About Nordic Swan Ecolabelled

Printing Companies and Printed Matter

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Nordic Ecolabelling

Content

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:

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1 Summary

The development in the graphical industry is changing towards new digital printing technologies which allows printing on all types of substrates/materials. The industry produces everything from printed matter and packaging to "Wrapping" of cars and buildings.

The main environmental impact of printed matter relates to the production of paper[1] and other printing substrates such as plastic, metal, glass, wooden boards, and textiles. Relevant environmental impact is linked to energy consumption, use of chemicals, effective use of resources and the end-of-life of printed products.

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.

The criteria include newly developed requirements concerning substrates other than paper such as textile, plastic, or other board material. Printing companies are awarded points for the use of mono-materials or materials containing recycled material, thereby promoting circular economy aspects in the graphic industry.

Only Nordic Swan Ecolabelled printing companies can produce Nordic Swan Ecolabelled printed matter. Nordic Swan Ecolabelled printed matter contains 100% inspected- or ecolabelled paper, -board/corrugated board, solid board/panels, or textile. This ensures that all paper and textile is produced energy-efficiently with low emissions to air and water and that the wood fibres originate from sustainable FSC or PEFC-managed forest, and in case of textiles, that the fibres are organic, recycled or bio-based.

Transport-/postal-/web shop packaging 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. To make this clear to the consumers, 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/

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

For a full description of the changes in the revised generation 6, see the table in section 9.

[1] 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).

2 What is a Nordic Swan Ecolabelled printing company 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 paper. At least 60% of the printing company's total annual consumption of paper is inspected or ecolabelled paper.
- Meets strict requirements for substrates printed on such as textile, plastic, or aluminium/composite board material. At least 85% of the printing company's total annual consumption of substrates other than paper is inspected – this to ensure compliance with strict requirements for chemicals used in finishing of the substrates.
- Meets strict energy requirements and thereby contribute to a lower 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 requirements for waste management and through requirements for recycling of printed matter.

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:

- Meets strict environmental requirements and energy requirements to the substrate. The printed matter contains 100 % Nordic Swan Ecolabelled, inspected or ecolabelled paper, board, textile, or panels.
- Meets strict requirements for chemicals which are harmful to the environment and/or human health.
- Does not contain PVC, fragrance, or scent.
- Promotes circular economy through requirements for recycling of printed matter.

2.1 UN's Sustainable Development Goals

The UN Sustainable Development Goals are a universal call to action to fight poverty and inequalities, protect the planet and tackle climate change by 2030. The Nordic Swan Ecolabel is a powerful tool for securing a sustainable future.

The Nordic Swan Ecolabel actively contributes to reach goal 12: responsible consumption and production. Nordic Swan Ecolabelled printing companies and printed matter have a reduced environmental impact and the requirements ensure control of the value chain. This contributes to more environmentally friendly production methods throughout the world.

Nordic Swan Ecolabelled printing companies and printed matter also contribute to fulfilling other UN Sustainable Development Goals.

How Nordic Swan Ecolabelled printing companies and printed matter contribute to Goal 12:

- Sustainable management and efficient utilization of natural resources are achieved through requirements for certified sustainable wood raw materials in paper and board materials, traceability in the supply chain, reduced energy use in the production of printed matter and requirements that promote the use of mono-materials and materials containing recycled materials.
- Strict requirements for environmentally harmful chemicals in production of printed matter reduce the spread of harmful substances in nature and promote the possibility of recycling the materials in the future.
- Limits on the emission of volatile organic compounds (VOC) contribute to a healthy indoor climate and helps to prevent people from being exposed to harmful chemicals.
- Requirements that promote effective use of paper substrates (minimize wastepaper in production), generation of unsorted waste and waste management contribute to resource efficiency.

How the Nordic Swan Ecolabel contributes to other UN Sustainable Development Goals:

Reduces the use of chemicals harmful to health and the environment

- Chemicals that are carcinogenic, mutagenic, toxic to reproduction and endocrine disruptors mentioned in EU's list and national lists of suspected endocrine disruptors are forbidden.
- Emission of volatile organic compounds (VOC) to the air is restricted.
- Fragrance and scents are forbidden in Nordic Swan Ecolabelled printed matter.

Improves energy efficiency

- Strict requirements for energy consumption and thereby contribute to a lower climate impact.

Requires efficient use of resources

- Sustainable renewable and recycled materials are promoted.
- Reduced energy consumption in the printing company.

Promotes biodiversity and sustainable use of terrestrial ecosystems

- Fibre raw materials must be certified and sustainably sourced.
- Strict requirements for waste management and through requirements for recycling of printed matter.
- Strict requirements for the use of environmentally harmful chemicals reduce pollution of habitats for animals and plants.

3 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. In order 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. In order 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[2] and an RPS analysis were performed.

The MECO analysis are based on several LCA studies[3][4]. 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.

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.

[2] MECO stands for the assessment of Materials, Energy, Chemicals and Other characteristics and describes the principal environmental impacts during the products' life cycle phases.
[3] 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).
[4] https://www2.mst.dk/Udgiv/publications/2006/87-7052-173-5/html/kolofon_eng.htm#resume.

- Use of energy in the production of printed matter.
- 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.
- Waste management - effective use of substrates/raw materials thereby reducing the amount of waste.

Use of paper and other printing substrates

Most LCA studies[5] 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[6][7]. 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[8] has made assessments and calculations for selected plastic substrates using ClimateCalc[9]. These calculations show that these substrates even make a greater LCA contribution than paper substrates.

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

[5] 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).
[6] https://www.fespa.com/en/news-media/features/wide-format-printing-key-factors-for-sustainability-success, Visited April 2019.
[7] Viluksela P. et all (2010): Environmental performance of digital printing - Literature study.VTT2010.
[8] 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.
[9] www.climatecalc.eu.

steerability (S). This is in line with the EU strategy for plastics in a Circular Economy[10].

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[11].
There is both a high relevance (R) and 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[12].
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 is crucial for the environmental performance of paper. Recyclability in turn is linked to repulp ability and de-inkability[13]. 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.

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

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

materials is efficient, thereby reducing the amount of waste. This is in line with the EU's new circular economy package[14] 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/a points system 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.

4 Justification of the requirements

This chapter presents the requirements, and explains the background to the requirements, the chosen requirement levels and any changes compared with generation 5 of the criteria for Printing Companies, Printed Matter, Envelopes and Other Converted Paper Products.

4.1 Definition of the product group

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**).

Nordic Ecolabelling also includes:

- the production process used by manufacturers of envelopes to produce 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.

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

Other 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.

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.

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

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

The following printing methods and types of printed and converted products are not eligible for a Nordic Ecolabelling licence according to criteria for "Printing Companies and Printed Matter":

- No films may be used to illustrate the printing plates - repro.
- Printing companies using the following printing methods; letterpress printing, non-digital screen printing and 3D printing.
- Packaging printed on other substrates than paper.
- Printing companies 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 banners, roll ups and Point of Sale (POS) is however part of these criteria.
- Printing companies printing on tissue paper (serviettes, kitchen rolls, toilet paper and similar products). Separate ecolabelling criteria exist for these.
- Printing companies printing on packaging for liquid foods. Separate ecolabelling criteria exist for these.
- Printing companies printing on disposables for food. Separate ecolabelling criteria exist for these.

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

Background to the definition of the product group
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.

In the sixth generation of the criteria the name of the product group has changed from "Printing Companies, Printed Matter, Envelopes and Other Converted Paper Products " to "Printing companies and printed matter" in order to reflect the development in the graphic industry which increasingly focuses on printing on substrates other than paper.

The criteria still 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 5 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 packaging, however not 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.

In this criteria generation 6, it has been clarified that 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).

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 in order to support the concept of a circular economy.

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 the process of converting paper to paper board or corrugated cardboard. The conversion process involves gluing together a minimum of two paper grades (such as gluing together liner and fluting) 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 in order to use the Nordic Ecolabel Swan logo on the final transport packaging.

As in generation 5 of the criteria, the 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).

Printing companies using film/film production are excluded from generation 6 of 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 excluded from generation 6 of 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.

4.2 Terms and definitions

Advanced energy threshold value	The Energy threshold values is based on data from Nordic Swan Ecolabelling licensees. The advanced energy threshold value represents a value which is approx. 25% below the average energy data for total energy consumption for each printing method (kWh/tonne).
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.
Basic energy threshold value	The Energy threshold values is based on data from Nordic Swan Ecolabelling licensees. The basic energy threshold value represents a value which is approx. 25%-30% above the average energy data for total energy consumption for each printing method (kWh/tonne).
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.
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 Appendix 1 in the Basic Module, version 3.
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 printing paper are set in 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. A substrate containing PS homogeneous, and PS foamed is not considered a mono substrate. 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.
Orders produced	A production order is an order issued within a company to produce a specific quantity of material within a certain timeframe.
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) 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.
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).

4.3 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:

The following applies to printing companies that use only one 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.

The following 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%.*

✉ 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 the requirement

As in generation 5, 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[15] or Nordic Swan Ecolabelled construction and facade panels[16].

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 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

[15] 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.
[16] 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.

in the printing company or exempted (only the substrate other than paper, not the chemicals) from the criteria.

4.4 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 the requirement

The requirement for suppliers is the same as in previous generation 5. 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 O30.

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 the requirement

The requirement has been adjusted and changed to include only the annual tonnes of substrates (both paper and substrates other than paper) done by external chemical finishing services. In generation 5 of the criteria, the requirement was linked to the total tonnes of paper substrates for both in-house and externally chemical finishing. The adjustment is done to simplify the requirement and to increase the proportion of inspected chemical finishing services.

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 O10 chemicals i.e., requirements in Appendix 1.

4.5 Printing substrates

The requirements O4 to O8 apply to all printing substrates purchased annually by the printing company. The requirements for substrates are divided into requirements which include substrates of paper and requirements for substrates other than paper.

Table 1: Overview on printing substrates and specific requirements

O4 Printing Substrates - Applies to all annually purchased substrates		
P1 Printing substrates - The printing company can earn up to 5 points in P1 depending on the quantity of purchased paper		
		
O5 Inspected and Ecolabelled paper		**O6 Other substrates than paper** (PVC-free) - Applies to all substrates
The printing company can earn up to 10 points in P2, depending on the quantity of Inspected/ Ecolabelled paper used		
P2 Inspected and Ecolabelled paper		**O7 Textiles** - Only applies if printing on textiles
		O8 Panels/boards made of wood - Only applies if printing on panels/boards of wood
		The printing company can earn up to 10 points for P3, P4 and P5, based on the types of substrate used
		P3 Content of recycled materials
		P4 Mono materials
		P5 Recycled material and mono substrates

For a paper grade to be inspected and available for the printing company, the paper mill must document compliance with the requirements set for paper in the Appendix 1 in Paper Products - Basic Module. More information can be found from https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/

For at **paper board/corrugated board** to be inspected and available for the printing company, the manufacturer/converter must document compliance with the requirements using Appendix 6. Paper board/corrugated board applies to conversion of Inspected and Nordic Swan Ecolabelled paper to packaging such as corrugated board/cardboard and solid paper boards.

For a printing substrate other than paper to be inspected and available for the printing company, the manufacturer/supplier must document compliance with the requirements using Appendix 2.

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.

Substrates of paper also includes paper board/corrugated board.

- 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.

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 substrates

The printing company may be awarded points depending on the proportion of purchased paper in relation to the total purchase of tons substrates annually.

*Example: If the printing company purchase 40 tons of paper and 5 tons of substrates other than paper annually (total of 45 tons), the company achieves (40/45) * 100 = 89% = 3 points.*

Table 2: P1 Example of points

Proportion of purchased paper in relation to the total purchase of tons substrates annually	Points
0 - 50%	0
51 - 60%	1
61 - 70%	2
71 - 90%	3
91 - 99%	4
100%	5

✉ 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 the requirement

The requirement has been adjusted in generation 6 regarding the functional unit that has been changed from number of tons of produced product to purchased tonnes of substrate. The requirement now also includes annual purchase of substrates other than paper, in order to reflect the development in the graphic industry. Therefore, Nordic Ecolabelling also need to get information on the total number of annual purchased tonnes substrates other than paper.

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 points 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.

4.5.1 Paper

O5 Inspected and Ecolabelled paper

At least 60% 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.

Example: If 60% inspected paper is used in addition to 10% Nordic Swan Ecolabelled paper and 5% EU Ecolabelled paper, the calculation will be as follows: 60*0.9 + 10*1.0 + 5*0.8 = 68%

If only a single type of paper is used, 60% Nordic Swan Ecolabelled paper or 67% inspected paper or about 75% EU Ecolabelled paper will be required for the requirement to be fulfilled.

✉ 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.

P2 Inspected/ecolabelled paper

The printing company may be awarded points depending on the quantity of inspected/ecolabelled paper purchased/used annually.

Use the formula below to calculate points for inspected/ecolabelled paper on an annual basis. The quantity of inspected/ecolabelled paper is weighted in such a way that Nordic Swan Ecolabelled paper has a weight of 1, inspected paper 0.9 and EU Ecolabelled paper 0.8.

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).

Use the following formula to calculate the percentage of the total paper consumption that is inspected/ecolabelled paper on an annual basis:

Score = (proportion of Nordic Swan Ecolabelled paper * 1) + (proportion of inspected paper * 0.9) + (proportion of EU Ecolabelled paper * 0.8)

*Example: If 60% inspected paper is used in addition to 10% Nordic Swan Ecolabelled paper and 5% EU Ecolabelled paper, the calculation will be as follows: (60*0.9+10*1.0+5*0.8) = 68% = 2 points*

Table 3: P2 Examples of points

Proportion of inspected/ecolabelled paper	Points
61 - 70	2
71 - 80	4
81 - 90	6
91 - 99	8
100	10

✉ 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.

Background to the requirement

The requirement regarding inspected and Ecolabelled paper has been made more stringent in generation 6, but the structure remains the same. The proportion of the printing companies' total annual consumption of inspected and ecolabelled paper has been changed from 25% to 60% (O5). The printing company may be awarded points depending on the quantity of inspected/ecolabelled paper used (P2).

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 60% is based on data from Nordic Swan Ecolabelled printing companies.

As in generation 5 of the criteria, Nordic Swan Ecolabelled[17],- inspected- and EU Ecolabelled paper[18] 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, version 5, the Paper products - Basic Module, version 3 (inspected paper) and the EU Ecolabel requirement levels for graphic paper[19].

4.5.2 Other substrates than paper

The requirement includes all **substrates other than paper**. Requirement O6 applies to all substrates (substrates of paper + other than paper), while requirements O7 to O8 are additional requirements to specific types of substrates.

O6 Other substrates than paper (PVC-free)

Up to 15% of the printing company's annual consumption of substates (substrates of **paper** + **substrates other than paper**) may contain PVC or PVC coating.

In 2026 up to 10% of the printing company's annual consumption of substrates may contain PVC or PVC coating. This is reported as the annual follow-up based on purchases in 2025.

For a printing substrate other than paper to be declared and available in the Nordic Ecolabelling Portal, the manufacturer/supplier must document compliance with the requirements using Appendix 2.

✉ 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.

✉ Declaration from the manufacturer/supplier of substrates other than paper. Appendix 2 may be used.

Background to the requirement

This requirement on substrates other than paper has been restructured in generation 6 of the criteria. In generation 5, up to 25% of all substrates other than paper were exempted from the criteria. In generation 6 up to 15% of the printing company's total annual consumption of substrates (substrates of paper + substrates other than paper) may contain PVC or PVC coating. However, from 2026 (annual follow-up based on purchases in 2025) up to 10% of the printing company's annual total consumption of substrates may contain PVC or PVC coating.

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

Developments in the graphic industry show an increasing interest for printing in substrates other than paper such as plastic, fabric/textiles, metal, and wood[20,21]. Compared to paper, knowledge of these materials is relatively limited in terms of production process, environmental impact, and the circular economic potential of the materials.

Contact with the graphic industry shows that for certain product groups, e.g., signs, there are several types of substrates and materials to choose from, while substrates for other product groups are product specific, e.g., foils. Substrates are often coated on one side (to improve printing properties) just as adhesives are typically used on one side of foils and laminates, see table 4 below. The wide variation in materials and material composition presents challenges for the recycling industry[22].

