC/Ton substrate)	Example: 1170 Kg VOC (A or E applicable) / 400 Ton (F) = 2,93 Kg VOC/Ton substrate (G).

Appendix 6 Inspected paper board/panel and corrugated board

This declaration is used by manufactures of paper board, paper panels and corrugated board used as inspected printing material in Nordic Swan Ecolabelled printing companies. The declaration must be completed in the Supply Chain Declaration Portal.

Only paper board, paper panels and corrugated board, which is registered item for a specific use, that meets the requirements for inspected paper board, paper panels and corrugated board may be used in Nordic Swan Ecolabelled printed matter.

Note that the item name (product name) and manufacturer/supplier together with type of paper board, paper panels and corrugated board and grammage (g/m^2) will be published for printing companies, - either all of them if no confidentiality restriction is chosen and if confidentiality restriction only the companies with special permission.

Definition of inspected paper board/panels and corrugated board

Inspected paper board/panels and corrugated board applies to conversion of paper to paper board/panels and corrugated cardboard. The conversion process involves gluing together a minimum of 2 paper grades (such as gluing together liner and fluting) and e.g. also a process of cutting, trimming, and bending the board.

Name/trade name:	
Manufacturer/supplier:	
Type of paper board/panel or corrugated board:	**Board/panel grammage (g/m2):**

Requirements for inspected paper board/panels and corrugated board

Inspected paper board/panel and corrugated board must meet the following requirements: Does the paper board/panel or corrugated board comply with the following requirements?

Yes ☐ No ☐ If No, please specify:

- The manufacture of paper board/corrugated board must have a quality system that is certified to ISO 9001 or similar quality system.
- The paper/board used in the inspected paper board/corrugated board must be inspected or Nordic Swan Ecolabelled.

A list of inspected paper grades is published on Nordic Ecolabelling's publicly available web portal https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/

List of inspected paper or Nordic Swan Ecolabelled paper used in paper board/panel or corrugated board:

- Wax, latex coatings or lamination must not be used.
- Labels must not be used.
- PVC must not be used in tape.
- Adhesives and chemicals used for coating must be assessed by Nordic Ecolabelling and must fulfil the requirements provided for in Appendix 1 in the Criteria document for printing companies, generation 6.

Appendix 1 must be fill in/declared by the manufacturer of the chemicals.

List name/trade name of adhesives and chemicals used for coating in the manufacturing of paper board/panel or corrugated board: