About Nordic Ecolabelled

Writing instruments, paint, glue and tape for office and hobby

Draft Version 4

Background to Ecolabelling

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Document for consultation

Nordic Ecolabelling

Nordic Ecolabelled writing instruments, paint, glue and tape for office and hobby - Background to Ecolabelling
Product group number 57/Version 4, Date 10/6 2013

1 Summary

The overall objective of this revision is for the Swan (Nordic Ecolabel) criteria to ensure a positive environmental benefit via ecolabelling, and that the criteria are also clear and useful for the industry. The revision has considered the areas that were apparent on the evaluation of the criteria. This revision has also had focus on expanding the product group with the opportunity to add paint, glue and tape for office and hobby use to the Nordic Ecolabel.

MECO and RPS analysis
In order to gain an overview of the key environmental impacts in the products' life cycle, environmental assessment of the product group has been performed as a qualitative MECO analysis for each of the four product areas – writing instruments, paint, glue and tape for office and hobby. MECO stands for the assessment of Materials, Energy, (C)Chemicals and (O)Other characteristics and describes the most important environmental impacts during the product group's life cycle stages. This was followed by an overall RPS (Relevanse, Potential, Steerability) analysis for the overall product group.

High RPS was found for the following:

- To set Ecolabelling requirements that motivate greater use of renewable or recycled raw materials in fixed materials such as plastic, metal, wood and paper.

- There is also high RPS to reduce the use of metal and the volume of packaging.

- For requirements concerning certified timber and bamboo, to ensure sustainable raw materials.

- For requirements for the classification of chemical products and classification of the constituent substances. In addition, high RPS to exclude or reduce specific problematic substances such as VOC, halogenated organic solvents, preservatives and aroma compounds.

- To make further, more stringent health requirements of products that are marketed as products for children, while there is also high RPS not to use erasers with PAH on pencils, for example, and PAH in coloured pencils.

- To exclude heavy metals from pigments, and metal components and halogenated substances from pigments, and other environmentally hazardous substances from pigments/ink that end in recycled paper fibres.

- For refill opportunities for specific product types.

- For information on the quality characteristics of hobby paint, and for other products RPS to make quality requirements, either as requirements for standardised tests, or as user tests.

- For communication and information concerning environmental and health issues for this product group.

Market description
A brief Nordic market description has been prepared. This shows that the market for this product group is divided into two focus areas, which are hobby products for private consumers, and products for professional users in the form of office and hobby products for offices and childcare institutions. The market description also shows that environmental claims used in marketing in the private market within the product area are closely related to health issues, and often the health aspect is the most important. The products are marketed to contain natural and organic raw materials, and not to contain hazardous substances such as parabens. This is particularly the case for hobby products for children. With regard to the professional office segment, environmental arguments are used instead, such as that packaging and ballpoint pens are made from renewable or recycled raw materials.

Changes in the revision
On the basis of the evaluation, the MECO and RPS analysis, and the market description, the largest changes in the revision are concentrated on expanding the criteria with new requirements of paint, glue and tape for office and hobby use, and on setting more stringent requirements of materials and chemicals. Quality requirements are also introduced, as well as requirements of the information to be stated on the products. Chapter 8 presents an overview of all changes to the requirements, while more detailed descriptions of the changes to the requirements and new requirements can be found in Chapter 7.

2 Basic facts about the criteria

2.1 Products that may be Nordic Ecolabelled

The product group comprises writing instruments, paint, glue and tape for office and hobby use. Refill systems for these products are also included. Application components and dispensers that are not part of the product packaging may be included in the licence if they do not weigh more than the product itself. These four areas are detailed below:

Writing instruments: Pencils, coloured pencils, refillable pencils, ballpoint pens, reservoir pens, overhead pens, whiteboard pens, highlighters, felt-tip pens, charcoal, ink and crayons.
Hobby paint: Acrylic paint such as school paint and artist's colours, fresco, tempera, gouache, finger paint, watercolours, glass paint, textile paint, printing ink, airbrush paint and porcelain paint. Brushes may be included as an application component if they are sold together with the paint.
Office/hobby glue: such as universal glue, paper/school glue, glue sticks, glitter glue and other office and hobby glue that fulfil the criteria.
Tape: Office tape, packing tape, decorative tape, correction tape, double adhesive tape and photo tape with or without colour and/or print.

The criteria set more stringent requirements of products marketed for children. In order to control which products are marketed for children this is defined as follows: *Products marketed for children are products where on either the product itself, the product packaging or other product information it is signalled, either as text or design, that the product is for children.*

It will not be possible to control whether children actually use specific Nordic Ecolabelled products for children, but this gives parents and childcare institutions the opportunity, if they so require, to select Nordic Ecolabelled products that make special consideration of children.

Products that are not included:

- The product group does not include hobby sets that include hobby paint, for example, together with other products such as plaster figures, or felt-tip pens together with a painting book.
- Electronic application components are not included.
- Body and face paint are not included here, but may be Nordic Ecolabelled according to the criteria for cosmetics.
- Dyes for the dyeing of textiles are not included.
- Interior paint for floors and walls is not included, but may be Nordic Ecolabelled according to the Ecolabelling criteria for interior paint.
- Building and industrial glue are not included. Building glue may be Nordic Ecolabelled according to the criteria for chemical construction products.
- Professional tape products for e.g. construction are not included.
- Sport tape, plaster and electrical tape are not included.

Nordic Ecolabelling reserves the right to determine whether a product can be Ecolabelled according to the Nordic Ecolabelling criteria, and the criteria for any product application. For further information please contact the Nordic Ecolabelling organisation (see addresses at the beginning of the document).

2.2 The version and validity of the criteria

Nordic Ecolabelling adopted the previous version 3 of the criteria for writing instruments on 4 November 2008 with validity up to and including 31 December 2012. Amendments to K5, K6, K7 and K8 were adopted at the secretariat management meeting on 13 September 2011. The new version became 3.1.
At the secretariat management meeting on 15 September 2011 it was decided to extend the criteria's validity by 18 months. The new version was 3.2, with validity up to and including 30 June 2014.
At the secretariat management meeting on 8 February 2013 it was decided to extend the criteria's validity by 6 months. The new version was 3.3 with validity up to and including 31 December 2014.

The revised version is version 4, and will be submitted for approval by the Nordic Ecolabelling Board in December 2013. With a duration of five years, this entails validity up to and including 31 December 2018.

3 Reason for Nordic Ecolabelling

Nordic Ecolabelled writing instruments and paint, glue and tape for office and hobby use make requirements of the use of resources by requiring a certain proportion of recycled or renewable raw materials, and by limiting the use of metal. The criteria require a high proportion of certified, sustainable timber and bamboo.

For many of the products there is a high exposure risk, especially for products used by children. The criteria therefore set stringent chemical requirements of the chemical element of the product, such as requirements of the classification of product and raw materials, and the limitation of VOC, halogenated organic solvents and aroma compounds.

The criteria make requirements of good quality, and for writing instruments the requirement of refills for types for which these are used.

4 Overall RPS analysis

The following is an RPS analysis for the product group. The relevance is described above in section 4.1 on the MECO analysis. Below, the potential and controllability are assessed in relation to the relevance found in the MECO analysis.

The environmental assessment for the product group is performed as a qualitative MECO analysis for each of the following four product areas: Writing instruments, office and hobby paint, office and hobby glue and office and hobby tape. MECO stands for the assessment of Materials, Energy, (C)Chemicals and (O)Other characteristics and describes the most important environmental impacts during the product group's life cycle stages. The purpose of the analysis is to provide a qualitative view of the key environmental impacts during the products' life cycle. An overall RPS analysis is then performed for the entire product group, where the four product areas are considered individually, when this is relevant.

4.1 Relevance (MECO analysis)

Below is a brief review of the relevance found in the MECO analysis for writing instruments, hobby paint, hobby glue and tape. The text will state which environmental parameters are only relevant for some of the product areas. The overall MECO analysis may be ordered in the Nordic languages by contacting Nordic Ecolabelling.

Relevance – Materials

Raw materials stage

The product group includes many different types of products. This is also reflected in the materials, which include non-renewable raw materials such as plastic and other polymers (crude oil), china clay, calcium carbonate, paraffins (fossils), metals and synthetic rubber; and renewable raw materials such as timber, natural rubber, vegetable raw materials and agricultural raw materials in the form of bioplastics. The non-renewable resources are

environmentally relevant since these are finite resources that each have a specific supply horizon (expressed in years and assessed on the basis of the resource's known global reserves and the annual global consumption of the resource). This must naturally be compared with the volumes used in the products.

For renewable resources such as timber and agricultural raw materials, the resource volumes are not subject to the same absolute limitation. Yet it is not correct either to perceive the renewable resources as infinite, and they cannot thus be considered to be a "free" resource. But sustainable, renewable raw materials are important to ensuring a sustainable society in the future, and it still makes good sense that a product is resource-efficient, even when the material is renewable. There is also a sustainability aspect to the use of renewable resources, which can be important to include when requirements are set.

For most of the products, and especially writing instruments such as ballpoint pens and felt-tip pens, part of the product is a holster to apply the ink/colour. For hobby paint and glue a lot of material is also used for tubes and other containers. It should be noted that no trade-off is made by encouraging lower consumption of resources or use of renewable resources in product elements if this results in poorer quality and possible shorter product lifetime. If the quality and possibly also lifetime are reduced, resource efficiency in relation to the product's functional unit will be compromised. This is particularly relevant for writing instruments.

It has been assessed that a large part of the product group's environmental relevance lies in the consumption of resources in relation to the products' lifetime. There is also relevance to the use of recycled raw materials, where this is possible.

Production stage
Raw materials are used in the raw materials stage, while in the production stage the parameters are the product design, including choice of materials, the resource efficiency of the production of materials, and whether recycled raw materials are used in the product and packaging.

For all product types it is relevant to ensure that the packaging volume is reduced as far as possible.

Use stage
As relevance has been found in relation to the consumption of resources for the product group, the lifetime during the use stage is also relevant. Consumption of resources in relation to the product's lifetime and function are important to the resource efficiency of the product. For products such as ballpoint pens, the functional unit of writing length is defined. Resource consumption should therefore be considered in relation to the functional unit, if possible. In addition to lifetime, quality also affects whether the product fulfils the expected function. It is therefore also relevant to ensure good quality.

Waste stage
Common to this product group is that a large part of the product is used up during the product's lifetime, and for some writing instruments such as crayons and pencils, of which the entire product is used, the waste stage is when the paper that has been written on or coloured is discarded. For writing instruments such as ballpoint pens, felt pens (e.g. felt-tip pens), hobby paint, glue and tape, the waste fraction consists of used holsters,

tubes or other application components of either fossil plastic, bioplastic, wood or metal, including pigment residues. For ballpoint pens, there are often mixed types of materials. There will be relevance in relation to the recirculation of materials from e.g. ballpoint pens.

Relevance – Energy

Extraction and production of raw materials

Energy consumption is concentrated on the extraction and production of raw materials. This is the extraction of non-renewable raw materials such as crude oil, china clay, titanium dioxide and metals, and production of agricultural raw materials, and the production and drying of timber. The polymerisation and production of plastic granulate for both fossil and renewable plastics are also relevant to energy use. The recirculation of raw materials, often plastic raw materials, will reduce the raw material's overall energy consumption.

Production and Use stage

The relevance lies in the selected materials' energy load, and the products' lifetime in relation to any functional unit. Like resource efficiency, the products' energy efficiency is relevant in relation to the functional unit. If possible.

Waste stage

The chemical element of the products is used during the use stage and disseminated. This means that only holsters, tubes and other packaging elements are left in the waste stage. There will be relevance with regard to recirculation, and thereby energy savings by avoiding the production of new materials, or the opportunity for energy utilisation on the incineration of products of e.g. plastic, wood and paper.

Relevance – Chemicals

Extraction and production of raw materials

There is relevance for process chemicals and emissions to air on the extraction and refining of crude oil, production of polymers and pigments, and on the mining of metals.

Specific areas include the following:

Powdered substances may give rise to dust at the workplace and thereby present a health hazard for production employees.

Depending on which environmental requirements are observed in the production of ink, the employees may be exposed to various chemicals that are hazardous to health, such as colourants, volatile organic solvents, various oils and wax, and carbon black[1].

On production of products with petroleum-based paraffins that can be found in both ink and colours, there is a risk of an impact when these paraffins are melted or incinerated. These are such chemicals as toluene, formaldehyde, benzene, methyl ethel ketone and particles[2].

[1] Science Lab.com, 2001; Elementis Pigments, 2006
[2] Science Lab.com, 2007

Carbon black in its unbound form is extremely hazardous to health. The substance is classified as carcinogenic in class 2B. In addition, there is use of heavy metals in pigment production, and other problematic substances.

Use stage
As described in the Light RPS performed, most children are in daily contact with various hobby products, such as paint, felt-tip pens, coloured pencils, crayons, glue and tape. Children are more likely to get paint, felt-tip pen and glue, etc. on their skin and hands, and it can be absorbed via the skin, or cause irritation. Alternatively, it can be absorbed orally, if the child sucks fingers, felt-tip pens or brushes. Children will therefore often be considered to be more exposed to these products. In addition, children have thinner skins, and can thus more easily absorb substances, and their lower weight will lead to relatively stronger impacts than on adults. The products are not always directly intended for children. It is therefore not certain that the products' content of hazardous substances takes account of the exposure conditions that apply to children's use of hobby products.

The Danish Environmental Protection Agency has performed an investigation of[3] such substances as paint, glue and felt-tip pens that are used in the children/school area. Around 50 hazardous substances were found (heavy metals, emollients, solvents (VOC), halogenated organic compounds, preservatives, allergens and aroma compounds). None of the products investigated were marked with risk codes.

In black coloured pencils and erasers there may be residues of the bitumen substances, PAH, which are carcinogenic and can be genotoxic and reprotoxic. Tænk (the Danish Consumer Council's magazine) has found this in two black coloured pencil products[4]. Tænk's tests also show that it is possible to produce writing instruments without PAH. In the two products, the total amount of PAH found was 2.3 to 5.7 mg/kg. Tests were also made for heavy metals, and small doses of the heavy metal barium were found in the varnish on coloured pencils. Barium in high doses leads to raised blood pressure and kidney damage if the substance is absorbed - and children sometimes chew coloured pencils, for example. The test also found almost three times as much of the phthalate DBP as permitted in the varnish on a pencil.

For pencils with erasers at the end there is relevance in relation to the content of PAH (polycyclical aromatic hydrocarbons), as both synthetic and natural rubber may contain PAH. Several PAH are carcinogenic and genotoxic, and PAH are considered to be the largest single group of carcinogenic chemical compounds[5]. PAH can also occur in the pigment carbon black and in mineral oils.

Waste stage
For writing instruments, hobby paint and glue, relevance is found in terms of heavy metals from pigments and metal elements, and halogenated substances from pigments and other environmentally hazardous substances from pigments/ink that end up in recycled paper fibres on the recycling of paper that has been written on, and can thereby be problematic in terms of the recirculation of paper.

[3] Investigation and health assessment of chemical substances in hobby products for children. MST 2008
[4] http://taenk.dk/test/tuscher-og-farveblyanter/testkonklusioner-tuscher-og-farveblyanter
[5] PAH in products for children, working report no. 114 MST 2011

Relevance - Other
Use stage
In this respect, the perceived writing and colour quality is relevant for both writing instruments and hobby paint, as this is vital to whether the product lives up to the functional unit requirements. This concerns the actual quality of writing and the ergonomic quality when the writing instrument is held.

The product's weight in relation to the functional unit influences the transport load on distribution.

The high exposure risk on using these products makes it relevant to be able to communicate regarding the products' content of chemicals. The Ecolabelling criteria for these product types are thus relevant in terms of the information on the environment, health and quality that the Nordic Ecolabel can provide to consumers.

4.2 Potential and controllability - materials

Raw materials stage and production stage
Supply horizons for resources
For holsters, tubes and other packaging, there is potential in using renewable raw materials where this is possible without diminishing the quality. There is also potential to reduce the consumption of non-renewable raw materials with a short supply horizon. On use of iron, 0.08 milli-person reserves per kg (mPR/kg) are used; for aluminium approximately 1.5 mPR/kg; and for zinc 33 mPR/kg. The higher the figure, the shorter the resource's supply horizon. For fossil plastic products, on the other hand, where deductions are made for resources such as crude oil and natural gas, around 0.02 mPR/kg are used. As previously described, renewable raw materials do not have a limited supply horizon, since they are renewable.

There is thus potential to promote raw materials with longer supply horizons in the products. This means replacing metal with either fossil or renewable plastic, wood or carton, and also replacing fossil plastic with renewable plastic, wood and carton. There is only potential for this where the replacement does not result in diminished quality and shorter product lifetime. Renewable plastics are still new products in the market and it must therefore be taken into account that availability is not as high as for fossil plastics.

It is assessed that there will be good controllability for such a requirement, as this requires that the material types and volumes used must be documented, which is possible for an applicant and necessary for Nordic Ecolabelling.

The use of bioplastics rather than fossil plastics would be significant to the opportunities to recycle materials, since for several fossil plastics recirculation systems have been established in the Nordic countries, where this is by and large only possible for biobased polyolefines that are chemically identical with fossil polyolefines and can thereby be recycled in existing recirculation systems for polyolefines in the Nordic countries. In the waste stage below, however, it is assessed that there is no high RPS for the recycling of materials from the products in the product group.

Conclusion – there will thus be good RPS to set Ecolabelling requirements that encourage use of an increased ratio of renewable raw materials, or the replacement of metal with either fossil plastic or renewable raw materials, as long as this is not at the expense of the quality, and thereby long lifetime, of the product.

Recycled raw materials
There is seen to be potential for the use of a higher ratio of recycled plastic in holsters, tubes and other packaging or application components. There is, however, a risk of a poor chain of custody of contamination in the plastic. On using recycled plastic, the use of both fossil raw materials and energy consumption are reduced[6]. Recycled materials often have a low chain of custody in terms of additives, and there is thus a risk of a trade-off in relation to problematic chemicals in the recycled raw materials. This applies especially if it is post-consumer, rather than post-industry, in which case it will also be far more difficult to document the constituent substances of the materials, due to a low chain of custody. There will therefore be no possibility of controlling that recycled materials must comply with the same additive requirements as for new materials.

There are producers of writing instruments with several products in the market with a content of 50-70% recycled materials[7] (either post- or pre-consumer) measured in relation to the total weight of the pens. This applies to ballpoint pens, felt-tip pens and pencils.

Conclusion – there is assessed to be acceptable RPS for the use of recycled raw materials. If pre-consumer (post industry) is included, there is greater availability of material, and there will be a better chain of custody for additives, and thereby any contaminants in the material.

Sustainable renewable raw materials
Nordic Ecolabelling has longstanding requirements of sustainable forestry for products that include timber raw materials. In most criteria documents this requirement is made by ensuring the chain of custody of the origin of the raw material, together with a requirement that a certain proportion of the raw material must be from areas that are certified according to a standard for sustainable forestry that is accepted by Nordic Ecolabelling. For agricultural crops it is also relevant to ensure the chain of custody and sustainable raw materials. For agricultural raw materials for biopolymers, for example, the same chain of custody systems as for timber raw materials are not found, however. The availability of organic raw materials is relatively low in international terms. At a global level, only 0.86% of agricultural land was cultivated organically in 2011, and 2.2% in Europe[8]. So as not to limit the use of renewable raw materials in these products, it is assessed that RPS is not yet high enough to make requirements of agricultural raw materials for this particular product group.

Conclusion – there is high RPS for the requirement of certified timber raw materials and bamboo, for which there are widespread certification systems to ensue sustainable raw materials.

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[6] http://www.miljoevejledninger.dk/ordbog/uddybendeforklaringer/p/plast

[7] http://bicworld2.s3.amazonaws.com/files/pdfs/sustainable_development/NF_Environnement_certified_products_en.pdf

[8] http://www.organic-world.net/2413.html besøgt den 12/3 2013

Production stage

Besides selecting resources with long supply horizons, the volumes used in production are also relevant. Several producers have versions of writing materials that are light products. They operate with light ballpoint pens with long lifetime, ballpoint pens with refills, and ballpoint pens made from recycled materials. A ballpoint pen with all three characteristics is rare, however. [9]. There is therefore seen to be potential in ensuring resource-efficient writing instruments in terms of writing length (functional unit). The good functional unit in terms of writing length gives a certain controllability. A specific requirement of the consumption of materials for a writing instrument must, however, be viewed in conjunction with other requirements of ballpoint pens, such as refill options, or renewable or recycled materials.

For the other product types in the product group, the same obvious standardised functional unit does not exist, and it will thus be even more difficult to set up a requirement of the weight of materials per functional unit. For all products there will, however, be potential in setting requirements of packaging volume. This concerns avoiding secondary packaging of products where this is not necessary, and minimising the packaging volume per functional unit for writing instruments.

In the production stage there are such parameters as design of the product, including choice of materials, where there is potential for resource-efficient materials production and use of recycled raw materials in the product and packaging.

Conclusion - For all product types there is relevance for ensuring that the packaging volume is reduced as far as possible, and high RPS is seen for the prohibition of individual packaging of, for example, one writing instrument, one glue stick, one tube of hobby paint, etc. It is assessed that there is a need for better insight on selection of materials and materials requirements for ballpoint pens, in order to assess whether there will be high RPS to make a stringent requirement of the weight of materials in the ballpoint pen. It is therefore recommended that this be investigated at the next revision.

Use stage

The product's lifetime in the use stage is important in terms of resource efficiency. As seen from the requirement for a refill option for selected writing instruments in the current version of the criteria, there is potential to extend the lifetime of selected writing instruments. It is both controllable and realistic that lifetime can be extended for the writing instruments for which there are refill options in the form of new ink cartridges or new leads. For selected writing instruments there are also standardised tests to assess writing length and thereby the lifetime of the ink cartridge. It is thereby possible to make requirements of the writing length of the ink cartridge. For felt pens that are refilled by filling with new ink, it is less realistic, however, that the user will use such a refill system. It is instead recommended with regard to resource efficiency that requirements are made of the selection of materials, as described above.

For the other product types such as hobby paint the same refill opportunities do not exist. Some expensive blocks of watercolours can be purchased individually, but

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9 http://bicworld2.s3.amazonaws.com/files/pdfs/sustainable_development/2012/NF%20Environnement%20certified%20products_en-2012.pdf

otherwise refill systems do not seem to be used. For glue, this is relevant with regard to glue pistols. Electrical application components, such as a glue pistol, are not part of the product group and will thus not be relevant either. For tape, on the other hand, it is possible that a non-electrical application component may be included, where there will be potential to ensure that it is possible to buy new refill tape rolls.

Conclusion – For writing instruments with ink cartridges or replaceable leads there is RPS for the refill option requirement. For tape, there is high RPS for the refill option requirement if an application component for the tape is included.

Waste stage

It is assessed that most of these product types will end as unsorted waste, and in large parts of the Nordic region will be used for incineration with energy utilisation. These is because these are small products, and because holsters and packaging may be contaminated with chemical residues and therefore may not be very suitable for the recycling of materials. For packaging with glue and paint residues, there is not considered to be much potential in ensuring that the materials are recycled. There will, however, be potential for the recycling of materials from writing instruments of non-compound materials. The Nordic Ecolabel has no direct controllability, however, in terms of what happens to the used products in the waste stage, and these products are not currently sorted in the Nordic region.

Conclusion – no overall high RPS is seen for specific requirements to motivate the recycling of materials from the product group's product types.

4.3 Potential and steerability – Energy

Extraction and production of raw materials

As stated under the MECO analysis, the energy consumption for the various products in the product group is concentrated on the extraction of raw materials and the production of materials. For energy consumption in the extraction and cultivation stage, there is low steerability, as there are many remaining links in the product chain. Here, there are no certification systems with regard to energy consumption.

In terms of materials production, there are several materials that require a lot of energy to produce, such as polymers, aluminium, organic solvents and certain vegetable oils. Many of these materials are essential for the product group, however, such as fossil or bio-based polymers. The production of both renewable and fossil polymers is energy intensive. Since many bioplastic productions are relatively young, energy efficiency is expected to improve in coming years[10]. At present, however, environmental improvements with regard to the use of biopolymers are mainly related to how these are renewable, rather than fossil raw materials, and not to a generally lower energy consumption in the production of the polymer.

Energy data for polymer productions is often given by Plastic Europe, stated as average figures for the industry, and not specified for the individual productions. We therefore

[10] Vink et al 2010, The Eco-profile for current Ingeo polylactide production, Industrial Biotechnology, vol.6, No. 4, pp. 211-224

do not know of variations in these average figures and thereby the potential for environmental improvements in relation to energy consumption. Minimising the content of residual monomers will often require increased energy consumption and there is thus a trade-off in terms of the environmental impact in this regard.

The use of recycled raw materials, such as plastic raw materials and aluminium, will reduce the raw material's overall energy consumption. There is therefore seen to be potential in requiring a certain proportion of recycled material in the products, if fossil plastic, paper or metal for specific product components are used as fixed materials.

Conclusion – High RPS is found to require a certain proportion of recycled raw material in respect of metals and fossil plastics. The proportion must be based on the actual supply of recycled material in the market. High RPS is not found for making direct energy requirements of the production of materials.

Production stage

No particularly high energy relevance is found for this life cycle stage. The product group is also very heterogeneous and not all of the product types have clearly defined functional units, so that it would be difficult to set a requirement level. Steerability is therefore also low.

Conclusion – Low RPS is found for the energy requirement of the production stage.

Use stage and waste stage

No high energy relevance is found for these life cycle stages in the MECO analyses.

4.4 Potential and steerability - Chemicals

Extraction of raw materials and production of materials

Relevance is found for process chemicals and emissions to air on the extraction and refining of crude oil, production of polymers and pigments, and on the mining of metals. Yet there is only steerability for requirements in the actual production of the products and not all the way back to the production of raw materials. As requirements are made of the constituent substances in the chemical products, this may have an effect back to the production of the chemicals. The general assessment is that there is no high RPS for requirements of emissions and discharges.

Conclusion – No high RPS is found for requirements of this stage. Instead, requirements of the constituent substances in the production stage might have an environmental impact with regard to the problematic substances used in the raw materials stage.

Production and use stage

In terms of the production stage, it is difficult to pinpoint specific areas with high potential, as the product group includes many types of production. In particular, problematic substances such as heavy metals in pigments are hazardous to work with. In general, the productions described previously in the "relevance" section may have different discharges and emissions. On the present basis, however, no high RPS has been found, however. The Danish Environmental Protection Agency has performed an

investigation of[11] such substances as paint, glue and felt-tip pens that are used in the children/school area. Around 50 hazardous substances were found (heavy metals, emollients, solvents (VOC), halogenated organic compounds, preservatives, allergens and aroma compounds). The environmental and health impacts of these substances are relevant in terms of both the production of the products and the use stage. There is therefore potential to ensure that toxic, hazardous and CMR substances are not used as constituent substances in the production of ink, hobby paint, graphite, crayons and glue. This will ensure that these substances do not lead to a poor working environment or are discharged to water or air during production. The applicant must be able to document the constituent substances in the chemical products used and there is thus steerability for such a requirement.

In addition to requirements of problematic substances in the chemical products, relevance is also found for the content of PAH (polycyclical aromatic hydrocarbons) that may be included in both synthetic and natural rubber (latex) in erasers on pencils and refillable pencils, and in coloured pencils[12]. Several PAH are carcinogenic and genotoxic, and there will thus be considerable health relevance in removing these substances from writing instruments. It is possible to use erasers without PAH[13]. It is assessed that such a requirement is controllable.

In terms of steerability, it is important to set a clear requirement for how far back in the supplier chain the requirement must be documented. Nordic Ecolabelling has experience with generally good steerability for documentation from subsuppliers 1-2 stages back in the chain.

There is seen to be potential to set more stringent requirements of products that are marketed as hobby products for children. Regarding hobby paint, glue and crayons for children, for example, the health aspect will be decisive and another product quality than e.g. hobby and office products for adults can therefore be accepted

In order to control which products are marketed for children this must be clearly defined in the criteria. It will not be possible to control whether children actually use specific Nordic Ecolabelled products for children, but this gives parents and childcare institutions the opportunity, if they so require, to select Nordic Ecolabelled products that make special consideration of children. As shown by the Light RPS performed for the expansion of the product group, several producers already market their hobby products in terms of children's health.

Conclusion – High RPS is found for the requirements of classification of chemical products and classification of constituent substances. In addition, high RPS to exclude or reduce specific problematic substances such as VOC, halogenated organic solvents, preservatives and aroma compounds is also found. There is also RPS to ensure that further, more stringent health requirements are made of products that are marketed as

[11] Investigation and health assessment of chemical substances in hobby products for children. MST 2008
[12] http://taenk.dk/test/tuscher-og-farveblyanter/testkonklusioner-tuscher-og-farveblyanter
[13] http://www.forbrugerkemi.dk/nyheder/born/dynamiske-lister-til-nyeste-om_born/nyeste-om-legetoj/ga-udenom-helt-billigt-tegnegrej

products for children, while there is also high RPS to ensure that erasers with PAH are not used on pencils, for example, or with PAH in coloured pencils.

Waste stage

The aforementioned RPS to prohibit the use of constituent problematic substances in ink, hobby paint, graphite, crayons and glue also applies to the waste stage. Here, there is RPS to avoid heavy metals from pigments and metal elements, halogenated compounds from pigments, and other environmentally hazardous substances from pigments/ink that end in recycled paper fibres on the recycling of paper that has been written on. By making requirements of the constituent substances in ink, hobby paint and glue, steerability is also achieved of what can end up in the waste stage from these products.

Conclusion – In this stage, high RPS has been found to exclude heavy metals from pigments and metal components, and halogenated compounds from pigments, and other environmentally hazardous substances from pigments/ink that end in recycled paper fibres.

4.5 RPS - Other

Raw materials stage

For both the raw materials stage and materials production it is also relevant to assess the social and working environment aspects. However, it has been very difficult to concretise this further, and as this is several stages back in the production chain, the steerability for working environment requirements in e.g. pigment production will be low. It is therefore assessed that the greatest steerability to do anything here is to prohibit problematic substances as constituent substances in ink, hobby paint, graphite, crayons and glue. This will also have a working environment impact on the production of these chemical products.

Conclusion – No high RPS is found for further requirements.

Use stage

In this respect, the perceived writing and colour quality is relevant for both writing instruments and hobby paint, as this is vital to whether the product lives up to the functional unit requirement. It is assessed that there is potential to set quality requirements for the products, It is, however, also important to be aware that for e.g. hobby paint there are different quality levels in the market, which are described as e.g. artist's colours and studio colours. The producers themselves use these quality designations on the products in order to signal the quality, but also the price class. The consumer may thus select between different price and quality classes. Especially for hobby paint, the Nordic Ecolabel should therefore accept that there is a need for several quality types in the market. The important aspect is correct information to consumers.

For other products in the product group, such as glue and tape, and possibly writing instruments, there is seen to be potential to ensure good quality. Standardised quality tests give the best steerability, but user tests are used instead in cases where there are no relevant test standards.

The high exposure risk on using these products makes it relevant to be able to communicate regarding the products' content of chemicals. The Ecolabelling criteria for these product types are thus relevant in terms of the information on the environment, health and quality that the Nordic Ecolabel can provide to consumers. As there are no other environmental labels than operate across the Nordic market, there is seen to be considerable potential. Use of the Nordic Ecolabel on these products will provide high steerability of this communication, and ensure its credibility.

Conclusion – There is RPS for information on the quality characteristics of hobby paint, and for other products RPS to make quality requirements, as either requirements for standardised tests or user tests.

Conclusion – Very high RPS is found for communication and information concerning environment and health conditions for this product group.

4.6 RPS – overall conclusion

RPS was found for the following:

- To set Ecolabelling requirements that motivate the use of a higher proportion of renewable raw materials, or to replace metal with either fossil plastic or renewable raw materials.

- For the use of recycled raw materials in fixed materials such as plastic, metal, wood and paper.

- For requirements concerning certified timber and bamboo, to ensure sustainable raw materials.

- That the volume of packaging be reduced as far as possible. This can be achieved by a prohibition on individual packaging of e.g. one writing instrument, one glue stick, one tube of hobby paint, etc.

- For requirements of the classification of chemical products and classification of the constituent substances. In addition, high RPS to exclude or reduce specific problematic substances such as VOC, halogenated organic solvents, preservatives and perfume.

- To exclude heavy metals from pigments and metal components and halogenated substances from pigments, and other environmentally hazardous substances from pigments/ink that end in recycled paper fibres.

- For requirements of refill options for writing instruments with ink cartridges or replaceable leads.

- For requirements of refill options if an application component for the tape is included.

- For information on the quality characteristics of hobby paint, and for other products RPS to make quality requirements, either as requirements for standardised tests, or user tests.

- For communication and information concerning environmental and health issues for this product group.

5 Market description

5.1 The Nordic market

The market is divided into two focus areas, which are hobby products for private consumers, and products for professional users in the form of office and hobby products for offices and childcare institutions.

The private market
In the Nordic market there are major players such as Panduro Hobby, Clas Ohlson and Lekia, and the products are also sold by various toy stores such as Toys R'us, everyday commodities stores, and bookshops. Much of the sale also takes place via the Internet, where there are many different stores. Professional artists will often also be part of this market segment.

The professional market
The professional market is large, as it includes both public and private enterprises' purchases of office materials. This includes major players such as Lyreco, Staples and Lekolar. It is often some of these that achieve framework agreements with public bodies.

Market distribution of producers
In the Light RSP performed it was assessed that a small number of Nordic producers cover around 15% of the market, the European producers a slightly larger share of up to 30% of the Nordic market, while a number of Asian and American producers hold the remaining share of the market for the product types paint, glue and tape for office and hobby use.

Nordic producers
There are not many Nordic products within the product group, but the following are some well-known producers:

Writing instruments:
Ballograf AB, Penol A/S, Vestergaard A/S (Filia crayons), Creas A/S (Viking pencils), Rahmqvist Avico AB
Hobby paint:
Scherning A/S, Penol A/S, Wenström Oy, Terapima AB (Swedish with production in the EU)
Glue for hobby and office use:
Danalim A/S, Henkel A/S (Pritt), Kiilto
Tape:
Stokvis tape (offices throughout the Nordic region), (non-Nordic producers: Releif, Scotch and Tesa)

In addition, Panduro, IKEA and Clas Ohlson have private labels within several of the product types. There are also major distributors such as ColArt

5.2 Environmental and health aspects as competition parameters

The private market

Environmental claims used in marketing in the private market within the product area are closely related to health issues, and often the health aspect is the most important. The products are marketed to contain natural and organic raw materials, and not to contain hazardous substances such as parabens. This is particularly the case for hobby products for children. An example is a finger paint that is marketed to consist of ingredients that are approved for food products and are thus marketed as "*Healthy finger paint guaranteed free of hazardous chemicals*"[14]. The finger paint in question holds the German Ökotest label. There are also watercolours with vegetable colours that are marketed with the following sentence: "*watercolours made from plant-based raw materials with a high concentration of plant extract and food colour. Dip the brush in water and paint with a clear conscience!*" and crayons made from beeswax that are marketed as "free of chemicals".

Finger paint from the Dutch producer SES Creative is marketed as: "*Finger paint consists of 90% natural materials. There is a minimum content of parabens, however, since otherwise the product would be full of bacteria. Eco line from SES Creative is quality products designed to protect children's welfare, as well as nature and the environment. Produced in the Netherlands and guaranteed reduced CO_2 emissions via effective production and minimum transport. All packaging is made from recyclable materials*[15]*.*"

Panduro Hobby, which sells hobby articles, differentiates between hobby paint for children and others.

In terms of artists' supplies such as paint, crayons and writing instruments, quality is an important parameter in the marketing of the products.

The professional market

Environmental arguments such as that the packaging is made from renewable or circulated raw materials are used more and more within the product area. Within the product area of tape, environmental arguments such as recycled material, renewable or biologically degradable are often used.

For writing instruments, in the same way it seems that most major producers/suppliers have a series they describe as "green" in their range, such as Pilot with their "Be Green" series. This is used as a type of own "Ecolabel". Some use "eco" in the product name, others refer to the use of recycled material, and some use such terms as environmentally friendly, green, etc. in their marketing.

These own "Ecolabels" are also used actively in marketing from office supplies wholesalers. However, the office supplies wholesaler Staples will not acknowledge and emphasise its own "declared environmental labels". Staples has been in dialogue with the Nordic Ecolabel on which Ecolabels are OK in terms of being type I Ecolabels, i.e. third-party certification and multi-criteria based.

[14] http://www.naturebaby.dk/shop/fingermaling-plus-1099p.html besøgt den 15/1 2013
[15] http://lirumlarumleg.dk/product/SES-Creative/Fingermaling-%D8ko-4-stk-klare-farver visited on 15/1 2013

Mitsubishi Pencils has a ballpoint pen called Uni Power tank Eco[16] that is made from recycled plastic, with a grip made from sawdust and resin. It is marketed as being free of hazardous substances.

5.3 Nordic Ecolabel licences

List of licences as of March 2013:

Danish licences:
557-005 - Penol A/S (registered in Norway and Sweden)
Products: Felt-tip pens (6 different types)
For children and sold in bookshops and hobby supplies stores.

Swedish licences:
357-006 - Ballograf AB (registered in Norway, Finland and Denmark)
Products: Ballpoint pens + refills, highlighters, whiteboard pens.
Mostly sold to the professional market. Option of customised design of ballpoint pens.

357 004 - Rahmqvist Avico AB (registered in Norway and Finland)
Products: Flipover pens, four products in total, different colours
Only sold to the professional market.

5.4 Other labels

A-label in Denmark
The trade organisation Fællesrådet for Formnings- & Hobbymaterialer (FFFH) is an association of producers, importers and distributors of hobby materials in Denmark. FFFH has developed a labelling system called the A-label.

The overall purpose of the A-label is to promote craft and hobby materials that are not hazardous to the health of children and young people. The A-label is the industry's own label, and is therefore not a type 1 Ecolabel.

The A-label sets the following requirements:

- A safety data sheet is provided with all products
- No products have a hazard label
- No products contain hazardous substances to be named in the safety data sheet. The amount is so small that it is below the triviality limit.
- Only one particular group of preservatives may be used.
- Butyl paraben and propyl paraben may not be used
- Substances that are carcinogenic, mutagenic and reprotoxic (CMR) may only occur in such small quantities that they lie below the triviality limit.
- Allergenic substances may only occur in such small quantities that they lie below the triviality limit.

[16] www.uniball.com.au/sn220ew.html

- Endocrine-disrupting substances (determined by the EU) do not occur in the product.
- The product must comply with the requirement of minimum release of heavy metals.
- No perfume or aroma compounds may be added to the product.

Ökotest" label
The German producer Öko-Norm produces crayons, coloured pencils, plasticine, finger paint and hobby glue with strong focus on health aspects, and markets these products under the "Ökotest" label. The products are also sold in the Nordic market. These products are marketed as "*non-toxic natural products from renewable resources that do not impact the environment and resources. The products are either biodegradable or can be recycled*".

NF400 – NF Environnement
For writing instruments there is the French Ecolabel, NF400. The criteria are only available in French, but in the evaluation of the version 3 criteria are translated into English, and are attached to the Evaluation Report as Appendix 1. Requirements are e.g. made of writing length and prevention of drying out, and there is prohibition of specific classifications of both ink and constituent substances in the ink, This does not seem to include the prohibition of environmentally hazardous, allergenic and hazardous (Xn) substances and products.

In the Light RPS performed, it was investigated whether there are labelling schemes for hobby paint, hobby glue or tape under Blaue Engel or the Danish Asthma and Allergy Association. This is not the case.

6 About the revision

Objective of the revision
The overall objective of this revision is for the Swan (Nordic Ecolabel) criteria to ensure positive environmental benefits via Nordic Ecolabelling, and that the criteria are also clear and useful for the industry. The revision must consider all of the areas that were identified on the evaluation of the criteria, and also expand the product group to include hobby paint, glue and tape.

In 2012 a light RPS was performed for the expansion with these three product types. High RPS was found for the Nordic Ecolabelling of these product types.

By expanding the product group it will be possible to Ecolabel a wider range of products within office supplies and hobby products. It is therefore the aim that the Nordic Ecolabelled products become more visible among office supplies for professionals and hobby items for children (both private consumers and in childcare institutions and schools).

About this revision

The revision is performed by Nordic product manager Heidi Bugge as project manager and Svante Sterner as the handover officer. In each country there is a national contact that provides national input.

The external anchoring is performed in connection with consultation and in the ongoing contact with Nordic producers within the product group.

7 Motivation of the requirements

1.1 Productdescription

K1 Information concerning the product

The applicant must provide the following information on the product(s):

1. Brand/trading name

2. Where the products will be sold (retail stores, web shops, professional, childcare institutions, schools or similar)

3. Description of the constituent product(s). If primary packaging, reels, application components or other components included with the product are used, these must be included in the description and be subject to the requirements in the document. Product data sheets or equivalent for each material must be submitted.

4. Description of the manufacturing process for the product. Subsuppliers must be described with the name of the company, production site, contact, and the production processes performed (such as ink production).

5. State a list of materials and chemical products used in the production of the writing instrument, hobby paint, glue or tape, and any primary packaging, reels, application components or other components included with the product. A safety data sheet for each chemical product must be submitted.

Materials are constituent materials such as wood, paper, carton, pulp, plastic, rubber, metal, etc. Chemical products are the chemical compound such as ink, glue, crayon or paint. Primary packaging is e.g. carton or plastic encasing individual products such as one writing instrument, one paint tube, and so on. The reel is the plastic or cardboard roll on which the tape is rolled.

Chemical products are e.g. ink, paint, crayon and glue. Auxiliary chemicals used during the manufacturing processes and that are not included in the finished product are not required to be stated.

☒ Submission of information stipulated in the requirement. A product data sheet may be submitted as part of the documentation. Information concerning materials, cf. Table 2 in Appendix 1, must be submitted. It is possible to use Excel spreadsheets equivalent to Table 2 in Appendix 1 as lists of materials.

☒ Table 1 in Appendix 1 is completed for the product(s) and submitted.

Background to the requirement
This requirement must provide an insight on which product(s) the application is submitted for, in order to ensure correct processing.

7.1 Environmental requirements

1.2 Resources

K2 Renewable and recycled raw materials

State the percentage composition of the materials in the product.

Plastic materials in writing instruments for professional users:

At least 30% w/w of the plastic materials included in the finished product with more than 5% w/w must be made from renewable or recycled raw materials.

For polypropylene (PP), polyethylene (PE) and polyethylene terephthalate (PET) the 30% w/w must be post-consumer recycled plastic, while for other plastic types both pre- and post-consumer recycled plastic are accepted, cf. the definition in ISO 1402.

Oils and wax included with more than 20% w/w in the chemical compound:

At least 50% w/w must consist of renewable raw materials.

Renewable raw materials are here defined as biological material that is reproduced in nature. This includes the biodegradable element of products, waste and residues from agriculture and aquaculture (both vegetable and animal), forestry and similar industries, and the biologically degradable fraction of industrial waste and municipal waste.
Recycled raw materials are here defined as pre-consumer and post-consumer, cf. the definition of this in ISO 1402.

On using primary packaging, the weight of the packaging is distributed proportionally on the individual products.

☒ An overview of the constituent materials with information on material types that show that the requirement is fulfilled. Form 1 may be used for this.

Background to the requirement
The requirement is new for this product group.
In the RPS analysis in section 4.2 RPS is found to set Ecolabelling requirements that encourage the use of a higher proportion of renewable raw materials and the use of recycled raw materials.
The requirement concerns plastic, oils and wax, as it is assessed that there is greatest potential for the use of either renewable or recycled raw materials. The use of metal is limited in requirement O3.
Renewable raw materials
On using wax and oils in e.g. crayons and colouring sets it is often possible to use renewable raw materials such as beeswax and vegetable oils. The requirement applies to the use of more than 20% w/w of either wax or oil in the chemical compound, which may be the crayon or the actual crayon in a coloured pencil. Beeswax crayons are found in the Nordic market[17].

Recycled raw materials
The opportunity to use recycled material in this product group is most relevant for plastic and metal. The use of metal is strongly limited in requirement K3, however, and this requirement of recycled material therefore only includes plastic. According to an investigation by Nordic Ecolabelling in cooperation with SP in Sweden in 2007, considerable amounts of packaging plastic are collected in the Nordic countries, especially polyethylene (PE), polypropylene (PP) and polyethylene terephthalate (PET). Most of the plastic collected is recycled outside Europe, but today there are several recycling players in the Nordic region and Europe. Experience with the Nordic Ecolabel criteria for furniture and interior fittings shows that for certain types of plastic both pre-consumer and post-consumer material must be accepted in order to fulfil the requirement of a certain proportion of recycled plastic. But for the plastic types PP, PE and PET, only post-consumer plastic is accepted as recycled plastic. For other types of

[17] http://www.stockmar.de/index.php?ccPath=21_61

plastic, production waste from other industry is thus also accepted (internal waste in own activities is not accepted).

The requirement of recycled and renewable plastic only includes writing instruments for professional use. In the industry development can be seen towards reducing the environmental impact of the consumption of the resources in the products, e.g. by using recycled and renewable materials. For writing instruments for children, recycled plastic is not required, as the chain of custody of the additives in plastic is given higher weight due to a higher exposure risk, as children can put these products in their mouths.

Producers of writing instruments such as BIC and Pilot use recycled materials in their writing instruments. Pilot call these products Begreen and state that the proportion of recycled material is stated for the writing instrument excluding replaceable components such as cartridges, ink or other refills. This means that they have ballpoint pens with up to 94% recycled material. The recycled plastic is mainly PET from recycled bottles, but it is not clear whether only post-consumer materials are considered to be recycled[18]. BIC describe how their percentages of recycled material are calculated for the product's total weight. The ratios are from 50% w/w to maximum 74% w/w. It is not stated whether the recycled material is only post-consumer, or whether post-industry is also included[19]. It is stated, however, that recycled material is used in accordance with the ISO 14021 standard. The definition of recycled material in the standard is both pre- and post-consumer.

Pre-consumer material:
Material redirected from the waste flow during a manufacturing process. This excludes the reuse of materials such as reprocessed materials (rework), reground materials or scrap produced in a process, and that can be recovered within the same process as it was generated in.

Post-consumer material:
Material from households or from commercial, industrial and institutional facilities in their role as end users of the product, and that can no longer be used for the intended purpose. This includes material discarded from the distribution chain.

BIC does not, however, have products that have both the refill option and recycled material. It can therefore be expected that writing instruments with the refill option cannot be produced with the same high content of recycled material. This is supported by how Pilot do not include refill cartridges in their material ratio when the ratio of recycled material is calculated. A lower ratio would have to be set if refill cartridges were also included. Here in the requirement, it has been decided to set the ratio at 30% w/w and only allow the requirement to concern plastic materials, so that e.g. ink is not included. 30% w/w is differentiated in relation to plastic type in terms of whether both pre- and post-consumer recycled material is accepted. The ratio here is therefore not comparable with e.g. BIC's ratio of recycled material. This requirement also credits both recycled and renewable material.

[18] Environmental statement, 2013, Pilot
[19] BIC's sustainability report 2011

K3 Metal product components and packaging

Metal may not be used in packaging, holsters, reels or application components of the Nordic Ecolabelled product.

Springs, ink cartridges and related tips for writing instruments, the tear-off part of a tape dispenser and small metal parts that constitute less than 5% w/w of the product are exempt from this requirement.

✉ Declaration from the producer that there is no metal in the product component or packaging.

Background to the requirement
The requirement is new for this product group.

RPS is found for a high ratio of renewable raw materials and raw materials with a long supply horizon without this giving any deterioration in the product in relation to the function required. Metal generally has a shorter supply horizon than plastic and renewable raw materials. This means that replacing metal with either fossil or renewable plastic gives an environmental gain in relation to the resources consumed, if the replacement does not result in considerably diminished quality and a shorter product lifetime. It is assessed that this is possible for the packaging, holsters, reels or application components for the Nordic Ecolabelled product. For springs in ballpoint pens, ink cartridges and related tips and the tear-off section of a tape dispenser, however, it is assessed that there is a need to use metal to achieve the required function and quality.

K4 Refill option

The applicant must offer refill cartridges or refill leads for Nordic Ecolabelled ballpoint pens and refillable pencils.

The user must be able to replace refills without special tools being required. The refill cartridge must contain at least as much ink as the equivalent original cartridge.

One-off tape dispensers are not permitted, as there must be a refill option

✉ Declaration from the applicant that the requirement is fulfilled, and photo showing the refill system.

Background to the requirement
The requirement is amended to only require the refill option for ballpoint pens and refillable pencils, and not felt-tip pens.
For both ballpoint pens and refillable pencils, the producers often offer refill options. This extends the lifetime of the writing instrument and minimises the product's environmental impact in relation to the functional unit. The requirement is amended to only require the refill option for ballpoint pens and refillable pencils, and not felt-tip pens. Refilling of felt-tip pens is more complicated if the ink is poured in. Refill cartridges for felt-tip pens are only rarely used. It is therefore assessed that it is not realistic that the consumer will use refills for felt-tip pens and instead there is focus on setting resource requirements by requiring renewable and recycled materials in the product.

If the tape is sold including a dispenser, it must be possible to refill with new tape.

K5 Individual packaging

Individual packaging may not be used for writing instruments, hobby paint and glue.

The actual container for the ink, paint or glue, and the application component for e.g. tape, is not considered to be packaging, but part of the product.

✉ A description of any product packaging is sent in, including a statement of how many products are packed in the same packaging.

Background to the requirement
The requirement is new for the product group.

The purpose of the requirement is to conserve resources. Therefore individual packaging of e.g. writing instruments, hobby paint and glue is not permitted. Individual packaging is permitted for tape, as the product does not include a container. The requirement does not concern the actual paint and glue container, or the holster of the writing instrument. BIC has worked to reduce the consumption of resources on packaging per ballpoint pen. Their target for 2013 is maximum consumption of 4.48 g of packaging per ballpoint pen[20].

1.3 Chemicals

The requirements concern the chemical sub-products, here called the "*chemical compound*" included in the Nordic Ecolabelled product. The chemical compound may be ink, paint, graphite, watercolour pencils, crayons, chalk, glue and other adhesives.

Several of the requirements are made of the constituent *substances* in the chemical compound. A *substance* is a chemical element and compounds thereof, natural or industrially produced, containing the additives necessary to maintain the stability of the substance, and the impurities resulting from the production process, apart from solvents, that may be removed without this affecting the substance's stability or changing its composition. A *compound* is a compound or solution that is composed of two or several substances.

Unless otherwise stated, constituent substances are taken to be any substances in the ink, paint, graphite, watercolour pencils, crayons, chalk, glue and other adhesives, including additives (e.g. preservatives or stabilisers) in the raw materials, but not impurities from raw materials production.

Impurities are taken to include residues from raw materials production that are included in ink, paint, graphite, crayons, chalk, glue and other adhesives in concentrations of less than 100 ppm (0.0100% w/w, 100 mg/kg), but not substances added to a raw material or product deliberately and for a purpose, regardless of the quantity. Impurities at raw material level in concentrations of over 1.0 % in the raw material are, however, considered to be constituent substances. Known cleaved off products from constituent substances are also considered to be constituents.

[20] BIC's sustainability report 2011

PCB residues in pigment are subject to a more stringent impurity limit, see requirement K10.

Products marketed for children are products where on either the product itself, the product packaging or other product information it is signalled, either as text or design, that the product is for children.

General background to the chemical requirements

The Danish Environmental Protection Agency has investigated the chemical content of various hobby products and found that several of them contained less desirable substances, including CMR-*classified* substances[21]. The investigation included hobby paint, felt-tip pens and hobby glue**.** The study included products in the Danish market, but is assumed to be representative of the entire Nordic region. This is generally the same type of products as are used in all the Nordic countries.

K6 Classification of the chemical product:

The final chemical compound used in the product must be classified in accordance with the current legislation (CLP Regulation 1272/2008 or the EU's Dangerous Preparations Directive 1999/45/EEC 2008, or later) and may not be classified in accordance with Table 6 below.

Archive-resistant ink is exempt from the prohibition of R22.

There are extra requirements, cf. Table 6, for products marketed for children, and for office/hobby paint and crayons.

Table 6. List of non-permitted classification of the final chemical compound used in the product, in accordance with the CLP Regulation 1272/2008, or later.

Signal words	Hazard code	Hazard designation	Risk code
Warning, Aquatic acute 1	H400	Environmentally hazardous,	R50
Warning, Aquatic chronic 1	H410	N	R50/53
Warning, Aquatic chronic 2	H411	N	R51/53
-, Aquatic chronic 3	H412	N	R52/53
-, Aquatic chronic 4	H413	-	R53
-, Ozone	EUH059	-	R59
		N	
Hazardous, Carc. 1A or 1B	H350	Carcinogenic, T	R45
			and/or
Hazardous, Carc. 1A or 1B	H350i	T	R49
Warning, Carc. 2	H351	Xn	R40
Hazardous, Muta. 1A or 1B	H340	Mutagenic T	R46
Warning, Muta. 2	H341	Xn	R68
Hazardous, Repr. 1A or 1B	H360	Reprotoxic T	R60
Hazardous, Repr. 1A or 1B	H360	T	R61
Warning, Repr. 2	H361	Xn	R62
			and/or
Warning, Repr. 2	H361	Xn	R63
-	H362	-	R33
-	H362	-	R64

[21] Investigation of chemical substances in consumer products, No. 93 2008.

Hazardous, Acute Tox. 1 or 2	H330	Very toxic, Tx (T+ in Norway)	R26
Hazardous, Acute Tox. 1	H310	Tx (T+ in Norway)	R27
Hazardous, Acute Tox. 2	H300	Tx (T+ in Norway)	R28
Hazardous, STOT SE 1	H370	Tx (T+ in Norway)	and/or R39
Hazardous, Acute Tox. 2 or 3	H330 or H331	Toxic T	R23
Hazardous, Acute Tox. 3	H331	T	R24
Hazardous, Acute Tox. 3	H301	T	R25
Hazardous, STOT SE 1	H370	T	R39
Hazardous, STOT RE 1	H372	T	and/or R48
Warning, STOT RE 2	H373	Hazardous to health Xn	R48
Hazardous, Asp. Toax. 1	H304	Xn	R65
Warning, STOT SE 2	H371	Xn	and/or R68
Hazardous, Skin Corr. 1B	H314	Corrosive C	R34
Hazardous, Skin Corr. 1A	H314	C	R35
Hazardous, Eye Dam.1	H318	Local irritating, Xi	R41
Flam. Gas 1,	H220	Extremely flammable F+ , gas	R12
Flam. Gas. 2,	H221	F+ , gas	R12
Flam. Liq. 1	H224	F+ , liquid	R12
The following prohibition only concerns products for children and office/hobby paint and crayons			
Warning, Acute tox 4	H332	Hazardous to health Xn	R20
Warning, Acute tox 4	H312	Xn	R21
Warning, Acute tox 4	H302	Xn	R22
Hazardous, Resp. Sens. 1	H334	Sensitising, Xn	R42
Warning, Skin sens. 1	H317	Xi	R43

The classification applies in accordance with the EU's Dangerous Substances Directive 67/548/EC with subsequent amendments and adjustments and/or CLP Regulation 1272/2008 with subsequent amendments. During the transition period, i.e. up to 1 June 2015, classification in accordance with the EU's Dangerous Substances Directive or the CLP Regulation may be used. After the transition period, only classification in accordance with the CLP Regulation applies.
** Only applies to products for children and office/hobby paint and crayons.*

☒ Declaration from the producer of the final chemical compound used in the Nordic Ecolabelled product that the requirement is fulfilled. Form 2 must be used.

☒ A safety data sheet that is not older than three years for the final chemical compound used in the Nordic Ecolabelled product in accordance with Appendix II of Reach (Regulation 1907/2006/EC with subsequent amendments and additions).

Background to the requirement
The requirement level for the classification of the chemical element of the product is not amended in this revision. The requirement is updated in accordance with CLP, however,

and the text of the requirement has been made clearer. The requirement now also includes paint, glue and tape for office and hobby use.

Nordic Ecolabelling seeks to ensure that the health and environmental impact of the products is as low as possible. Therefore requirements are made for the prohibition of specific classifications of the products. In section 4.4 of the RPS analysis, generally high RPS is found for stringent chemical requirements for this product group, and for products used by children especially high RPS is found for stringent chemical requirements. It is also found relevant to make extra classification requirements of products where it is probable that there is skin contact with the chemical compound on using the product, and thereby stronger exposure to the product. This applies to all products: office/hobby paint, crayons and all products for children. The requirement is also a prohibition of chemical compounds classified as allergenic for products that are marketed for children, and all office/hobby paint and crayons.

Products marketed for children are products where on either the product itself, the product packaging or other product information it is signalled, either as text or design, that the product is for children.

The requirement means that only products with a very small or no environmental or hazardous impact may bear the Nordic Ecolabel. The requirement e.g. excludes products where the chemical compound is dissolved in toxic or hazardous solvents.

K7 Classification of constituent substances

The requirement concerns all constituent substances in the final chemical compound included in the product.

The constituent substances used in the chemical compound (e.g. ink, paint, graphite, watercolour pencil, crayon, chalk, glue and other adhesives) must be classified in accordance with the current legislation (CLP Regulation 1272/2008 or the EU's Dangerous Preparations Directive 1999/45/EEC 2008, or later) and may not be classified in accordance with Table 7 below.

The requirements also concern known decomposition substances.

Archive-resistant ink is exempt from the prohibition of R22.

There are extra requirements, cf. Table 7, for products marketed for children, and for office/hobby paint and crayons.

Exempt from this requirement are isothiazolinones that are used for the preservation of the chemical compound and that are not allocated one of the risk codes R33, R42, R49, R68 or combinations thereof (further requirements of isothiazolinones are stated in K14).

Note that the residual monomers in polymers have an additional classification requirements in requirement R13.

Table 7. List of non-permitted classification of the constituent substances in the final chemical compound used in the product.

Signal words	Hazard code	Hazard designation	Risk code
Hazardous, Carc. 1A or 1B	H350	Carcinogenic, T	R45 and/or
Hazardous, Carc. 1A or 1B	H350i	T	R49
Warning, Carc. 2	H351	Xn	R40

		Mutagenic	
Hazardous, Muta. 1A or 1B	H340	T	R46
Warning, Muta. 2	H341	Xn	R68
		Reprotoxic	
Hazardous, Repr. 1A or 1B	H360	T	R60
Hazardous, Repr. 1A or 1B	H360	T	R61
Warning, Repr. 2	H361	Xn	R62
			and/or
Warning, Repr. 2	H361	Xn	R63
-	H362	-	R33
-	H362	-	R64
		Very toxic,	
Hazardous, Acute Tox. 1 or 2	H330	Tx (T+ in Norway)	R26
Hazardous, Acute Tox. 1	H310	Tx (T+ in Norway)	R27
Hazardous, Acute Tox. 2	H300	Tx (T+ in Norway)	R28
			and/or
Hazardous, STOT SE 1	H370	Tx (T+ in Norway)	R39
		Toxic	
Hazardous, Acute Tox. 2 or 3	H330 or H331	T	R23
Hazardous, Acute Tox. 3	H331	T	R24
Hazardous, Acute Tox. 3	H301	T	R25
Hazardous, STOT SE 1	H370	T	R39
			and/or
Hazardous, STOT RE 1	H372	T	R48
		Hazardous to health	
Warning, STOT RE 2	H373	Xn	R48
Hazardous, Asp. Toax. 1	H304	Xn	R65
			and/or
Warning, STOT SE 2	H371	Xn	R68
The following prohibition only concerns products for children and office/hobby paint and crayons			
		Sensitising,	
Hazardous, Resp. Sens. 1	H334	Xn	R42
Warning, Skin sens. 1	H317	Xi	R43
		Hazardous to health	
Warning, Acute tox 4	H332	Xn	R20
Warning, Acute tox 4	H312	Xn	R21
Warning, Acute tox 4	H302	Xn	R22

The classification applies in accordance with the EU's Dangerous Substances Directive 67/548/EC with subsequent amendments and adjustments and/or CLP Regulation 1272/2008 with subsequent amendments. During the transition period, i.e. up to 1 June 2015, classification in accordance with the EU's Dangerous Substances Directive or the CLP Regulation may be used. After the transition period, only classification in accordance with the CLP Regulation applies.

☒ Safety data sheet not older than three years in accordance with Appendix II in Reach (Regulation 1907/2006/EC, with subsequent amendments and supplements) for all constituent raw materials in the final chemical compound used in the product.

☒ Complete recipe with all raw materials in the final chemical compound used in the Nordic Ecolabelled product. For all raw materials the recipe must state the following: function, chemical name, trading name, INCI (International Nomenclature of Cosmetic Ingredients) designation, any CAS number, constituent volume, including and excluding water.

☒ Declaration from the raw materials producer/supplier that the requirement is fulfilled. Appendix 3 must be used.

Background to the requirement
As the requirement now also includes paint, glue and tape, the prohibition of classification with the risk codes R20 and/or R21 (H302, H312) is amended to solely concern products for children and office/hobby paint and crayons, as this will present the highest exposure risk. For classification with R20 and/or R21 (H302, H312) the requirement level is thereby eased for individual types of writing instruments that are not marketed for children, and are not crayons either. This is also to prevent the requirement from being too restrictive in relation to the choice of raw materials.

The requirement is now adjusted to the now expanded product group, which has resulted in a differentiation of the requirement level so that a distinction is made between products marketed for children and those that are not. The explanation is that children are often more strongly exposed to these product types due to how children handle the products (e.g. draw on their skin or taste the products). The criteria set more stringent requirements of products marketed for children. Products marketed for children are products where on either the product itself, the product packaging or other product information it is signalled, either as text or design, that the product is for children. It is also found relevant to make the same tighter classification requirements of products where it is probable that there is skin contact with the chemical compound on using the product, and thereby stronger exposure to the product. This includes office/hobby paint and crayons.

The exemption for isotiazolinones, which are used as a preservative in the product, is motivated by Nordic Ecolabelling's experience that preservatives for paint have some of the risk codes R23, R24, R25, R26, R27, R28, R39, R40 or R48 (or a combination thereof), and that it is at present not possible to replace these preservatives and still have a product with good durability.

The requirement among other things excludes several pigments (e.g. 22 Azo pigments), various hazardous solvents (e.g. methanol and those containing benzene, toluene or xylenes), several binders (e.g. containing bisfenol A or formaldehyde), and several preservatives.

K8 Heavy metals

The requirement concerns all constituent substances in the final chemical compound used in the product.

Heavy metals or heavy metal compounds: cadmium, lead, chromium VI, mercury, arsenic, barium (with the exception of barium sulphate) selenium, cobalt and antimony may not be included in the constituent chemical substances.

✉ Declaration from the producer of the final chemical compound used in the product that the requirement is fulfilled. Appendix 3 must be used.

Background to the requirement
The requirement was also made in the previous version of the criteria. The requirement now includes all chemical compounds in the expanded product group.

Heavy metals may be used for e.g. pigments/colour production. For example, it is still normal for cadmium to be used in pigments in hobby colours. Heavy metals have also been found in pigments in other hobby products with hobby paint[22].
The requirement especially concerns environmentally and health-hazardous heavy metals specified in the text. These are toxic to humans and other organisms. See further motivation of the requirement of heavy metals in the background to K20 .
Selenium is not a metal, but this substance interacts with many metals and acts in the same way in the environment and is therefore included in this requirement. Selenium has the following classification: T;R23/25 R33 R53[23].

K9 Volatile organic compounds (VOC)

Volatile organic compounds may not be included in the chemical compound.

Volatile organic compounds are here defined as:

a. Organic compounds with a steam pressure exceeding 0.01kPa, at 20°C (does not apply to hobby paint),

but if the steam pressure is not stated, and for hobby paint, the following definition is used instead:

b. organic substances with an initial boiling point that is lower than or equal to 250°C measured at a normal pressure of 101.3 kPa.

If both steam pressure and value of initial boiling point are stated as described above, the steam pressure is always used. This does not apply to hobby paint.

Volatile aromatic hydrocarbons (VAH) may not be added actively to the product. An exemption is made for this if volatile aromatic hydrocarbons are included as denaturants in alcohol or in organic pigment/colourants.