Nordic Ecolabelling wants to stimulate and contribute to the circular economy of graphic products by excluding environmentally problematic chemicals and materials in the substrates, as well as encouraging the use of mono substrates and recycled materials.

Organic compounds containing halogenated compounds such as chlorine, bromine, fluorine, or iodine must not be present in any substrates other than paper. Halogenated organic compounds encompass a wide range of substances harmful to health and the environment, they are very toxic to aquatic organisms, carcinogenic or harmful to health in other ways. The halogenated organic compounds do not break down readily in the environment, which increases the risk that the substances will have harmful effects. The requirement is therefore imposed that halogenated organic compounds must not be present in the substrates. This means, inter alia, that halogenated flame retardants, chloroparaffins, perfluoroalkyl compounds and PVC must not be present in any type of substrate.

Halogenated compounds such as PVC are widely used within all types of substrates, typically as a coating, but also as an integrated part of the substrates e.g., vinyl and **mesh** banners. The supply of PVC-free substrates is how ever growing in all types of substrates.

PVC contains chemicals that may have adverse health effects:

- Exposure to PVC often includes exposure to phthalates and chlorine.
- Manufacturing, burning, or landfilling PVC releases dioxins.
- Phthalates, dioxins, and BPA are suspected to be endocrine disruptors. Endocrine disruptors are chemicals that may interfere with the production or activity of human hormones.

[20] 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.
[21] 2018 Intergraf economic report.
[22] Dialog with Stena Recycling and Rangsells 2019.

Table 4: 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

Type of substrates	Substrates and materials	Processing of the substrates	Waste and recyclability	
Film/foil and laminated	**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
Signs	**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), PVC, Acrylic, PS, PC, PET, PP, Styrene, PUR	May be coated in different colours or varnishes	Mono materials with/without print	Good
Textile	**Same material:** 100% polyester Canvas Cotton	Without coating	Mono materials with/without print	Possible
		May be coated with vinyl or PVC	Materials coated with vinyl/PVC	Problematic
	Composite: PE/cotton, PET/cotton	May be coated with vinyl or PVC	Materials coated with vinyl/PVC	Problematic

Temporary textiles (or soft signage) are the term for flexible advertising signage and interior decoration that is printed on textiles – mostly polyester and some types of canvas. Whenever cloth, fabrics or textiles are used in public buildings, hotels or at public events it mandatory in some countries[23] to provide a flame-retardant certificate such as B1 according to DIN4102-1, M1 according to NFP 92503 or EN13501-1. However, the textile/fabric must comply with requirement O7 (certified fabrics) which contains requirements for the use of specific types of flame retardants.

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 the protection of adhesive surfaces of various adhesive products and protecting of the printing surface. There are two types of base materials: paper or plastic (film). Typical films are made of PE or PET, but PVC is also being used. The requirement is therefore imposed that halogenated compounds, e.g., PVC, must not be present in the release paper/-liner.

[23] It is stipulated in current requirements in technical regulations in German, France, Belgium, and Luxemburg that decoration materials used by exhibitors, event organizers, stand construction companies and service companies must be flame retardant in compliance with DIN 4102, NFP 92503 or DIN EN 13501-1.

4.5.3 Fabrics/textiles

The requirement only applies to printing on fabrics/textiles used for advertising such as roll-ups, banners, or signs. Printing on textiles produced for clothing and accessories or furnishing fabrics is not part of this ecolabelling criteria. See section 4.1, Product definition.

O7 Fabrics/textiles (e.g., polyester, canvas)

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 to the requirement

This is a new requirement in generation 6 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[24], 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[25], such as the Nordic Swan, the EU Ecolabel and GOTS[26]. 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[27] 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.

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

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 15% of the printing company's total annual consumption of substrates other than paper 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.

4.5.4 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.

Nordic Ecolabelled panels/boards made of wood fulfil the requirement automatically. Only the manufacturer, licence number and product name must be stated.

O8 Panels/boards made of wood

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 the requirement

This is a new requirement in generation 6 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[28].

The requirement for fibre raw material follows Nordic Ecolabelling's general forestry requirements[29]. 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.

A number of 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 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 are met. The manufacturer of panels/boards of wood must document compliance with the requirement using Appendix 2.

Nordic Ecolabelling criteria for Construction and facade panels covers several types of panels/boards made of wood.

4.5.5 Points for types of substrates other than paper

The printing company can earn up to 10 points for P3, P4 or P5, based on the types of substrates used. A substrate can only obtain points from either P3 or P4 or alternative P5.

P3 Content of recycled materials

The printing company may be awarded points depending on the annual consumption of substrates other than paper containing **recycled material**.

Substrates that can be awarded points must contain minimum 50 w% recycled material*.

Substrates containing recycled PVC cannot be awarded points.

** 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

[28] http://www.nordic-ecolabel.org/product-groups/group/?productGroupCode=010, visited September 2019.
[29] https://www.nordic-swan-ecolabel.org/pulp-paper-declaration-portal/

product which can no longer be used for the intended purpose. This includes return of material from the distribution chain.

*Example: If the printing company purchase 50 tonnes of substrates other than paper a year and 3 tonnes of the substrates meets requirements for recycled material, the company achieves (3/50) *100 = 6% = 1 point.*

Table 5: P3 Example of points

Proportion of substrates containing recycled material / Substrates other than paper on an annual basis	Points
0 - 4%	0
5 - 10%	1
11 - 25%	2
26 - 50%	3
51 - 99%	4
100%	5

✉ The manufacturer of the substrate shall demonstrate compliance with the requirement by duly completing the declaration in Appendix 2.
✉ The manufacturer of the substrate shall enclose product data sheets or other documentation for content of pre- and post-consumer recycled material in the product.
✉ 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.

P4 Mono substrates

The printing company may be awarded points depending on the annual consumption of substrates other than paper consisting of only the same type of material and property (**mono substrate**).

Mono substrates made of PVC cannot be awarded points.

*Example: If the printing company purchases 50 tonnes of substrates other than paper a year and 3 tonnes of the substrates meet requirements for mono substrate, the company achieves (3/50) *100 = 6% = 1 point Table 6: P4 Example of points*

Proportion of substrates that consist of the same type of material on an annual basis	Points
0 - 4%	0
5 - 10%	1
11 - 25%	2
26 - 50%	3
51 - 99%	4
100%	5

✉ The manufacturer of the substrate shall demonstrate compliance with the requirement by duly completing the declaration in Appendix 2.
✉ The manufacturer of the substrate shall enclose product data sheets.
✉ 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.

P5 Recycled material and mono substrates

The printing company may be awarded points depending on the annual consumption of mono substrates other than paper containing recycled material e.g., a PE foil containing minimum 50 w% recycled material.

Definition of substrates containing recycled material, see P3.

Table 7: P5 Example of points

Proportion of substrates that consist of both recycled material and consist of the same type of material	Points
0 - 4%	0
5 - 10%	2
11 - 25%	4
26 - 50%	6
51 - 99%	8
100%	10

☒ The manufacturer of the substrate shall demonstrate compliance with the requirement by duly completing the declaration in Appendix 2.
☒ The manufacturer of the substrate shall enclose product data sheets.
☒ 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 P3, P4 and P5

This is a new requirement in generation 6 of the criteria. The use of new digital printing techniques has made it possible to print on virtually all substrates/types of material. However, the types of material used in substrates are developing significantly faster than the knowledge of the material's circular economic potential. By introducing a points system that rewards substrates consisting of recycled material or consisting of only one material, the criteria encourage and contribute towards the circular economy in the graphic industry.

The market for substrates other than paper, made of recycled material or containing recycled material is still very limited. Recycled material is typically being used within signage, e.g., panels and boards containing recycled plastic or wood, or other advertising products such as banners/roll-ups containing typically recycled polyester. Some substrates are made from 100% recycled material such as acrylic or polystyrene while others contain a proportion of recycled material.

Substrates that can be awarded points must contain a minimum of 50 w% recycled material. The limit of 50% w% is determined from the standpoint of credibility. Recycled material is defined in accordance with ISO 14021.

With a circular economy approach, it is quite clear that compound materials (combine two or more sub-materials), are hard or even impossible to recycle, and are best avoided. This is even more important in the context of the large number of materials created for many popular wide-format applications. A billboard or window wrap for an office building may easily amount to a few hundred, or even thousands of square metres of foil waste after use. As a single origin material, the foil is a valuable raw material for recycling.

Substrates containing adhesive such as films/laminating films, composite boards or substrates coated with another material (such as PVC) are not considered as a mono substrate. Mono substrates coated with ink is considered as a mono substrate as it does not cause problems in the recycling process.

PVC is still widely used as a substrate or as a coating for substrates. There are usually PVC-free alternatives available, including textiles for soft signage applications to replace posters and signage printed on PVC foils. But these are likely to be more expensive and are therefore deselected. PVC leads to adverse environmental impacts particular in waste handling and contains substances with adverse health effects. Substrates containing recycled PVC or mono substrates made of PVC are therefore not awarded points in either P3, P4 or P5.

4.6 Requirement for paper-based packaging

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

O9 Requirement for 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[30]) 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 the requirement

This is a new requirement in generation 6 of the criteria. 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[31], the 2016 recycling rate for paper-based packaging was 84.8%. The biggest potential for improvement in paper recycling lies in the development of separate collection[32]. 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.

[30] https://www.cepi.org/wp-content/uploads/2020/10/Cepi_recyclability-guidelines.pdf.
[31] EUROSTAT: PPWD Monitoring, 2016 data on packaging waste generation and recycling by material. https://appsso.eurostat.ec.europa.eu/nui/show. do?dataset=env_waspac&lang=en
[32] www.impactpaperec.eu, visited December 2019.

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 O10.

The requirement supports the overall CEPI recycling guidelines for paper-based packaging[33].

4.7 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.
- 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.

[33] http://www.cepi.org/recyclability_guidelines, visited December 2019.

- 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.

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

O10 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 applies 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 O27 and O31.

✉ 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 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 chemicals have been removed in generation 6:

- Toluene-based washing agents and printing ink and chemicals containing chrome trioxide and copper sulphate used in gravure printing. This means that it is not possible to use rotogravure printing in the new generation 6.
- Cobalt complex dyes in foils for foil printing and waterless offset.
- UV inks (energy-curable inks) used in inkjet machines. This means that there is limited opportunity to use UV inks in the new generation 6.

The specific requirements and background information for chemicals are described in Appendix 1.

The requirement is divided into a general part applicable to all chemicals, a specific part containing requirements as to individual categories of chemicals, and an information section where the supplier must provide information underlying the various points scored under the points system of the criteria document.

Washing agents classified as Aquatic Acute 1 H400, Aquatic Chronic 1-4 H410, H411, H412 or H413, are no longer exempted from the 5% trivial limit, as there are alternatives that are not classified as hazardous to the aquatic environment.

As in generation 5 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.

An exception for the use of 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, has been introduced after the consultation. 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.

4.8 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 O10 (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.

O11 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 8 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 8: Threshold values - 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 O10.

Background to the requirement

The requirement on consumption of VOC has been adjusted and made more stringent in generation 6 of the criteria. The overall limit for VOC consumption at the printing house have 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.

P6 Consumption of VOC

The printing company may be awarded points depending on the annual VOC consumption (kg VOC/tonne purchased substrate). The threshold values for each printing method are listed in O11.

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, see O11.

Calculate points = (1 - (VOC used/threshold value)) *100

Example of calculation (sheet fed offset printing company): If the printing company uses 4 kg VOC/purchased substrate, the calculation will be as follows:

*(1 - (4/7)) *100 = 43% = 4 points*

Table 9: P6 Example of points

Proportion (%) of annual VOC consumption in relation to threshold value (VOC/tonne purchased substrate)	Points
0 - 4%	0
5 - 24%	2
25 - 49%	4
50 - 74%	6
75 - 99%	8
100% (no use of VOC)	10

✉ The documentation must consist of a calculation in accordance with the option for scoring points outlined above and reports/lists from the suppliers of substrates stating type/material/quantities purchased annually. See O10.

Background to the requirement

The points requirement for consumption of VOC has been adjusted in generation 6 of the criteria. As mentioned earlier, VOC are an important contributor to the environmental impact of the production stage. Hence, introducing points for measures to lower the emission of VOC in the printing company, could reduce the environmental impact.

Consumption of VOC is an area in which printing companies have considerable scope for making a difference and where there is major potential for improvement. Several printers have entirely abandoned the use of alcohol as an additive in dampening solutions, and many printers use washing agents free of VOC.

VOC emissions can also be reduced by using BAT technology that either destroys or recycles VOCs. The points requirement rewards printing companies that have low VOC consumption, thereby reducing environmental impact.

Nordic Ecolabelling has collected data and calculated a market average/ spreading of data for the volume of VOC consumption/emission for each printing method, see Appendix 5. The possibility to obtain points is based on the market data as well as the overall weighting of points in the criteria, see O23.

Examples of initiatives to lower the emission of VOC:

- Replacement of production chemicals (washing agents, inks, toner) with a high VOC content with a lower or no VOC content.
- Replacement of old printing machines/technologies with machines/printing technologies which have lowered the total annual VOC consumption (kg VOC/purchased substrate).
- Installation of technology which has lowered the total annual VOC consumption (kg VOC/purchased substrate).

4.9 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.

The requirement for energy use is divided in two, part A and part B. All applicants must report the printing company´s total energy use per tonne purchased substrate per year according to part A. If the printing company does not comply with the energy requirement using the **advanced threshold value** in part A but meets the requirement using the **basic threshold value** in part A, the printing company must comply with the requirement in part B, and thus meet the requirement for energy use.

O12 Energy use

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

Part A

The amount of energy consumed at the printing company must be less than or equal to the threshold value for the printing company's total energy use per tonne of purchased substrate.

The permitted energy use varies depending on the printing method, and the use of either the advanced- or basic threshold value, see table 10 below. The printing company´s total energy use must be calculated on an annual basis.

Energy consumption is calculated using information in invoices received from suppliers of electricity, fuel, and heating to the practising company in relation to purchased substrate on an annual basis.

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

For heating of printing companies in Iceland, geothermal energy is not included in the 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. Braille printers receive data from computer devices and emboss that information in braille onto paper.

If the printing company uses multiple methods of printing, the threshold value is calculated as a weighted value which is defined according to the consumption of substrate in different printing methods. The calculation is done by using only the advanced- or basic threshold values.

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 advanced threshold value: (500/800) * 900 + (300/800) * 2100 = 1350 kWh/ton purchased substrate per year.*

*Calculated basic threshold value: (500/800) * 1700 + (300/800) * 3700 = 2450 kWh/ton purchased substrate per year.*

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.

a) install electricity meters and read off the total annual consumption of electricity, or

b) 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.

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.

Table 10: Threshold values - average energy consumption (kWh/purchased substrate) for different printing methods

Printing method	Threshold value - Average energy consumption (kWh/ton purchased substrate)
Sheet fed offset	Advanced: 900 Basic: 1700
Digital printing	Advanced: 2100 Basic: 3700
Coldset, newspapers	Advanced: 400 Basic: 800
Coldset, forms	Advanced: 700 Basic: 1300
Coldset rotation (except newspaper)	Advanced: 500 Basic: 850
Heatset rotation	Advanced: 600 Basic:1100
Flexographic printing (except envelope production)	Advanced: 250 Basic: 350
Envelope production with flexography	Advanced: 500 Basic: 800

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

Part B

Printing companies who own its buildings (this also incl. internal printing companies located in the same building as the main company):

- The printing company must have an energy action plan for complying with reducing the energy consumption by a minimum of 50% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued. Printing companies failing to meet the requirement lose their license.

The plan shall be conducted by a competent energy specialist with relevant knowledge on energy savings in buildings and/or printing techniques.

Printing companies who live in rented buildings e.g., copy and print shops located in shopping centres:

- The printing company must have an energy action plan for complying with reducing the energy consumption by a minimum of 25% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued. Printing companies failing to meet the requirement lose their license. The plan shall be conducted by a competent energy specialist with relevant knowledge on energy savings in buildings and/or printing techniques.

*Example of how to calculate the 50% energy reduction requirement. If the energy consumption is 1100 kWh/ton, at the time of application, and the advanced threshold value is 900 kWh/ton, the energy consumption must be reduced by minimum 100 kWh/ton i.e., 1000 kWh/ton, no later than 3 years after the date the Nordic Ecolabel license is issued. Difference between energy consumption and is calculated (1100-900) = 200 kWh/ton. (200 * 50% = 100 kWh/ton).*

Companies using part B is subjected to the requirement; O22 annual follow-up of licence. The continuous improvement objectives and targets relating to the reduction of energy consumption shall be reported on yearly basis even after the requirement is met.