Exemption

- For writing instruments: overhead, whiteboard, felt-tip and marking pens an exemption is made for the following volatile organic compounds in ink:
    - Ethanol (CAS 64-17-5)
    - Isopropyl alcohol (CAS 67-63-0)
    - 1-propanol (CAS 71-23-8) may be included with up to 10% w/w of the final chemical compound.

- For hobby paint, up to 5 g/litre (0.5%, 5,000 ppm) volatile organic compounds that are not VAH (volatile aromatic hydrocarbons) are permitted in the final chemical compound of the paint ("ready to use").

✉ Declaration from the producer or supplier of raw materials on the VOC content of the raw material. Appendix 3 may be used.

✉ Summary from producer of chemical compound showing the calculation of VOC content in the final chemical compound, cf. the requirement.

Background to the requirement

[22] http://taenk.dk/test/tuscher-og-farveblyanter/testkonklusioner-tuscher-og-farveblyanter
[23] http://www.mst.dk/NR/rdonlyres/025B84BC-FB4C-4A83-A0AB-AF7DFE601AC3/0/Selendec2002.pdf

The requirement is amended slightly, as the previous exemption for the requirement for 1-methoxy-2-propanol (CAS 107-98-2) in permanent marker pens has been removed. At the same time, a maximum content for 1-propanol (CAS 71-23-8) in the final chemical compound of maximum 10% w/w has been inserted. The removal of the exemption for 1-methoxy-2-propanol (CAS 107-98-2) cannot be seen as a more stringent requirement, as it has emerged that it is only possible to purchase the raw material 1-methoxy-2-propanol (CAS 107-98-2) with a minor content of a substance that is reprotoxic (Rep Cat 2; R61). The raw material 1-methoxy-2-propanol thus cannot fulfil the requirement of the classification of constituent substances K7.
The limitation of the content of 1-propanol (CAS 71-23-8) in the final chemical compound of maximum 10% w/w can be seen as a minor tightening. The reason for this limitation is that the content of 1-propanol of more than 10% means that the final chemical compound must be classified as R41, risk of serious eye damage, which is not permitted.

Several organic solvents have effects that are harmful to health. Organic solvents may be absorbed via the lungs and skin, and damage a number of organs. The damage may be acute or chronic.
Acute injury after inhaling gases presents itself as e.g. headache, tiredness, etc. Organic solvents may also irritate the mucous membranes in the eyes, nose and throat. Organic solvents dry out the skin and can lead to eczema. After longer exposure organic solvents can lead to chronic damage to the brain and nervous system. Certain organic solvents lead to other irreparable damage such as cancer and damage to reproduction (foetal damage). In addition, certain organic solvents contribute to the greenhouse effect, some to photochemical ozone formation and some to depletion of the ozone layer [24].

Volatile organic compounds in which one or several benzene rings are included are called volatile aromatic hydrocarbons (VAH), and are very stable. The expression "aromatic hydrocarbons" among other things describes benzene, toluene, mixed xylenes, orthoxylene and paraxylene.

Different methods are used to describe substances' volatility. Initial boiling point method is one of the methods used to determine whether a substance is volatile, but this method has an error margin in the area of around 250°C, where this requirement and EU Directive 2004/42/EC for paint and varnish set the limit for VOC. Steam pressure is a more certain method to assess whether the substance is a VOC. Yet not all substances have fixed steam pressure, so that the requirement cannot only refer to the steam pressure.

According to the VOC Directive, volatile organic compounds are defined as compounds that at 293.15°K have a steam pressure of at least 0.01 kPa, or that have equivalent volatility in special application conditions. For paints and varnishes, the EU has a special Directive (2004/42/EC) to limit the use of VOC, using another definition of VOC than in the VOC Directive as described above. For paint, VOC are defined as volatile organic compounds with an initial boiling point lower than or equivalent to 250°C measured at a normal pressure of 101.3 kPa.

As there is a Directive concerning decorative paint, and thereby office/hobby paint, the same VOC definition as the Directive has been used for these particular product types.

[24] Miljoevejledninger.dk - http://www.miljoevejledninger.dk/index.aspx?articleid=+808+808

For other products, in principle the steam pressure must be used. If the steam pressure is not determined for the substance in question, it is acceptable to use the initial boiling point instead. In cases where there are values for both steam pressure and initial boiling point, and this does not concern office or hobby paint, the substance must be assessed on the basis of the steam pressure.

In some cases volatile organic compounds may be replaced by water, but this often requires increased addition of preservative. The purpose of the requirement is therefore to exclude the use of volatile organic solvents where possible and to limit the use and only permit minor hazardous VOC where there is a need for VOC. For ink/colours in overhead pens, whiteboard pens and marker pens, there is a need for volatile organic compounds to prevent the ink or colour from drying out too quickly. The requirement therefore includes an exemption for selected VOC that are less problematic, cf. Table 9 below.

Table 9: VOC are subject to the exemption

VOC with exemption	**Classification (CLP)**	**Photochemical Ozone Creation Potential (POCP)**	**LCI value**
Ethanol (CAS 64-17-5)	Flammable liquid, H225	0.2	French LCI (= CLI) list 2006 = 9600
Isopropyl alcohol (CAS 67-63-0)	Flammable liquid, H225; Serious eye irritant, H318; STOT SE 3 May cause drowsiness or confusion H336	0.2	Original first list as issued by ECA report # 18 = 4000; French LCI (= CLI) list 2006 = 5000
1-propanol (CAS 71-23-8)*	Flammable liquid, H225; Serious eye damage, H318; STOT SE 3 May cause drowsiness or confusion H336	0.2	Original first list as issued by ECA report # 18 = 5000; French LCI (= CLI) list 2006 = 5000

* 1-propanol (CAS 71-23-8): *Due to the risk of serious eye damage the exemption only applies when* CAS 71-23-8 is included at levels below 10% of the final composition. Levels exceeding 10% mean that the final product must be classified as causing serious eye damage, which Nordic Ecolabelling will not permit.

EU Directive 2004/42/EG sets requirements of the maximum VOC content in paint. For decorative paint, the VOC content in the final paint may not exceed 200 g/l[25]. Nordic Ecolabelling here makes the requirement of a maximum VOC content of 5 g/litre (0.5% w/w, 5,000 ppm). This permitted value is due to how preservatives are often dissolved in a smaller content of VOC, and that there may be VOC residues from the actual raw materials production.
For adhesive for tape solvents is often used in the manufacturing process. Though processes and solvent free products are gaining ground, for example in connection with the use of UV hardening[26].

[25] DIRECTIVE 2004/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 April 2004
[26] Overfladebehandling med organiskeopløsningsmidler, arbejdsrapport MST 2008

K10 Halogenated organic solvents

Chemical compounds may not contain halogenated organic solvents, with the following exception:

Pigments in which the content of PCB (polychlorinated biphenyls) is contamination or residue and the content of PCB is <25ppm in the pigment.

The PCB concentration must be tested in accordance with "Determination of low levels of chlorinated biphenyl impurities in pigments"[27], or other relevant test method, e.g. "US EPA test method 608".

✉ Declaration from the pigment producer showing compliance with the requirement and the test report in accordance with the requirement. Appendix 4 may be used.

Background to the requirement

The requirement was also made in the previous version of the criteria. The requirement now includes all chemical compounds in the expanded product group. This version has been tightened, however, in terms of contamination with PCB (polychlorinated biphenyls) and on the same page an easing of PCB residues in the pigment.

Organic solvents that contain the halogens chlorine, bromium, fluoride or iodine (halogenated organic compounds) may not be included in the chemical compound. Halogenated organic solvents comprise many substances that are hazardous to the environment and health that are very toxic for organisms in water, carcinogenic or hazardous in other ways. The halogenated organic compounds are less degradable in the environment, which also increases the risk of hazardous effects from the substances.

PCB in pigment

PCB can arise as an involuntary residue on the production of chlorinated pigments (e.g. the Azo pigment), or from production processes where di/trichlorobenzene is used as a solvent[28]. The pigment producer also reports that PCB may occur as an impurity from the raw materials production of "all" organic pigments.

Several surveys have shown that PCB may be found in pigments. In Norway, KLIF has tested the content of pigment pastes and noted that they contain PCB, (2 ppm)[29]. American Toxic Tort reported in 2009 that PCB is found as a residual product on the production of Diarylide pigment and Phthalocyanide pigment, and that the levels vary between 50 and 500ppm[30]. In Switzerland, in 2009 ETAD found a PCB content of between 5 and 20 ppm. ETAD also notes that these small impurities in pigments have no demonstrable health or environmental risk.

In the REACH documentation for Stage 1 substances, pigments with a risk of traces of PCB were found. The EU legislation for the "limitation of the use and emission of certain hazardous substances and preparations (compounds)" sets 50 ppm as the threshold value for the residual content of PCB[31]. While 25 ppm is used as the threshold value for PCB content in pigments in food packaging[32].

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[27] Chemosphere, 1984, 13(4), 499-506

[28] Industrial Organic Pigments; W. Herbst, K. Hunger; Third edition 2004; p. 593

[29] Personal contact Anders Frisk at Flügger AB 3 February 2011

[30] Toxic Torts, Volume 27, Issue 10, July 1 2009

[31] Council Directive 89/677/EEC of 21 December 1989 for the 18th amendment of Directive 76/769/EEC

[32] Resolution AP (89) 1

Nordic Ecolabelling has imposed a more stringent requirement in relation to legislation for PCB contamination and residues in pigments. Here the same requirement limit has therefore been chosen as for food packaging; PCB <25 ppm[33] . The content of PCB in pigment must be tested in accordance with "Determination of low levels of chlorinated biphenyl impurities in pigments"[34], or other relevant test method, e.g. "US EPA test method 608".

Isothiazolinones are not subject to this requirement when the requirements apply only halogenating organic solvents. Isothiazolinones is regulatet by the requirement for preservatives.

K11 Endocrine disrupting substances

The requirement only concerns products for children and hobby paint and crayons.

None of the constituent substances in the chemical compound may be on the EU's priority list of substances that must be examined further for endocrine disrupting effects in category 1 or 2*. The list can be found here:
http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf

(Appendix L, p. 238-)

* ***Category 1****: At least one study indicates evidence of a endocrine disrupting effect in an intact organism.* ***Category 2****: Potential for endocrine disrupting effect. In vitro data indicates potential for an endocrine disrupting effect in an intact organism. Also includes in-vivo effects that may have arisen due to endocrine disruption. May include structural analysis and metabolic considerations.*

✉ Declaration from the raw materials producer/supplier that the requirement is fulfilled. Appendix 3 must be used.

Background to the requirement

The requirement is new for this product group.

Human beings' exposure to endocrine disrupting substances gives grounds for special concern. This is because the exposure to endocrine disrupting substances at important stages of development can cause irreversible damage to the foetus, and lead to serious health effects later in life, and since the consequences for the complex endocrine system of the long-term impact of endocrine disrupting substances is by and large unknown[35]. Endocrine disrupters are a problem in several ways. Firstly, there is no classification for endocrine disrupting substances as such, so that the Nordic Ecolabel must refer to more or less official lists of substances that are suspected or proven endocrine disrupters. This unofficial status makes it difficult to make referrals on formulating the requirements. In addition, endocrine disrupters have proved to have a "cocktail effect", which means that the effect of several substances may exceed the "sum" of the effects. It is thus very important to consider the volume and triviality limit in this context. The requirement refers to the EU's priority list of substances that must be examined further for endocrine disrupting effects in category 1 or 2*. The list can be found here:

[33] Resolution AP (89) 1
[34] Chemosphere, 1984, 13(4), 499-506
[35] Input for the REACH-review in 2013 on endocrine disrupters, DANISH CENTRE ON ENDOCRINE DISRUPTERS, 2013

http://ec.europa.eu/environment/endocrine/documents/final_report_2007.pdf (Appendix L, side 238-)

* **Category 1**: At least one study indicates evidence of a endocrine disrupting effect in an intact organism. **Category 2**: Potential for endocrine disrupting effect. *In vitro* data indicates potential for an endocrine disrupting effect in an intact organism. Also includes *in-vivo* effects that may have arisen due to endocrine disruption. May include structural analysis and metabolic considerations.

K12 Carbon Black

The requirement only concerns products for children and hobby paint and crayons. On using Carbon Black in the chemical compound, the content of the following PAHs may not exceed 0.2 mg/kg final chemical compound.

- Benzo[A]Pyrene, CAS No: 50-32-8
- Benzo[E]Pyrene, CAS No: 192-97-2
- Benzo[A]Anthracene, CAS No: 56-55-3
- Dibenzo[A,H]Anthracene, CAS No: 53-70-3
- Benzo[B]Fluoranthene, CAS No: 205-99-2
- Benzo[J]Fluoranthene, CAS No: 205-82-3
- Benzo[K]Fluoranthene, CAS No: 207-08-9
- Chrysene, CAS No: 218-01-9

✉ Documentation from the Carbon Black supplier showing the content of the stated PAHs, and calculation from the applicant showing that the requirement is fulfilled.

Background to the requirement

Carbon black is a product that is produced on the incomplete incineration or thermal degradation processes of heavy oils, such as coal tar (primarily pyrogenic PAH). Carbon black is classified by IARC (International Agency for Research on Cancer) (2006) as a group 2B carcinogen. However, carbon black is not on the list of harmonised classification and labelling of hazardous substances (Annex VI in the EU's Classification Directive 2008/1272/EC).

Carbon black is used, among other things, as a colourant and to reinforce rubber and plastic products. During the process, PAH are concentrated, primarily in the heavier fractions, e.g. in aromatic oils and tar, while they will only be present to a lesser extent in the lighter fractions, such as
petrol. Heavier mineral oils used as additives in minerals used in the production of toys and products for children are therefore expected to be a source of measurable concentrations of PAH in the products. There are methods to remove PAH from emollient and process oils, which makes it possible to use "cleaner" emollient and process oils in the production of consumer products (BAuA, 2010). There is also carbon black with a reduced content of PAH in the market. Carbon black is used as an additive, and even though the PAH in carbon black are removed during production to some extent, residual concentrations of PAH are still expected to be found in carbon black.

There are alternative oils with a low content of PAH that may be used, and that are used in consumer products. Both the Chemical Inspection Service (2003) and BAuA (2010) have drawn up lists of the these alternatives to the traditional emollient and process oils.

The amount of PAH in carbon black can be further reduced using special extraction methods, such as Soxhlet extraction with organic solvents at high temperatures (ICBA, 2010), or by thermal processing under pressure, or solvent extraction in an atmosphere consisting of inert gases at temperatures >300°C (BAuA 2010).

K13 Residual monomers in polymers

The requirement concerns products in which the polymer is 10% w/w or more of the final chemical compound.

The total content of residual monomers in the polymer may not exceed 100 ppm for the residual monomers classified in one or several classes, as described in Table 12 below. Statement of the quantity of residual monomers must be for a newly produced polymer.

Table 12.: Classification of residual monomers

According to the CLP Regulation (EC:1272/2008):	According to the Dangerous Preparations Directive 1999/45/EC:
CMR (category 1a, 1b, 2)	CMR (class 1-3)
Acute toxicity, (category 1-4)	Very toxic (T+)
Aspiration toxicity (category 1)	Toxic (T)
Specific organ toxicity on occasional exposure (category 1-2)	Hazardous to health (Xn)
Specific organ toxicity on repeated exposure (category 1-2) or Skin or Airway sensitisation (category 1, 1A, 1B).	Allergenic (R 42), (R 43)

The classification applies in accordance with the EU's Dangerous Substances Directive 67/548/EC with subsequent amendments and adjustments and/or CLP Regulation 1272/2008 with subsequent amendments. During the transition period, i.e. up to 1 June 2015, classification in accordance with the EU's Dangerous Substances Directive or the CLP Regulation may be used. After the transition period, only classification in accordance with the CLP Regulation applies.

✉ Declaration from the producer of the chemical compound that the requirement is fulfilled. Appendix 4 must be used.

✉ Specifications and/or analysis results from the polymer producer, to support fulfilment of the requirement.

Background to the requirement

The requirement is new for this product group.
Residual monomers in the polymer may cause negative health effects, e.g. due to the monomers' allergenic and carcinogenic characteristics. This risk is considered to be so great that it is necessary to set a separate requirement in order to limit the total content of residual monomers in the polymer. The requirement is set so that polymers at most may contain 100 ppm residual monomers, if these are classified as CMR (category 1a, 1b, 2), Acute toxicity, (categories 1-4), Aspiration toxicity (category 1), Specific organ toxicity on occasional exposure (category 1-2), Specific organ toxicity on repeated exposure (category 1-2) or Skin or respiratory sensitisation (category 1, 1A, 1B) in the newly produced polymer. Monomers usually diminish with time, as many monomers are volatile compounds. The requirement concerns the newly produced polymer, as it is

important to reduce the impact at source and when this is most practical, i.e. the polymer producer performs the analysis. This problem can be seen to be relevant for products that use a large amount of binder such as office/hobby inks, office/hobby glue, and the glue element in office/hobby tape, but not for writing instruments.
The requirement has a lower "cut off" limit at < 10 % polymer in the product. This has the effect that it should theoretically follow e.g. <100 ppm CMR classed items (if it is an unintended production residue) in < 10% of production, which results in a content in the final product that is <10 ppm (0.0001%).

K14 Preservative

Preservatives added to the chemical compound or raw materials may not be bioaccumulable.

The biological accumulability of a substance can be tested on fish in accordance with the OECD's test guidelines 305 AE. If the biological concentration factor (BCF) of the substance is ≥ 500, the substance is deemed bioaccumulable, and if BCF < 500 the substance is deemed non-bioaccumulable. Unless otherwise established, substances are deemed bioaccumulable if logKow ≥ 4 according to the OECD's test guidelines 107 or 117 or equivalent methods.

If there is a measured BCF value, the highest measured value must be used instead of logKow. This means that a substance with a logKow value ≥ 4 is not considered to be bioaccumulable if the highest measured BCF value is < 500.

The total content of isothiazolinones in the chemical compound may not exceed 100 ppm (0.01% w/w, 100 mg/kg).

The total content of the compound of 5-chloro-2-methyl-2H-isotiazol-3-on (CAS-no 26172-55-4) and 2-methyl-2H-isotiazol-3-on (CAS-no 2682-20-4) (3:1) in the chemical compound may not exceed 15 ppm (0.0015% w/w, 15 mg/kg).

✉ Declaration from the raw materials producer/supplier showing that the requirement is fulfilled. Appendix 3 must be used.

Background to the requirement
In the previous version of the criteria there was also a requirement that preservatives could not be bioaccumulative. In this version the requirement of preservatives has become more stringent, with a concentration limit for isothiazolinones and an even more stringent concentration limit for the compound of 5-chloro-2-methyl-2H-isotiazol-3-on (CAS-no 26172-55-4) and 2-methyl-2H-isotiazol-3-on (CAS-no 2682-20-4) (3:1). The requirement now includes the entire expanded product group.

In addition, preservatives except isothiazolinones must comply with the general classification requirement in the criteria.

With these limitations and with the requirements in the Biocid Directive (98/8/EC), there are few preservatives that comply with both legislation and the Nordic Ecolabel requirements. Classification with R43 is therefore permitted, so that it is possible to use preservatives with a pH of between 3 and 10.

Isothiazolinones and the compound (3:1) of CMIT/MIT
Isothiazolinones may occur as preservative in the raw materials used in the chemical products. It is difficult to avoid isothiazolinones completely without replacement with another problematic substance, so a threshold value is set for the content of the chemical products used in the chemical compound. In conjunction with consultation for the

Nordic Ecolabel's criteria for chemical building products it was stated that a certain content of isothiazolinones is necessary to preserve the products. Preservatives are both in-can and film preservatives.

The content of the compound of 5-chloro-2-methyl-2H-isothiazol-3-on (CAS no. 26172-55-4) and 2-methyl-2H-isothiazol-3-on (CAS no. 2682-20-4) (3:1) may not exceed 15 ppm (0.0015% w/w, 15 mg/kg) in chemical products used for the production of the floor. This is equivalent to the threshold set for this compound in the EU's Cosmetics Directive (76/768/EEC).

Nordic Ecolabelling is aware that there will be reclassification of several preservatives in 2015-06, as the requirement threshold will be tightened, e.g. for Kathon, from 15 to 2.5 ppm, (linked to sensitisation R43). If we do not adjust the criteria in conjunction with reclassification 2015-06, K1 will apply, so that e.g. products with a content of over 2.5 ppm Kathon will not comply with the classification for the product. Nordic Ecolabelling currently assesses that this will affect product types such as water-based inks, colours and glues. Nordic Ecolabelling will therefore monitor the development to see whether it will be necessary to adjust the requirement, or whether functioning alternatives will appear to preserve the products and comply with any requirements.
Nordic Ecolabelling is aware that there will be a reclassification of several preservatives during the criteria's term of validity, and there may be a need to adjust the requirement in this connection.

K15 Perfume, aroma and other fragrance substances

Perfume, aroma or other fragrance substances (e.g. essential oils, plant oils and plant extracts) may not be included in the chemical compound.

✉ Declaration from the raw materials producer or supplier showing that the requirement is fulfilled. Appendix 3 must be used.

Background to the requirement
The requirement is specified to state that aromas or other aroma compounds are also excluded.

Nordic Ecolabelled writing instruments, hobby paint, glue and tape may not contain perfumes, aroma or other aroma compounds. Aroma, flavourants, perfume, essential oils and plant oils and plant extracts often contain a number of allergens or carcinogenic substances, To avoid adverse health effects from this type of substance the use of aroma, flavourants, perfume and aroma compounds is prohibited. Several of the products in the product group may be used by children. Especially for products for children there are examples of the addition of different aroma compounds, such as felt-tip pens with strawberry fragrance[36]. As aromas, perfumes and other aroma compounds are not necessary and entail unnecessary use of chemicals, a prohibition has been included in the criteria.

[36] http://www.astma-allergi.dk/web/portal//good_news_item/-/journal_content/56_INSTANCE_Qq2u/12111/414960

K16 Nano particles

The product may not contain nano particles (from nano material*)

** The definition of nano material follows the European Commission's definition of nano materials from 18 October 2011, with the exception that the limit for the particle size distribution is reduced to 1%:*
"Nano materials" are defined as a natural, incidental or manufactured material containing particles in an unbound state or as an aggregate or an agglomerate and where at least 50% of the particles in the size distribution by number, in one or more external dimensions, are in the size range of 1-100 nm.

Polymer emulsions are not considered to be a nano material.
Exemptions from the requirement are given for the following:

- Pigments/colourants
- Natural minerals
- Metals (the exemption does not apply to gold, silver, copper and the metals excluded by other requirements in the criteria).

✉ Declaration from raw materials suppliers (besides pigment, natural minerals and metals) that the raw material does not contain nano material in accordance with the requirement's definition. Appendix 3 must be used.

Background to the requirement

The requirement is reworded in this version of the criteria and it is specified that polymer emulsions are not considered to be nano material, and where there is an exemption from the requirement. The requirement now includes the entire new product group.

"Nano material is a natural, unintentionally produced or intentionally produced material containing particles in free state, or in the form of aggregate or agglomerate, and where at least 1% of the particles in the number size distribution has one or several external dimensions in the size range of 1–100 nm"*.

Nano metals are, for example, nano silver, nano gold and nano copper. Nano metals such as nano silver and nano copper are a separate problem as they are found in many products from hosiery to refrigerators, to achieve an antibacterial effect. Items such as nano silver are considered as biocides by the US Environmental Protection Agency (EPA). There is particular concern that emissions of nano silver to wastewater and other dissemination can eliminate beneficial bacteria and lead to resistant bacteria. A general prohibition on nano particles is difficult to control as there is also material that is less than 100 nm, and that is not considered to be problematic.

Polymer emulsions are not considered to be a nano material.
Exemptions from the requirement are given for the following:

- Pigments/colourants
- Natural minerals
- Metals (the exemption does not apply to gold, silver, copper and the metals excluded by other requirements in the criteria).

The requirement can, for example, be documented via a description of how nano particles are tied in the product, and are therefore not released to the environment (during and after use) or users (during and after use).

1.4 Timber, paper, carton and paper pulp

The following requirements concern paper, carton, paper pulp, plywood and solid wood used in the product, if it is included with more than 10% w/w in the final product. The requirements also apply if the raw materials/materials are included with more than 10% w/w in the primary packaging, reel, application components or other elements included with the Nordic Ecolabelled product.

K17 Paper, cardboard and paper pulp

On using paper, cardboard or pulp in the product or packaging at least 60% w/w must be recycled fibre.
The requirement does not concern paper labels adhered to the product.

✉ Declaration from the paper, cardboard or pulp producer showing that the requirement is fulfilled. The declaration must include the name of the paper, carton or pulp, and the producer. Appendix 6 may be used.

Background to the requirement
The requirement has been tightened from the previous version in which the ratio was 50% to the current 60% w/w. The requirement now includes the entire new product group.

Paper, carton and pulp are included in smaller quantities in this product group, and usually as part of the packaging. Carton may, for example, be part of the holster on a ballpoint pen or in the packaging for a packet of felt-tip pens. It is therefore assessed that paper, carton and pulp do not have much environmental relevance for this product group. It is possible, however, to use recycled fibres in paper, carton and pulp and thereby reduce the consumption of new wood fibre. It is also considered whether to encourage the use of certified wood fibre. The Nordic Ecolabel has good experience with this for products in which paper is a key element of the product. This requires a lot of documentation, however, and since paper, carton and pulp are not very relevant in this product group this requirement is kept simple so that it only concerns recycled fibre. For carton packaging with print on the outer side there will often be a need for another finer white paper quality. This fibre quality often has a higher ratio of new fibre.

K18 Solid wood, plywood and bamboo - origin and chain of custody

Raw materials that are extracted for use for product components of solid wood, plywood and bamboo as the raw material for writing instruments, brushes and packaging, must comply with the following requirements.

Secondary raw materials from trees such as palm leaves are exempt from the requirement.

1. State name (Latin and a Nordic language) and geographical origin (country/state and region/province/municipality) and suppliers of the timber and bamboo raw material used.
2. There must be a chain of custody for all raw materials.
3. The licence holder must have a written routine for sustainable timber supplies.
4. Ensure that all timber and bamboo are from legal sources. Timber may not come from:

- protected areas or areas that are subject to consideration to become protected areas

- areas with unclear ownership or rights of use
- illegally felled trees
- genetically modified wood

In addition, forestry may not destroy or damage:

- Natural forest, biodiversity, special ecosystems and important environmental functions.
- Social and cultural heritage assets.

Nordic Ecolabelling may require further documentation if the raw materials origin is subject to uncertainty.

✉ Name (Latin and a Nordic language) and geographical origin (country/state and region/province/municipality) of the timber and bamboo raw material used. Appendix 7a must be used

✉ A chain of custody system must be described. Chain of Custody Certificate may be used as documentation for item 2.

✉ Written routines to ensure sustainable timber and bamboo supplies. The requirement of a Chain of Custody Certificate from sub suppliers may be used as part of a routine. The routine must ensure updated lists of all suppliers.

Background to the requirement
The requirement is updated to be harmonised with the Nordic Ecolabel's latest wording of the requirement for origin of chain of custody. The requirement is also extended to include bamboo.

It must be documented how it is ensured that timber varieties that are prohibited, according to the criteria set, are not used. The producer must also describe which timber varieties are used, and their geographical origin. If a product comes from forestry that is certified according to a forestry standard approved by the Nordic Ecolabel, the requirement does not need to be further documented. Nordic Ecolabelling for example considers FSC and PEFC Chain of Custody (CoC) certification as examples of systems to support the chain of custody of fibre raw materials.

The EU's new timber regulation (995/2010) entered into force in April 2013. The timber regulation concerns timber that is felled and the production of timber raw materials both within and outside the EU. The purpose of the regulation is to handle the global problem of illegal forestry and combat the inflow and trade in illegally felled timber and timber products of illegal origin to the EU.

The timber regulation's requirement of enterprises to a certain extents eases compliance with the Nordic Ecolabel requirements of the timber raw materials' origin and chain of custody. The timber regulation does not, however, completely replace the Nordic Ecolabelling requirements of timber raw materials, but may contribute to documenting their origin. The Nordic Ecolabel requirement that the timber may not originate from natural forest, areas with high biodiversity, special ecosystems and important ecological functions, and may not be to the detriment of social and cultural values is not subject to the timber regulation. The timber regulation concerns illegal felling and follows the

legislation in the relevant country. It will therefore not provide sufficient certainty that the timber is from sustainable forestry.

K19 Certified solid wood, plywood and bamboo

The requirement concerns timber products that are extracted for use for product components of solid wood, plywood and bamboo as the raw material for writing instruments, brushes and packaging.

70% w/w of all wood for components of solid wood and plywood and 70% of all bamboo must come from certified forestry. Alternatively, bamboo may be cultivated organically, or the cultivation may be being switched to organic production.

The requirement can be documented as purchased wood and bamboo on an annual basis. The certification must be performed by an independent third party.

The certification must be in accordance with a current forestry standard that fulfils the requirements of the standard and certification system stated in Appendix 7c.

✉ The proportion (%) of certified wood or bamboo included in the applicant's Nordic Ecolabelled production on an annual basis. Appendix 7b may be used.

✉ A copy of the forestry certificate signed and approved by a certification body.

✉ Nordic Ecolabelling may require further documentation in order to assess whether the requirements of the standard, certification system and certified share are fulfilled. For example a copy of the certification body's approval report, a copy of the forestry standard including name, address and telephone number of the organisation that drew up the standard, and references to persons representing parties and stakeholder groups that are invited to participate in the development of the forest standard.

Background to the requirement
The requirement is updated to be harmonised with the Nordic Ecolabel's latest wording. The requirement has been tightened from the previous version, so that 70% certified wood is now required, compared to 50% in the previous version. The requirement is also extended to include bamboo. Forestry has an environmental impact. In order to reduce this environmental impact, products based on raw materials from solid wood are required to contain at least 70% w/w of wood that is certified in accordance with a standard for sustainable forestry. The timber received from certified forests varies in the Nordic countries. Today (2008-9) there are approximately 25 million hectares of FSC-certified and approximately 38 million PEFC-certified forests in the world. The influx of certified timber is expected to increase in the coming years, and the Nordic Ecolabel can hereby contribute to increasing the proportion of certified timber in the product group. Nordic Ecolabelling approves forestry standards (e.g. national standards) that fulfil the requirements in form 6c of the criteria document.

According to figures from the UN for 2007-2008, 8.3% of the world's forest areas are certified, amounting to 320 million hectares. The growth in certified forest areas was by 8.8% from 2007 to 2008. The figures include the American SFI standard and the Canadian CSA standard, which were both recognised by PEFC in 2005, but not the Malaysian standard (MTCC), which is now subject to revision by PEFC. Table 19 presents figures from FSC and PEFC from September 2008.

Table 18. Certified forest in September 2008 by continent. The figures are from the websites of FSC and PEFC (www.fsc.org and www.pefc.org)

	Mill. ha FSC	***Mill. ha FSC***
EUROPE	*48.1*	*54.7*
N. AMERICA	*35.6*	*145.5*
ASIA-OCEANIA	*3.7*	*7.9*
LATIN-AMERICA	*11.6*	*7.9*
AFRICA	*3.5*	*0.0*
Total	*102.5*	*216.0*

According to a market report from the UN, western Europe has certified more than 50% of its total forest area, and Northern America more than one third, while Africa and Asia have only certified 0.1%. In tropical areas, 40% of the certified forest areas are based on certification schemes that are not certified by third parties.

Wood used for pencils includes cedar, linden, asp, maple and pine. The most suitable is the wood from a juniper tree from Virginia (Juniperus virginiana) or the western American cedar tree (Libocedrus decurrens). Both are light, with a pleasant aromatic fragrance[37]. The producers' websites state that several pencils are marketed as using certified wood. Staedtler Wopex HB pencil is made from 100% PEFC wood from sustainable German forests[38].
Calpino in France use Pulay/Pulai (also called Milk wood, White cheese wood or pagoda tree) FSC wood in their pencils[39].

Bamboo
There has been a strong increase in demand for bamboo products, and the Nordic Ecolabel will therefore ensure that this raw material is not sourced from areas where preserving biodiversity or social assets are threatened. Bamboo is a type of grass and is the fastest growing plant in the world. It can be harvested after approximately 7 years, without any of the plant dying. Bamboo is often claimed to be harder than deciduous wood, and therefore suitable for floors, chopsticks, salad bowls, and so on. More than 1,200 species of bamboo are found in Asia, Central America and South America, as well as some species in parts of Africa and Australia, and the species have various uses. Bamboo is also important food for pandas - 99% of their diet is bamboo. Only one species is used for floors (Moso/Phyllostachys pubescens) and the panda does not eat this species.