✉ Part A: Calculation and documentation (invoices from suppliers of electricity, fuel, and heating) showing compliance with the requirement.

✉ Part A: 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.

✉ Part B (Printing companies who own its buildings): Copy of the energy action plan for complying with reducing the energy consumption by a minimum of 50% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued.

✉ Part B (Printing companies who live in rented buildings): Copy of the energy action plan for complying with reducing the energy consumption by a minimum of 25% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued.
Certified energy management systems according to ISO 50001 or EN 16247-1 can serve as a basis for the specific goals and action plans.

✉ Part B: Documentation that the energy action plan is conducted by a competent energy specialist with relevant knowledge on energy savings in buildings and/or printing techniques.

Background to the requirement

The requirement on energy use has been adjusted and amended in generation 6 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 requirement on energy use covers all the printing company's purchased energy in kWh per tonne of purchased substrate per year.

In generation 5, the threshold for energy use was set at 5000, 4000 and 3500 kWh/tonne of product respectively for digital printing, sheet fed offset and all the remaining printing technologies. In generation 6, the functional unit is defined as kWh/tonne purchased/used substrate, and the requirement levels can therefore not be directly compared. New threshold values for energy use have been set for each of the printing methods, primarily based on data from licence holders (around 350 printing companies). The requirement for energy use has also been amended from one threshold value to two threshold values for each printing method. The reason for this is a desire both to set an absolute threshold value for energy use and to address energy efficiency by supporting/recognizing printing companies working with **Energy Management Systems** (EnMS).

The result of a major European project[34] on energy efficiency in the printing industry shows that there is great potential for energy savings at the printing companies especially within the areas of e.g., lighting, compressed air, ventilation, or space heating.

Printing companies meeting part B are divided into groups: Printing companies who own its buildings (this also incl. internal printing companies located in the same building as the main company) and printing companies who live in rented buildings e.g., copy and print shops located in shopping centres. Printing companies who live in rented buildings do not have the same opportunities to make energy improvements on the premises, as they do not own the building themselves.

Printing companies (who own its buildings) meeting part B must have an energy action plan for complying with reducing the energy consumption by a minimum of 50% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued. Printing companies (who live in rented buildings) must have an energy action plan for complying with reducing the energy consumption by a minimum of 25%. The action plan must contain specific goals and actions for complying with the requirement from the time of application and minimum 3 years onward. Printing companies failing to meet the requirement lose their license. The plan shall be conducted by a competent energy specialist with relevant knowledge on energy savings in buildings and/or printing techniques. This may be a documented educated person who works at the printing house. Printing companies certified according to e.g., ISO 50001, EN 16247-1 or ClimateCalc[35] can serve as a basis for the specific goals and action plans to meet the requirement.

Printing companies using part B is subjected to the requirement; O22 annual follow-up of licence. The printing company must continuously work with improvement objectives and targets relating to the reduction of energy consumption even after the requirement is met e.g., comply with O22 annual follow-up of licence.

[34] Energy Management Standardization in printing industry (EMSPI) conducted in 2014-2017. https://www.emspi.eu/index.html, visited May 2019.
[35] https://eu.climatecalc.eu/ (visited 7/6-2019).

Printing companies that only carry out braille printing are exempt from the requirement. This is partly due to the fact that 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.

P7 CO_2 calculation

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 under the following conditions:

- The CO_2 calculation tool is in compliance with ISO 16759 and the GHG Protocol[36], such as ClimateCalc[37]. 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 the requirement

The requirement has been adjusted in generation 6 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.

There are other certification tools for calculation of the carbon footprint such as Carbon Footprint Calculator[38] or Berkeley´s Cool Climate Calculator[39], 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.

O13 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.

[36] https://ghgprotocol.org, visited November 2020.
[37] https://eu.climatecalc.eu/ (visited 7/6-2019).
[38] https://www.carbonfootprint.com/calculator.aspx, visited November 2020.
[39] CoolClimate Calculator (berkeley.edu), visited November 2020.

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

Background to the requirement

The requirement is unchanged compared to generation 5 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 (O10).

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 O6.

4.10 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.

O14 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.

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).

✉ 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.

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

Background to the requirement

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.

P8 Wastepaper

The printing company may be awarded up to 10 points depending on the quantity of wastepaper. The threshold values for each individual printing method are listed in table 11 below.

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 in order to produce a figure for total wastepaper, unless the printer can show that some other figure applies for wastepaper generated by external bookbinders.

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%.*

Table 11: 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

Calculate points = 1 - (quantity of wastepaper/threshold value) * 100

Example of point calculation (sheet fed offset printing company): If the printing company´s quantity of wastepaper is calculated at 18%, the calculation will be as follows:

*(1 - 18/25)) *100 = 28% = 6 points*

Table 12: P8 example of points

Proportion of wastepaper (%) in relation to threshold value for wastepaper (%)	Points
0	0
1 - 10%	2
11 - 20%	4
21 - 40%	6
41- 60%	8
61 - 100%	10

✉ The printing company shall provide a description of the calculation in accordance with the option for scoring points outlined above as well as an annual specification or the like from the recipient documenting the quantity of wastepaper disposed of, or details of how the wastepaper was weighed.

✉ 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 the requirement

The requirement for wastepaper has been adjusted and amended in generation 6 of the criteria. 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[40] and Blue Angel[41]. Compared to generation 5 of the criteria the reference value for digital printing has been changed from an average of 10% to 18% and reflects the evolution within new digital printing technologies. E.g., in the past, digital printing was primarily made up of photocopies and simple printers. Today, new digital technologies have replaced traditional offset printing

[40] https://ec.europa.eu/environment/ecolabel/products-groups-and-criteria.html, visited August 2019.
[41] Basic Criteria for Award of the Environmental Label for Printed matter (RAL-UZ 195) of Blue Angel. January 2015.

with accompanying higher share of wastepaper. After the consultation, the reference value for sheet fed offset has been adjusted from 23% to 25% due to trends in the marked of smaller print runs. The average reference value for the other printing methods is the same as in generation 5. The requirement for point scoring has, however, been amended in generation 6. Now it is only possible to score points if the printing companies' proportion of wastepaper is below the different threshold values.

As in generation 5, 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.

P9 Unsorted waste

The printing company may be awarded up to 5 points depending on the quantity of mixed waste in kg per tonne substrate (unsorted/unsuitable for recycling, solid waste that is incinerated or goes to a land fill).

If household waste can be separated, it can be excluded from the calculation.

Table 13: P9 example of points

Mixed waste (kg/tonne purchased substrates)	Points
0	5
1 - 5	4
6 - 10	3
11 - 15	2
16 - 20	1
Above 20	0

✉ The printing company shall provide a description of the calculation in accordance with the option for scoring points outlined above as well as an annual specification or the like from the recipient documenting the quantity of mixed waste (kg).

Background to the requirement

The requirement is unchanged compared to generation 5 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[42] 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.

4.11 Ecolabelled products and services

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

P10 Purchase of ecolabelled products and services

The printing company may be awarded up to 3 points depending on the annual use of ecolabelled products and services. The products or services are listed in table 14 below:

Table 14: P10 example of possible 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 services	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 imaging equipment within the categories: printers/multifunction devices	1
100% use of Nordic Swan Ecolabelled industrial cleaning and degreasing agents	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.*

✉ 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 the requirement

It is only possible to obtain points for use 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.

From the 6th generation of the criteria, it is possible to obtain points if:

- 100% of the cleaning carried out at the printing company is performed by Nordic Swan Ecolabelled cleaning services and/or
- 100% of the printing company's multifunction devices (imaging equipment) is Nordic Swan ecolabelled and/or
- 100% of the industrial cleaning and degreasing agents used at the printing company is Nordic Swan ecolabelled.

[42] Anna Fråne ett al.: PVC waste treatment in the Nordic countries, Nordic Council of Ministers 2019.

- 100% of the purchased electricity is ecolabelled according to Bra Miljövalg, EKO Energy or similar.