Bamboo grows wild like "weeds" and generally does not require pollination or spraying. Bamboo is also used to prevent soil erosion in vulnerable areas. When bamboo is felled, new shoots grow on the stump that is left. This also makes it difficult to remove bamboo once it has become established. Due to the increased pressure on bamboo today, there is a risk that forest felling and use of pesticides and fertiliser can destroy well-functioning ecosystems. According to Inbar (International Network for Bamboo and Rattan) bamboo is a natural resource and is taken from uncontrolled natural forests in southwestern China. But in many areas, poor felling practices can jeopardise the fauna

[37] http://www.denstoredanske.dk/It,_teknik_og_naturvidenskab/Kemi/Bl%C3%A6k_og_skriveredskaber/blyant

[38] http://www.staedtler.ca/wopex_ca
[39] http://en.calepino.fr/s/20260_103837_wooden-pencil-made-in-france

that depend on bamboo (such as the red panda (bear cat) and the Giant Panda) and generally undermine ecosystems. Bamboo is also cultivated in plantations of different types.

Today bamboo can be certified according to a sustainable forestry standard, or certified as biologically cultivated. Raw fibre that is certified as organically cultivated or that originates from areas that are being transferred to organic production must be cultivated in accordance with EU regulation 2092/91 or 834/2007
or cultivated in an equivalent way based on an equivalent control system, such as KRAV, SKAL, IMO, OCIA, etc.

The Nordic Ecolabel has not developed its own requirements of sustainable production of
biomass, but makes the requirement that sustainable biomass production must comply with existing forest and certification standards/schemes.

1.5 Metal

The metal requirements concern metal in both products and containers.

K20 Heavy metals

Metal elements may not contain chromium VI, nickel, mercury, lead or cadmium.

Surface treatment with chromium, nickel, lead, cadmium or zinc may not occur.

There is an exemption from the requirement for metal elements that are not in contact with the skin and that weigh less than 5 g, and for the tips of ballpoint pens.

By tip is only meant the metal part that holds the ball in a ballpoint pen.

The requirement does not apply to impurities from raw materials production or processing. Impurities are considered to be residues from raw materials production/processing included in metals in concentrations of < 100 ppm. Substances that are deliberately added to a raw material or included for a purpose are not considered to be impurities, irrespective of the concentration.

✉ Declaration from the producer of the chemical compound that the requirement is fulfilled. Appendix 8 may be used.

Background to the requirement
The requirement has been tightened so that it now includes all metal elements with the exception of the tip and ink cartridge in ballpoint pens. As the product group includes products consisting of many small material elements, e.g. a ballpoint pen, a lot of documentation would be required for all metal parts. A triviality limit of 5 g has been set, but only for metal parts without skin contact. The requirement now concerns the expanded product group and has been tightened so that surface treatment with zinc is not permitted either.
Heavy metals impact the environment, so their discharge must be limited as far as possible. It is relevant to ensure that metal parts used in the product group do not contain the heavy metals chromium, nickel, lead, cadmium or zinc (only surface treatment).

Chromium
Chromium (III) and chromium (VI) are used for e.g. chrome plating, in colours and in pigments. Chromium(III) is essential, since living organisms require chromium. The different types of chromium have different effects. All chromium compounds are toxic. Chromium (VI) has particularly hazardous effects, as it is carcinogenic and allergenic. A number of chromate compounds are on the Danish Environmental Protection Agency's list of undesirable substances. It is therefore still relevant to include a ban on chromium in the criteria.

Nickel
Nickel is one of the most common reasons for contact allergy in Denmark. Yet its frequency has declined since new rules were introduced in 1991 for a large number of consumer products that are intended to be in direct and prolonged contact with the skin. The rules apply to e.g. jewellery, spectacles. buttons and belts, while mobile phones and laptop computers must also comply with the nickel requirements. Yet the rules do not protect all consumers, since some people are more sensitive. Even though metal elements comply with the rules, this is not sufficient to prevent particularly sensitive people from developing nickel allergy[40].

Mercury
Mercury occurs as inorganic and organic chemical compounds, and is one of the most hazardous environmental toxins. Mercury is a threat to the environment and to human health. Organic mercury compounds are particularly toxic. Mercury compounds are extremely toxic for aquatic organisms and for mammals. Mercury, even in small quantities, can cause 3 chronic toxic effects. Mercury can also cause kidney damage, foetal damage and lead to contact allergy.

Lead
Lead is a toxic heavy metal that is accumulated in nature an in human beings. This means that even small quantities of lead can be hazardous to health. Children are particularly vulnerable. They are generally exposed to more lead than adults via food, soil and dust, while their gastrointestinal system absorbs lead far more effectively than adults. Lead affects the nervous system. As children's nervous system is still developing, they are particularly sensitive to these effects and American studies have shown that, even in small quantities, lead, can affect children's learning ability and intelligence. Lead is also toxic for organisms in soil and water. If products containing lead are disposed of as waste, after incineration the lead will be present in slag and fly ash. A smaller element is spread with smoke and dust from incineration plants[41].

Zinc
Zinc is an essential meta, since living organisms require zinc. In excessive quantities zinc can be toxic for organisms in the environment and can cause stomach cramps and vomiting, and anaemia after prolonged ingestion. It can also affect rats' ability to

[40] http://www.forbrugerkemi.dk/nyheder/elektronik/computeren-kan-give-allergi statement from Peter Jensen, physician at the Skin and Allergy Clinic, Gentofte Hospital.

[41] Focus on specific substances – lead, www.mst.dk

reproduce, but it is not known whether it also has this effect on human beings. Zinc is a finite resource with a supply horizon of 20 years[42].

Cadmium
Cadmium and cadmium compounds are acutely and chronically toxic for human beings and animals.
Most cadmium compounds are also carcinogenic. Cadmium is classified as highly toxic on aspiration and carcinogenic. Cadmium can also potentially be reprotoxic and cause foetal damage. Most cadmium compounds are extremely toxic for aquatic organisms, especially in fresh water, and acutely toxic for
mammals. Cadmium also has chronic toxic effects on many organisms, even in
very small concentrations.

Cadmium is bioaccumulating in fish and mammals and has a long biological half life in mammals.

Tips of ballpoint pens
The tip and the ball make up the part of the pen that delivers the ink/colour in a controlled and steady flow on the paper. The tip and ball are thus an important element of ballpoint pens' practical function and are strongly related to the pens' functional quality. This element also has a cork function, to ensure that the ink does not dry out. The tip is usually of either brass or steel. In WIMAS' study of the lead content (Pb) in the tips of ballpoint pens (2009)[43] they found that the lead content in brass tips was between 2.5 and 5%. More exclusive pens may have tips of stainless steel or nickel-silver alloy. In the same study, a lead content of between 0.1 and 2% was found. They also found that in around 85% of cases the tips were made of brass.
A tip weighs maximum approximately 0.3 g and the according to the producers the lead content is necessary to be able to produce the tip and ball with the precision required by the function[44].

It is not easy for ballpoint pen producers to replace the raw material in the tip, as from brass to steel in the tip. The reason is that these metals require different production equipment and production methods.

Even in terms of exposure to children, the WIMA sums up that the low lead content in the ballpoint pen's tip will not present a health risk[45].

It is therefore assessed that there is a need for an exemption from this requirement for the actual tip (holding the ball) in the ballpoint pen.

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[42] Environmental guideline – Zinc, Danish Environmental Protection Agency
[43] Petition from; Writing Instrument Manufacturers Association (WIMA) to: U.S. Consumer Product Safety Commission, 9- February 2009, Re: Section 101 Request for Lead Content Exclusion for Pen Point Components

[44] Petition from; Writing Instrument Manufacturers Association (WIMA) to: U.S. Consumer Product Safety Commission, 9- February 2009, Re: Section 101 Request for Lead Content Exclusion for Pen Point Components
[45] Petition from; Writing Instrument Manufacturers Association (WIMA) to: U.S. Consumer Product Safety Commission, 9- February 2009, Re: Section 101 Request for Lead Content Exclusion for Pen Point Components

1.6 Plastic and rubber

K21 and K22 applies to all plastic elements included with more than 1% w/w in the final product and K21 applies to all rubber irrespective of % w/w in the product. The requirements concern the product including packaging such as holsters and containers.

K21 Additives in plastic and rubber

The following substances may not be actively added to the master batch or compound for plastic/plastic elements and rubber:

- pigments and additives based on lead, tin, cadmium, chromium VI and mercury, and their compounds
- phthalates
- halogenated organic compounds in general (including chlorinated polymers, PVC, chlorinated paraffins, fluorinated compounds and flame retardants)
- carcinogenic, mutagenic and reprotoxic compounds (categories 1 and 2)?

Constituent substances are taken to be any substances in the product, including additives in the ingredients (e.g. pigments), but not impurities from raw material production. Impurities are taken to include residues from raw materials production that are included in the end product in concentrations of less than 100 ppm (0.01% w/w, 100 mg/kg), but not substances added to a raw material or product deliberately and for a purpose, regardless of the quantity.

The requirement concerns constituents added to master batches or compounds. The requirement does not concern the actual polymer production.

✉ Documentation from the master batch and compound producer or supplier in accordance with Appendix 9.

Background to the requirement
In the previous version of the criteria applying to writing instruments the following additives were prohibited in plastic: antimony, arsenic, barium, cadmium, mercury, selenium, lead and/or chromium VI, and that the raw material could not consists of chlorinated plastic.

The requirement is tightened after the product group now also includes plastic in such products as paint, glue and tape for office and hobby used, or their packaging/containers. The requirement of additives in plastic is expanded to include carcinogenic, mutagenic and reprotoxic compounds (category 1 and 2), halogenated organic compounds in general, and the specific exclusion of phthalates. The requirement excludes specific additives with characteristics that are hazardous to health and the environment.

The requirement concerns constituents added to master batches or compounds. The requirement does not concern the actual polymer production.

Concerning the background to the prohibition on pigments and additives based on lead, cadmium, chromium VI and mercury, see the background to K19.

The requirement also concerns recycled plastic. To a great extent the use of such additives as cadmium, lead and chromium has been staged out today. But especially from electronic waste plastic with halogenated flame retardants may occur. It is therefore a requirement that the recycled plastic may not contain halogenated flame retardants, but

contamination up to 100 ppm is permitted. So far no threshold level has been set, which means that the detection limit for the analysis method used will be the limit for whether the recycled plastic contains flame retardants or other additives among those listed.

Tin
Tributyltin (TBT) and triphenyltin compounds (TFT) are artificially produced organic tin compounds. They are toxic to many marine organisms and warm-blooded mammals. Long-term TBT effects can seriously damage health. TBT was previously used i anti-fouling paint for ships and boats. This is now prohibited.

Phthalates
Phtalates are mainly used as softeners in plastics, and are found in many products we use on a daily basis. Some phthalates are prohibited, such as in toys and products for infants and young children. The same requirement does not generally apply to this product group, however.

The phthalates most used are DEHP, DIDP and DINP. Use of
DEHP is declining in western Europe, while use of DIDP and especially DINP is rising. According to the PVC industry itself, DINP accounts for approximately 56% of phthalate consumption, while
DEHP accounts for 24%. Today DEHP is classified in the EU as reprotoxic and harmful to the foetus and is on the EU's SVHC list, together with other
phtahlates such as BBP, DBP and DIBP. Many phthalate compounds have undesirable health and environmental impacts. A number of phthalates are on the EU's prioritised list of substances to be investigated more closely for endocrine-disrupting effect - and a number are already shown to have endocrine-disrupting effects. Phthalates also receive a lot of attention in the media and may therefore for many reasons be undesired in Ecolabelled products.
Some phthalates are included in the List of Banned Substances, i.e. di-ethyl-hexyl phthalate
(DEHP), dibutyl phthalate (DBP), benzyl butyl phthalate (BBP), dimethoxy ethyl phthalate
(DMEP) and diisobutyl phthalate (DiNP) on the following grounds: "All five phthalates have problematic characteristics
according to the List of Banned Substances. In addition,
DEHP, DBP and BBP are on the EU's priority list of substances that must be further investigated for endocrine disrupting
characteristics." Softeners in plastic have proved to be highly volatile, so that the plastic softeners may vapourise. They should therefore be avoided in this
product group. All phthalates used in large quantities in PVC are found everywhere in our environment today, among other things because they are substances that are easily released from PVC products. The phthalates DEHP, DINP and DIDP are degraded slowly in the environment, and they have high bioaccumulability, so that "it cannot be excluded that they are accumulated in the food chain".

Plastic elements with a high content of individual phthalates may lead children to be exposed to them. As several phthalates can have undesirable long-term effects such as foetal damage or reduced fertility, they are prohibited in plastic.

Halogenated organic compounds
Halogenated organic compounds include may substances that are hazardous to the environment and health, they are highly toxic for aquatic organisms, carcinogenic or hazardous to health in other ways. The halogenated organic compounds are degraded slowly in the environment, which also increases the risk of hazardous effects from the substances. Halogenated organic compounds may, for example, be flame retardants in plastic.

CMR compounds (carcinogenic, mutagenic and reprotoxic)
Nordic Ecolabelling wishes to limit the use of CMR compounds as far as possible, and has therefore included these compounds in the requirements for plastic materials.

K22 PVC and PVDC

PVC and PVDC may not be included in the product or packaging.

✉ Declaration from the producer that PVC and PVDC are not included.

Background to the requirement
The requirement in the previous version prohibited the use of chlorinated plastic. The requirement is reworded to be more specific. It is also now clear that the requirement concerns both product and packaging.

PVC may be used as soft or hard PVC. PVDC is a type of PVC with double chlorine atoms.

Besides the risk of phthalates in soft PVC especially the waste treatment of PVC is problematic. This is among other things because on the incineration of 1 kg of PVC from 0.4 to 1.7 kg flue gas purification products are formed and deposited. The volume depends on the type of incineration process used (Memo: Ole Hjelmar, DHI – Institut for Vand og Miljø, 2002 Memo on mass flows on incineration of PVC). In Denmark, for example, it has been sought to develop methods to process these flue gas purification products in order to recover the salts, especially $CaCl_2$, but this has not been financially viable, according to the Amager Resource Center in Denmark, which also reports that the hydrochloric acid that is formed on the incineration of the chlorine in PVC can corrode the installations and the chlorine can lead to the formation of dioxin and furan[46].

Besides the waste stage, PVC is also environmentally problematic in other areas. PVC consists of approximately 57% industrially produced chlorine and approximately 43% fossil coal from oil or gas. The electrolysis process in PVC production e.g. releases chlorine gas (Cl_2), which is toxic. In Plastic Europe's Cl_2 Eco-profile [47]the dioxin/furan emission is stated as less than 1 mg for production of 1 kg of chlorine. This is an average figure, however, so that there is a risk of pVC/chlorine gas production with higher dioxin emissions than stated here.

[46] Memo: Ole Hjelmar, DHI – Institut for Vand og Miljø, 2002 Memo on mass flows on incineration of PVC).
[47] Plastic Europe's Cl_2 Eco-profile

PVC may also container emollients such as phthalates that may be reprotoxic or harmful to the environment. There are alternative emollients to phthalates, such as biobased emollients. Previously, lead and cadmium compounds were also used as heat and light stabilisers in PVC. Many cadmium compounds are classified as either harmful to the environment, hazardous to health, carcinogenic or highly toxic. Cadmium is persistent and some cadmium compounds are bioaccumulating. Many lead compounds are classified as reprotoxic, hazardous to health and toxic for the environment. In PVC, cadmium was staged out in Europe in 2007, and the goal is to stage out lead as a stabiliser in the EU before 2015. In Denmark, the use of lead was already staged out in 2002. Imported PVC produced outside Europe may still contain lead and cadmium as stabilisers, however

K23 Natural latex and synthetic latex (SBR)

The content of 1,3-butadien must be less than 1 mg/kg latex.