The limit of at least 90% by weight of used rags/clothes laundered at Nordic Swan Ecolabelled textile services and use of ecolabelled industrial tissue paper has been amended from 90% to 100% in generation 6 of the criteria. The amendment of the requirement is based on data from licensees and dialogue with the industry. The limit of at least 90% used working clothes remains unchanged.

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.

4.12 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 in order to increase the awareness at the printing company, and among the printing industry's customers, to use the log on printed matter.

P11 Use of Nordic Swan logo on printed matter

The printing company may be awarded up to 5 points depending on either a) the annual number of **orders produced** using the Nordic Swan logo on printed matter or b) share (tons) of printed matter using the Nordic Swan logo in relation to total tons of printed matter**.**

*Example using alternative a: If the printing company manufactures 150 production orders a year and 12 of the production orders are Nordic Swan Ecolabelled printed matter, the printing company is awarded: (12/150) * 100 =8% = 1 points*

Table 15: P11 Example of points

Annual number of manufactured Nordic Ecolabelled orders in relation to the total number of orders produced (which can be labelled) or share (tons) of printed matter using the Nordic Swan logo in relation to total tons of printed matter	Points
0 - 4%	0
5 - 10%	1
11 - 15%	2
16 - 25%	3
26 - 49%	4
Above 50%	5

✉ The printing company shall provide a description of the calculation in accordance with the option for scoring points outlined above as well as an annual specification of orders produced.

Background to the requirement

This is a new requirement in generation 6 of the criteria. The requirement supports the printing companies' ability to use the Nordic Swan logo to a greater extent than they do today. 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 Environmental management and regulatory requirements

To ensure that the Nordic Ecolabelling requirements are met, a documented management system must be in place, and it must include the following implemented procedures.

If printing company has a quality system that is certified to ISO 9001, or an environmental management system certified under ISO 14 001 or EMAS, and the following procedures are applied, it is sufficient for the certification body's auditor to certify compliance with the requirements.

O15 Organisation and responsibility

An organizational chart shall be drawn up. Responsibility and authority for central environmental functions shall be defined. Responsibility for the Nordic Swan Ecolabel licence, marketing, training, and purchasing shall be specified, and the contact person for Nordic Ecolabelling named.

✉ Copy of organizational chart.

O16 Documentation

The licensee must archive the documentation that is sent in with the application, or in a similar way maintain information in the Nordic Ecolabelling data system, as long as the Nordic Swan Ecolabel licence remains valid. All the documents regarding the licence must be easily available at the premises of the licensee. This includes documents on internal checks and measurement reports, for example. The contact person for communication with Nordic Ecolabelling is responsible for ensuring that the documentation is updated and available.

🔑 This is checked on site, as necessary.

O17 Procedures in the event of changes, self-assessment, and non-conformities

The printing company must ensure via procedures or instructions that:

- In the event of planned changes that affect the requirements of the Nordic Swan Ecolabel, the contact person must notify Nordic Ecolabelling before the changes are implemented. This may relate, for example, to a change of chemicals or printing technologies. The printing company may only use chemicals assessed by Nordic Ecolabelling.

- In the event of unforeseen non-conformities that affect how the ecolabelling requirements are fulfilled, the contact person must immediately notify Nordic Ecolabelling in writing.
- There is a system for handling claims and complaints.

✉ Copy of procedures in the event of planned changes, self-assessment, unforeseen non-conformities, and claims.

O18 Training

All employees and contractors that are part of daily operations must have the know-how to ensure fulfilment of the Nordic Ecolabelling requirements.

Employees must receive regular training in general environmental matters and environmental issues specific to their field of work that have a bearing on the fulfilling of Nordic Ecolabelling requirements.

Participation in training shall be documented. Subcontractors participating in the daily business shall participate in the printing companies training or certify that they have received equivalent training.

🔑 Lists of participants after completion of training.

O19 Customer information

Customers must be informed that they are using a Nordic Swan Ecolabelled printing company and what this means.

✉ Copy of the customer information procedure.

O20 Legislation and regulations

The business must ensure compliance with the applicable legislation regarding the working environment, the external environment, finances, hygiene, and health.

The business must not have any form of negative criticism from an authority or agency which has not been rectified within the deadline set by the supervisory authority or agency. If this requirement is not met, Nordic Ecolabelling may revoke the licence.

✉ Duly signed application form.

O21 Strategic goals to reduce environmental impact

The printing company shall 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.

✉ 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.

Background to the requirement

This is a new requirement in generation 6 of the criteria. 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[43] 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 O22. 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.

O22 Follow-up of licence

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, O5, O6, O7 and O8.
- Chemicals, requirement O10.
- VOC, requirements O11.
- Energy (if using part B), requirement O12.

The printing company who owns its buildings must comply with reducing the energy consumption by a minimum of 50% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued.

The printing company who owns its buildings must comply with reducing the energy consumption by a minimum of 50% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued.

The continuous improvement objectives and targets relating to the reduction of energy consumption shall be reported on yearly basis even after the requirement is met.

- Follow up on strategic goals to reduce environmental impact O21.

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.

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

✉ Routine for monitoring licence.

Background to the requirement

The requirement has been adjusted to the new structure. As in generation 5, 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 and chemicals, including consumption of VOC.

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, requirement O21. 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.

If the printing company is working with energy management, part B in O12, they are obliged to evaluate their goals and action plans for reducing the energy consumption by a minimum of 50% (in relation to the difference between the energy consumption kWh/ton at the time of application and the threshold value for advanced energy consumption) no later than 3 years after the date the Nordic Ecolabel license is issued. 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.

6 Summary of points

O23 Obligatory requirement points scored

The printing company must score at least 19 points.

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

Table 16: Points total

Point score requirements	Points achieved	Maximum number of points	
P1 Printing substrates		5	
P2 Controlled and Ecolabelled paper		10	
P3 Content of recycled material		10	5
P4 Mono substrates			5
P5 Recycled material and mono substrates			10
P6 VOC		10	
P7 CO_2 calculation		1	
P8 Wastepaper		10	
P9 Unsorted waste		5	
P10 Ecolabelled products and services		3	
P11 Use of the Nordic Swan Ecolabel logo on printed matter		5	
Total		59	

✉ Summary of points in line with the table above.

Background to the requirement

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 as long as 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 19 points in the point score requirements. This can be attained through a high share of controlled/ecolabelled paper, -mono-substrates/substrates containing recycled material, reduced emission of VOC, 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-P11) is weighted from the LCA findings in section 3. Manufacturing of paper is the main environmental and resource-related burden in the life cycle of printed matter. Therefore, the mandatory requirement O5 for consumption of inspected and ecolabelled paper has been stringent from 25% to 60%. Additional consumption of inspected and ecolabelled paper (P2) is weighted a factor 2 or up to 10 points. Paper waste- and VOC minimization and use of mono substrates containing recycled material is weighted a factor 2 or up to 10 points. Use of paper substrates, mono substrates or substrates containing recycled material, minimization of unsorted waste and production of Nordic Swan Ecolabelled printed matter is weighted 1 or up to 5 points. Finally, use of other ecolabelled products or services can receive up to 3 points, while printing companies certified to calculate the climate impact of the printing company or individual graphic products can receive 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.

7 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.svanen.se/en/for-licensees/communicate-nordic-swan-ecolabel/

O24 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.

O25 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 requirement does not include food/beverage 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[44]) 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.

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

O26 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).

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.

O27 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 O10 are not used in the Nordic Swan Ecolabelled printed matter.

✉ Upload a copy of the duly completed and signed Appendix 4, see O24.

O28 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, see O24.

O29 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, see O24.

O30 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, see O24.

O31 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).

✉ Upload a copy of the duly completed and signed Appendix 4, see O24.

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.

In generation 6 it is now possible to use the Nordic Swan logo 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 general rule not be placed on the metal stand or wooden frame since confusion may arise about what the Nordic Swan Ecolabel applies to.

New in generation 6 of the criteria is the possibility to use the Nordic Ecolabel on packaging defined as transport-/postal-/web shop packaging.

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 O6 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.svanen.se/en/for-licensees/communicate-nordic-swan-ecolabel/

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.

As in generation 5, Nordic Swan Ecolabelled printed matter must not contain PVC or fragrance.

8 Areas without requirements

The following is a brief justification for why Nordic Ecolabelling has chosen not to include requirements within specific areas below in this criteria generation.

Requirements for water consumption during printing has been removed in this criteria generation primarily as gravure printing (a large water consuming technology) can no longer be used as a technology in this criteria generation.

9 Changes compared to previous generation

The table below lists changes compared with the previous generation of the criteria.

Table 17: Overview of changes to criteria for Printing Companies and Printed Matter generation 6 compared with previous generation 5

Requirement generation 6	Requirement generation 6	Same requirement	Change	New requirement	Comment
Functional unit	Definition of the functional unit		*		In order to assess the different printing technologies and types of printing substrates, the functional unit is defined as one tonne purchased/used substrate.
Definition of the product group	Definition of the product group		*		Clarification of definition. No use of; film (repro) and 3D printing. Packaging has to be made of paper (wood pulp).
O1	Type of printing company		*		The 50% turnover can also originate form ecolabelled textile and panels.
O2	Suppliers of printing services		*		The requirement has been stringent from 75% to 95% by weight for brokers.
O3	Chemical finishing services		*		The requirement only complies to external chemical finishing services. New requirement to washing agents.
O4	Printing substrates		*		Information and calculation of total number of tonnes substrate purchased annually. New requirement for inspected paper cardboard/corrugated cardboard
P1	Printing substrates			*	Points for total share of print on paper.
O5	Inspected and Ecolabelled paper		*		The requirement has been stringent from 25% to 60%.
P2	Inspected and Ecolabelled paper		*		New scale for points - up to 10 points.
O6	Other substrates than paper			*	New requirement for substrates other than paper containing PVC or PVC coating..
O7	Textiles			*	New requirement: At least 50% ecolabelled textiles.
O8	Panels/boards made of wood			*	New requirement; At least 50% ecolabelled or

					FSC/PEFC certified panels/boards.
P3	Content of recycled materials			*	Points for substrates other than paper containing recycled material.
P4	Mono substrates			*	Points for mono substrates - substrates other than paper.
P5	Recycled material and mono substrates			*	Points for mono substrates containing recycled material.
O9	Paper based packaging			*	Design for recycling. No use of PVC in tape, wax or latex coating.
O10	Chemicals		*		New structure - updated in relation to CLP and Nordic Ecolabelling's general requirements. New requirement to recyclability.
O11	Consumption of VOC		*		The requirement has been stringent from 9 kg purchased annually to <7 kg.
P6	Consumption of VOC		*		New scale for points - up to 10 points.
O12	Energy use		*		New structure - stringent threshold values and requirements for energy improvements.
P7	CO_2 calculations			*	New scale for points - up to 1 point.

O13	Plastic packaging used for protection of printed matter	*			No use of PVC.
O14	Waste management system	*			Requirement for waste management system.
P8	Waste paper		*		New scale for points - up to 10 points.
P9	Unsorted waste		*		New scale for points - up to 5 points.
P10	Purchase of ecolabelled products and services		*		New scale for points - up to 3 points.
P11	Use of Swan logo on printed matter			*	Points for Nordic Swan Ecolabelled printed matter.
O15	Organisation and responsibility	*			
O16	Documentation	*			
O17	Changes and non-conformities	*			
O18	Training	*			
O19	Customer information	*			
O20	Legislation and regulations	*			

O21	Strategic goals and reduced environmental impact			*	Procedure for working with strategic goals and reduced environmental impact - quantitative and time-based goals.
O22	Follow-up of licence			*	Annual review on consumption of substrates and chemicals.
O23	Obligatory requirement points scored		*		New scale for points - Minimum 19 points.
Special requirements concerning the Nordic Swan Ecolabel logo on the printed matter					
O24	Paper		*		Clarified that all paper must consist of inspected or Nordic Swan Ecolabelled paper.
O25	Board/corrugated board for packaging			*	Use of inspected board/corrugated board in packaging.
O26	Textile and panels			*	Use of Ecolabelled textile and panels.
O27	Printing inks, toners, ink, vanishes and adhesives			*	All chemicals must be assessed by Nordic Ecolabelling.
O28	Lamination and PVC		*		No PVC and requirements for use of lamination.
O29	Fragrance	*			No Fragrance.
O30	Printing suppliers and finishers	*			

O31	Traceability		*		Traceability on the printed matter, printing inks, toners, inks, varnishes, and adhesives used.

Criteria version history

Nordic Ecolabelling adopted generation 6.0 of the criteria for Printing companies and printed matter on 17th March 2021. The criteria are valid until 31st December 2026.

On 17 August 2021, Nordic Ecolabelling decided to adjust appendix 1, classification of production chemicals regarding dampening solution additives and furthermore appendix 1 and 2, prohibited substances in chemical products regarding substances on EU member state initiative "Endocrine Disruptor Lists", List II. The new version is called 6.1.

On 8 March 2022, Nordic Ecolabelling decided to adjust appendix 1, prohibited substances in chemical products regarding halogenated pigments and BHT in offset printing inks. The new version is called 6.2.

On 7 June 2022, Nordic Ecolabelling decided to adjust appendix 1, prohibited substances in chemical products regarding isothiazoliones and bronopol. The new version is called 6.3.

On 25 October 2022 Nordic Ecolabelling decided to adjust requirement O6, Other substrates than paper regarding the trivial limit for share of substrates exempted from the requirement from 15% to 25% (a time-limited adjustment). Furthermore, printing companies only carrying out braille printing are exempted the requirement O12, energy use. The new version is called 6.4.

On 14 February 2023 Nordic Ecolabelling decided to adjust requirement 01, type of printing company, regarding printing companies with multiple printing methods, of which one of the methods constitutes a maximum of 5% of the total consumption. The new version is called 6.5.

On 23 May 2023 Nordic Ecolabelling decided to adjust appendix 1, classification of production chemicals regarding production chemicals classified Skin Sens 1, H327 or Resp. Sens 1 H334 used in closed systems and furthermore appendix 1 and 2, prohibited substances in chemical products regarding chlorinated phenols in sublimation dye inks. The new version is called 6.6.

On 27 June 2023 Nordic Ecolabelling decided to adjust requirement O6, Other substrates than paper, to only included PVC and PVC coating. The calculation method has been changed from total consumption of substrates other than paper to total consumption of substrates (paper + substrates other than paper). Furthermore, production chemicals classified as Repr. 1, H360 due to the presents of acrylates (used in a closed printing system), are exempted the requirement O10 Chemicals. The new version is called 6.7.

On 26 September 2023 Nordic Ecolabelling decided to adjust appendix 1, part 2, prohibited substances in chemical products regarding per- and polyfluorinated alkylated compounds in latex ink, dry- and wet toner. The new version is called 6.8.

On 21 November 2023 Nordic Ecolabelling decided to prolong the criteria document with 12 months till 31 December 2027. The new version is called 6.9.

On 19 December 2023 Nordic Ecolabelling decided to adjust appendix 1, part 2, prohibited substances in chemical products regarding Diphenyl(2,4,6-trimethylbenzoyl) phosphine oxide (TPO)" listed on the SVHC Candidate list and Trimethylolpropane triacrylate (TMPTA) with CAS 15625-89-5 classified as Carc 2, H351. The exemption for dry toner containing per- and polyfluorinated alkylated compounds has been prolonged for 3 months to 30 June. The new version is called 6.10.

On 2 April 2024 Nordic Ecolabelling decided to adjust appendix 1, part 2, prohibited substances in chemical products regarding contents of isothiazolinones. 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 isothiazolinones, designed to be used in closed printing systems. The new version is called 6.11.

On 28 May 2024 Nordic Ecolabelling decided to prolong the exemption for dry toner containing per- and polyfluorinated alkylated compounds for 6 months to 31 December 2024 (appendix 1, part 2, prohibited substances in chemical products)r. The new version is called 6.12.

On 19 November 2024 Nordic Ecolabelling decided to adjust requirement P11 accepting volume as an alternative to orders produced in the calculation. Furthermore, OEKO-TEX 100 certified textile made from 100% Post-Consumer Recycled polyester (rPET) can also be used to produce printed matter using the Nordic Swan logo. The exemption for latex ink, dry- and wet toner containing per- and polyfluorinated alkylated compounds has been prolonged for 6 months to 30 June 2025 (appendix 1, part 2, prohibited substances in chemical products). The new version is called 6.13.

On 6 May 2025 Nordic Ecolabelling decided to adjust the exemption for wet toner and latex ink containing per- and polyfluorinated alkylated compounds. From the 1 July 2025 only printing companies officially participating in a testing program for PFAS-free alternatives to wet toner and latex ink will remain exempt, and only until 31 December 2025. The new version is called 6.14.

New 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

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 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.

☐ Dampening solution additive

☐ 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.

☐ Algicide

☐ Ink:

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

☐ Adhesive

☐ Varnish

☐ Repro-chemical

☐ Washing agent

☐ Foil for foil printing

☐ Laminate applicable for paper/printed paper

☐ Adhesive used in manufacturing of paper board/corrugated board

☐ 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.

Printing method in which the product is used:

☐ Sheet fed offset (not envelopes)

☐ Coldset, newspapers

☐ Heatset rotation

☐ Digital printing/photocopying

☐ Flexographic printing (not envelopes)

☐ Coldset, forms

☐ Coldset rotation (not forms/newspapers)

☐ 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 Carc 2, H351 if the classification is due to the presence of titanium dioxide (CAS No. 13464-67-7).
- 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[45]. 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 chain growth[46]. 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.

[45] https://echa.europa.eu/en/substances-restricted-under-reach, visited August 2019.
[46] https://www.hubergroup.de/fileadmin/Redaktion/Editorial_Content/Documents/INKFORMATION/INKFORMATION_5_en.pdf, visited August 2019.

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.

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
    - An exemption is made for non-declared dry toner used in the printing company. However, the exemption does not apply for Nordic Swan Ecolabelled printed matter. The exemption applies until 30 June 2025.
    - An exemption is made for non-declared wet toner and latex ink. However, this exemption does not apply for Nordic Swan Ecolabelled printed matter. The exemption applies until 30 June 2025. After this date, only printing companies officially participating in a testing program for PFAS-free alternatives to wet toner and latex ink will remain exempt, and only until 31 December 2025.
- 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 titanium dioxide (CAS no. 13463-67-7) classified as Carc 2, H351 and 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 the following links:

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 on prohibited substances has been adjusted and updated according to Nordic Ecolabelling's general formulation of the requirement thereby supporting Nordic Ecolabelling's strategic policy on environmental toxins.

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[47]. 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 titanium dioxide (CAS no. 13463-67-7) classified as Carc 2, H351 and 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

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

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.

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, in order 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 particular 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, in order 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[48]. The requirement is absolute – dyes or pigment shall not be based on these metals, there is no limit

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

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).

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[49] and repulpability according to PTC metod PTS-RH 021/97[50] or Aticelca 501:2019[51] 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[52]. 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).

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

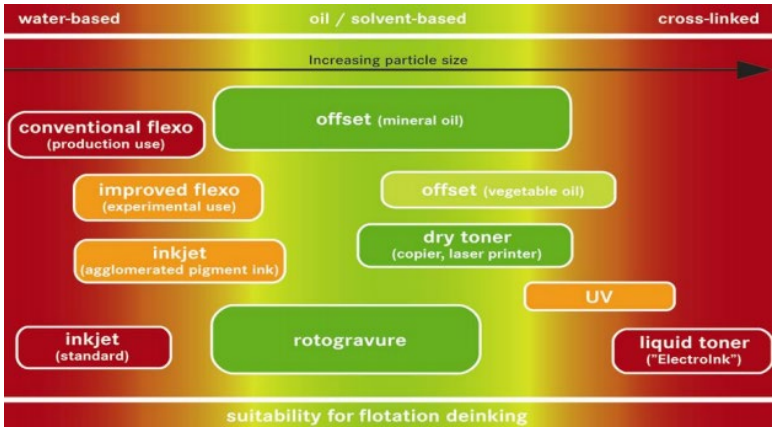

Figure 1 Figure 1: Deinkability of printed products by printing technology. (INGEDE)

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[53] (they are listed in the Annex of the "Assessment of Printed Product Recyclability, Deinkability Score"[54] 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[55] 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[56]. 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[57], 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.

[53] Faul, AM. 2010, Quality requirements in graphic paper recycling, Cellulose Chemistry and Technology 44 (10), pp.451-460.
[54] https://www.paperforrecycling.eu/publications/, visited October 2020.
[55] Vukoje, M.,Jamnicki, S. ,Rožić, M. 2016. Nord.Pulp Pap. Res. J., 31, 692.
[56] Alex Fischer, INGENDE: presentation at the 71st Annual Technical Conference Minneapolis, MN 2019.
[57] 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.

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 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"[58], 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 score 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.

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

3.2 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 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.

E-mail

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

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 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 are often used for signs or Point of Sale (POS) material. Rigid substrates may consist of one material but are often composed of several types of material forming a composite.

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:

☐ Film/foil ☐ Laminate

☐ Board/panel made of wood ☐ Textile

☐ Mesh ☐ 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 (O6)

Substrate, including release paper/liner, must not contain PVC or PVC coating.

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

Yes ☐ No ☐

2 Recycled material and mono substrates

The printing company may be awarded points based on the types of substrates used (substrate containing recycled material (P3), mono substrates (P4) or mono substrates containing recycled material (P5)).

2.1 Recycled material (P3)

Does the substrate contain minimum 50 w% recycled material*?

Substrates containing recycled PVC cannot be awarded points.

** 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 that can no longer be used for the intended purpose. This includes return of material from the distribution chain.

Yes ☐ No ☐

Description and quantity of the recycled material:

⇪ Metal:

- The percentage of recycled metal in the metal part shall be indicated.
- Declaration from the smelter about the proportion of recycled metal in production (on an annual basis)
- The traceability of the supply chain must be documented, e.g., in the form of a flow chart. The proportion of recycled metal in the supply chain must be documented, e.g., by information on invoice or declaration from

supplier. For aluminium (Al), the percentage recovered can be documented with the Hydro Circal certification.

⇪ Plastic:

- The percentage of recycled plastic in the plastic part shall be indicated.
- Manufacturer of recycled raw materials shall be stated.
- Documentation from the manufacturer of recycled raw material showing that the plastic has been recycled according to the ISO 14021.
  or
- Certificates in accordance with the Global Recycled Standard, EuCertPlast or other equivalent certification approved by Nordic Ecolabelling which shows that the raw material has been recycled.

⇪ Other recycled materials:

- Documentation of that recycled material is in accordance with ISO 14021.

2.2 Mono substrate (P4)

Does the substrate only consist of the same material and property (mono substrate)?

Mono substrates made of PVC cannot be awarded points.

Mono substrate (other than paper) consists of the same material such as PE- or PP foil, PC or PS board or polyester. A substrate containing PS homogeneous and PS foamed is not considered a mono substrate. 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.

Yes ☐ No ☐

2.3 Mono substrates containing recycled material (P5)

Does the mono substrate contain minimum 50 w% recycled material?

(Comply with the two above paragraphs for Recycled material (P3) and Mono substrates (P4).

Yes ☐ No ☐

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.

4

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.

E-mail

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

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 6.

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/tradename 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@uos.is
Stiftelsen Miljømerking (Norway)	info@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 in the printing company (O9):

- 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[59]) 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 (O13):

- 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 (O24 - O31):

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.

Print on board/corrugated board

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.

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

The requirement does not include food/beverage packaging.

- 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 guidelines[60]) 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 is 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/

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.

Please be aware of the definition of the product group:

> *Printing companies 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.*

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

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 O10 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.

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, 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 VOC and energy factors

1 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 Nm^3/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/Nm^3 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).

2 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/m3N
Light heating oil: 0.89 kg/litre
Heavy heating oil: 0.98 kg/litre
District heating water: 1.00 kg/litre

Appendix 6 Inspected paper board/corrugated board

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

Only paper board/corrugated board, which is registered item for a specific use, that meets the requirements for inspected paper board/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/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/corrugated board
Inspected paper board/corrugated board applies to conversion of paper to paperboard 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/tradename:	
Manufacturer/supplier:	
Type of paper board/corrugated board:	Board grammage (g/m2):

Requirements for inspected paper board/corrugated board

Inspected paper board/corrugated board must meet the following requirements:

Does the paper board/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/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/tradename of adhesives and chemicals used for coating in the manufacturing of paper board/corrugated board:

_____

_____

_____

☒ 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.
☒ Valid ISO 9001 certificate or similar

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.