The content of the following PAH may not be less than 0.2 mg/kg latex

Benzo[A]Pyrene, CAS No: 50-32-8

Benzo[E]Pyrene, CAS No: 192-97-2

Benzo[A]Anthracene, CAS No: 56-55-3

Dibenzo[A,H]Anthracene, CAS No: 53-70-3

Benzo[B]Fluoranthene, CAS No: 205-99-2

Benzo[J]Fluoranthene, CAS No: 205-82-3

Benzo[K]Fluoranthene, CAS No: 207-08-9

Chrysene, CAS No: 218-01-9

✉ Test protocol from test of content of 1,3-butadien and the PAH stated in the requirement in latex, showing that the requirement is fulfilled. Appendix 9 must be used.

Background to the requirement

The requirement is new for the product group.

Synthetic latex (rubber) comprises a number of different substances. Several synthetic rubbers contain substances that are harmful to the environment and hazardous to health, such as dicyclopentadiene in EPDM rubber, and substances that are (under suspicion of being) carcinogenic, such as butadiene and styrene in SBR-rubber. Several synthetic rubber types are plasticised with phthalates, such as come types of EPDM and SBR rubber /33/. Vulcanising agents, typical sulphurous substances or peroxides, are typically added to synthetic rubber. Some rubber surfaces are given stabilising polyester backing.[48]

Rubber may also be used as an adhesive, e.g. on tape.

For pencils with erasers at the end there is relevance in relation to the content of PAH (polycyclical aromatic hydrocarbons), as both synthetic and natural rubber may contain PAH. Several PAH are carcinogenic and genotoxic, and PAH are considered to be the largest single group of carcinogenic chemical compounds[49]. PAH can also occur in the pigment carbon black and in mineral oils.

[48] Moe et al, M, Working Report from the Danish Environmental Protection Agency No. 24 2002

[49] PAH in products for children, working report no. 114 MST 2011

A German risk assessment of carcinogenic PAH (polycyclical aromatic hydrocarbons) in consumer products resulted in a proposal to limit specific PAH. The risk assessment was performed by the German health risk assessment institute, BfR, and is part of a dossier prepared by several German authorities for the EU, in order to tighten the legislation on PAH due to the their well-known hazardous effects[50]. The dossier contains a recommendation to limit the content of carcinogenic PAH in consumer products to maximum 0.2 mg/kg and comprises the following substances:

- Benzo[A]Pyrene, CAS No: 50-32-8
- Benzo[E]Pyrene, CAS No: 192-97-2
- Benzo[A]Anthracene, CAS No: 56-55-3
- Dibenzo[A,H]Anthracene, CAS No: 53-70-3
- Benzo[B]Fluoranthene, CAS No: 205-99-2
- Benzo[J]Fluoranthene, CAS No: 205-82-3
- Benzo[K]Fluoranthene, CAS No: 207-08-9
- Chrysene, CAS No: 218-01-9

For more detailed information, see BfR's risk assessment. Carcinogenic polycyclic aromatic hydrocarbons (PAHs) in consumer products to be regulated by the EU - risk assessment by BfR.[51]

There are alternative oils with a low content of PAH that may be used, and that are used in consumer products. Both the Chemical Inspection Service (2003) and BAuA (2010) have drawn up lists of the these alternatives to the traditional emollient and process oils. The oils can also undergo supplementary treatment to remove PAH, and it is possible to substitute natural rubber or synthetic rubber with thermoplastic elastomers (TPE) (BAuA, 2010). Thermoplastic elastomers contain a hard thermoplastic component and a soft elastic component that are bound with each other to form the elastic polymer[52].

1.7 Surface treatment

K24 Surface treatment or foliation

Surface treatment or foliation of pencils, wooden coloured pencils and similar is not permitted for the last 3 cm at the end of the pencil or coloured pencil. There is an exemption, however, for the requirement of the necessary text/logo and Nordic Ecolabel.

✉ Declaration from the producer of the chemical compound that the requirement is fulfilled.

[50] http://www.tox.dhi.dk/News/2011/02/15/PAHIForbrugerprodukter.aspx
[51] Carcinogenic polycyclic aromatic hydrocarbons (PAH) in consumer products to be regulated by the EU - risk assessment by BfR.
[52] PAH in products for children, working report no. 114 MST 2011

Background to the requirement
The requirement is eased to only prohibit surface treatment or foliation of the last 3 cm of the pencil or coloured pencil.
The background to the requirement is that children may chew on the end of the pencil or coloured pencil, and thereby be strongly exposed to any surface treatment or foliation. The requirement is made in order to avoid this exposure. However, most coloured pencil producers often use a type of surface treatment/foliation of the coloured pencil so that the specific colour is easier to see from the coloured pencil's surface.

In the previous version of the criteria, surface treatment or foliation of the entire pencil or coloured pencil was prohibited, and no licences were given for these product types. Since maximum the last 3 cm at the end of the pencil will be chewed on, it is proposed that the prohibition only concerns this part of the pencil and coloured pencil. The argument to ease the requirement is that the required is adjusted to the industry, making it more usable.

1.8 Use and quality requirements

Background to the requirements
Nordic Ecolabelling sets high safety and quality requirements. To achieve a real reduced environmental impact, it is important to ensure that the Ecolabelled products have minimum the same quality and safety as other leading products in the market.

For some products, lifetime is also a relevant parameter, for example in terms of the writing length of ballpoint pens, and that the packaging of felt-tip pens, paint and glue can be re-sealed, so that the products do not dry out.

K25 Packaging/containers

For felt-tip pens, paint and glue, the packaging/container must be re-sealable, so that the product does not dry out.

✉ Photos or product sheets showing that the packaging can be re-sealed, so that the product does not dry out.

K26 Child safety

Products marketed as being products for children must fulfil the official child safety requirements, a well as the CE-marking requirements in accordance with relevant sections of the toy safety standard.

✉ Declaration from the producer of the chemical compound that the requirement is fulfilled.

Quality requirements

Quality requirements K27 to K34 are divided into the following sub-groups by product type and function:

- Hobby/office paint
- Hobby/office glue
- Hobby/office tape
- Writing instruments
  - with viscous colour or ink (not white board)
  - whiteboard pens
  - pencils
  - coloured pencils and crayons

K27 Quality requirements of hobby/office paint

The producer of paint for hobby/office use must have a quality procedure to test the viscosity of each batch of the paint to ensure that the required viscosity is achieved within a defined interval. There is an exemption for specific types of paints, where the viscosity intentional is close to that of water, such as fluid watercolour paints.

The viscosity must be storage stable. Storage stability is documented with a test of storage time of 2 months/56 days in accordance with ISO 3219-93.

The producer of the paint for hobby/office use must have a quality procedure for each batch in order to test that the paint is homogeneously blended (e.g. not grainy).

The paint's gloss range is determined, and the product label must state whether the paint is high gloss, gloss, semi-gloss, eggshell or matt. The gloss range is measured in accordance with ISO 2813-94 Gloss: Lacquers/varnishes and paints. Determination of film of non-metallic paints at 20°, 60° and 85°.

Table 30, Gloss ranges

Gloss type	Gloss range		
	20° Gloss	60° Gloss	85° Gloss >
Gloss	45-90	70 - 95+	-
Gloss	5-45	25-70	-
Semi-gloss	-	15-25	10-40
Eggshell	-	2-15	5-25
Matt	-	1-10	1-10

✉ Description of quality procedure to test the viscosity of paint, to ensure that the required viscosity is achieved for each batch. Statement of the viscosity required.

✉ Documentation as a storage test of 2 months/56 days, cf. ISO 3219-93, to ensure that the paint does not separate during storage.

✉ Documentation of the stated gloss type in accordance with ISO 2813-94 and label showing that the gloss type is stated.

Background to the requirement – Hobby paint

It is difficult to define good quality for hobby paint in general. One reason is that there are many different types of hobby paint with different functions, that are used on different surfaces. They include finger paint, poster paint and artist's colours. The paint's overall quality is also determined by several different factors, such as colour fastness, colour intensity, coverage and colour strength.

Colour fastness and colour intensity

Higher colour fastness guarantees the intensity and strength of the colour over a longer period. The colour intensity is determined by the choice of pigment, volume of filler and binder type. The binder is an important factor since acrylic and alkyd binders can generally "carry" less pigment than oil, and are thus less intense. Manufacturers cannot alter this fact. If it also taken into consideration that in terms of coverage pigments behave differently, a quality comparison should only be made within the same type of paint. Some colour will also be intensified by pigments based o heavy metals, which is not desired in Nordic Ecolabelled products.

Virtually all types of artist's colours are marketed in 2 (sometimes 3) qualities. Artist's colours, or A quality and studio colours, or B quality Not all of them bear these names. They are also referred to as first and second quality, Artist Colours, etc. The most obvious difference between artist's colours and studio colours is often the price: the studio quality is much less expensive that the artist's colours quality. Studio colours are intended to provide qualitatively fine colours at a relatively low cost. It is up to the customer to choose, based on price and the perceived quality. In a studio colours, expensive pigments such as cadmium and cobalt pigments are not used. They are replaced by less costly pigments with the same nuance[53]. They differ in quality from artist's colours, but in health terms it is preferable to avoid the heavy-metal based pigments.

It can be difficult to set general requirements of the paint's quality in terms of colour fastness and colour quality, as heavy-metal based pigments and price are often opposites. The industry has also developed quality levels that consumers already use.

Homogeneous paint and viscosity

There is a need, however, to ensure that the paint is of acceptable quality, and not too thin, and can thus be worked on with the hands, a brush or other tool, while ensuring that the paint remains a homogeneous blend in the packaging.

In order to determine the products' viscosity, coverage characteristics, flow mechanisms and sedimentation tendency, various reological characteristics were measured. Reology measurements were performed with a Bohlin Rheometer,VOR (Millennium software). Standard geometries were used for the measurements, which were performed in accordance with ISO 3219-93: Synthetics Polymers/resins in fluid, emulsified or dispersed state. Determination of viscosity using a rotation viscosity meter with defined intervals. This measures the product's viscosity[54].

The preferred viscosity may vary, however, according to the type of paint, so that the producer of paint for hobby/office use must have a quality procedure to test the paint's

[53] http://www.aartdevos.dk/katalog/maleri/farver/
[54] Substitution of biocides in anti-fouling paint for ships with enzymes, MST 2004

viscosity for each batch, to ensure that the required viscosity is achieved within a range given by the producer. The range must match the type of paint in question. The application must state which viscosity it is sought to achieve. Viscosity may be stated as number cP, Brookfield RVF, sp. 4, 10 rpm, 20°C.

To ensure that the paint remains homogeneous in the packaging, it is relevant to set a quality requirement with a storage test showing that the paint does not separate, but remains homogeneously blended in the packaging. Storage tests take several months (at least 2 months/56 days) to perform. An accelerated test of storage stability is to place the product in a closed container in a heat cabinet at a raised temperature for a shorter period. Reological measurements are used as the evaluation parameter for storage stability. This means that the reology is determined before the start of the storage test and again after completion of the test. Storage stability is measured as a function of viscosity[55].

The colour's gloss
The perceived gloss of the paint can be adjusted with a higher pigment content or by using different pigments. The paint's gloss is often described with 5 gloss levels, as described in Table 30. The gloss can be determined according to ISO 2813-94 Gloss: Lacquers/varnishes and paints. Determination of film of non-metallic paints at 20°, 60° and 85°. The preferred gloss type may be subjective, depending on what the paint is used for. Therefore a specific gloss level is not required, but instead that the gloss is determined based on ISO 2813-94 and stated on the label.

K28 Quality requirements of hobby and office glue

Based on quality tests it must be documented that the glue is of good quality, for use in the operation and the materials from which the product is marketed for on the product and product sheet, or for which the product is marketed elsewhere.

The product quality is here defined by the following 3 parameters:

- Glue efficiency expressed as an attachment in conjunction with the quantity used
- Glue consistency (is it too thin, too thick or lump it)
- The glue is easy to applicate

The Ecolabelled product must be tested against a reference product. The reference product must be an equivalent product in the Nordic market. The test must be carried out as laboratory test laboratory complies with requirements listed in the "Test institute" section in Chapter 4. The efficiency test must be performed with at least 20 replicates and in 80% of these replicates the ecolabeled product should be at least as good or better than the reference product. Selection of the test must be justified in relation to how it tests for the properties the glue is marketed with.

✉ Test report documenting compliance with the requirement

Background to the requirement

Office and hobby glue can be found with different functions that can be used for different types of materials. There are glue sticks, fluid glue and melt glue, and therefore different ways of applying these glues (directly or with a spatula or brush): The quality

[55] Substitution of biocides in anti-fouling paint for ships with enzymes, MST 2004

and characteristics of the glue must therefore be viewed in relation to the function for which the glue is marketed. Good adhesion to the stated material for which the glue can be used, and functional packaging that allows the glue to be easily applied, are parameters that are important to the perceived quality of the glue. There are standardised tests of adhesion for different materials.

K29 Quality requirements of hobby and office tape

It is must be ensured that the tape is of good quality in accordance with the function for which it is marketed. The following requirements must be fulfilled in terms of the function for which the tape is marketed.

Office tape

Adhesion to steel measured according to EN 1939: of at least 1.5 N/cm

Tensile strength measured according to EN 14410: at least 3 daN/cm

Elongation at break measured by EN 14410: of at least 20%

Decorative tape/Correction tape

Adhesion to steel measured according to EN 1939: of at least 1.5 N/cm

Tensile strength measured according to EN 14410: at least 2 daN/cm

Elongation at break measured by EN 14410: of at least 20%

Packing tape

Adhesion to steel measured according to EN 1939: of at least 4 N/cm

Tensile strength measured according to EN 14410: at least 300 N/100 mm width

Elongation at break measured by EN 14410: of at least 100 %

Moveable tape

Tensile strength measured according to EN 14410: at least 2 daN/cm

Elongation at break measured by EN 14410: of at least 20 %

✉ Test report for tests stated in the requirement showing that the requirement is fulfilled in accordance with the function for which the tape is marketed.

Background to the requirement

Besides the function of sticking together materials such as paper, carton or other material types, the various types of tape also have other characteristics. They can be transparent, flexible, or have a decorative effect. It is also significant to the perceived quality of the tape that the tape leaves the tape reel when the tape is pulled, and that it does not break too easily when the tape is pulled (elongation at break). There are also examples of moveable tape, which means that the tape can be moved, but still retain its adhesion. There are standardised international test standards to described the most important tape characteristics, such as adhesion strength and tensile strength.

Adhesion strength is expressed in Newton per 10 mm tape and rounded to the nearest 0.1 N/10 mm in accordance with EN 1939:2003. EN 1939:2003 shows, however, that the result of this test is not directly comparable for different products with different types of carriers. The test does express adhesion, however, and it will therefore be appropriate to require that acceptable adhesion is achieved, and possibly also that better adhesion is achieved for tape with more robust functions, such as packing tape.

The EN 1943:2002 standard measures the static shear adhesion and is expressed as the time it takes to remove the tape from the test surface.
Cf. EN 14410:2003 - Tape - Measurement of breaking strength and elongation at break, to measure the tape's characteristics in relation to tensile strength in the unit of Newton per 10 mm and elongation at break is measured by stating the percentage elongation of the tape from the starting point.

Table 29: Quality standards for tape.

Standard	Test area
EN 1939:2003	Self adhesive tapes. Determination of peel adhesion properties
EN 1943:2002	Self adhesive tapes. Measurement of static shear adhesion
EN 14410:2003	Self adhesive tapes - Measurement of breaking strength and elongation at break

K30 Ballpoint and rollerball pens with ink or gel

The pen's writing length must comply with the requirement level for writing length stated for the type of pen in question in one of the tables below. The writing length must be tested according to the test standard stated in the table. The requirement levels are stated for pens with a refill option, as this is a requirement for Nordic Ecolabelled pens, cf. requirement K4.

It must be described how the pen, including holster, is of high quality, so that the minimum lifetime is equivalent to the used of the pen for a lifetime of two ink cartridges, cf. the tables in this requirement.

Table 30.1 Ballpoint pens ISO 12 757

Ballpoint pens are tested in accordance with ISO 12 757 Part 1 (article 5) :		
Broad tip	*(diameter> 1.05 mm)*	*with refill 400 m*
Medium tip	*(1.05 mm > diameter > 0.85 mm)*	*with refill 600 m*
Fine tip	*(0.85 mm > diameter > 0.65 mm)*	*with refill 900 m*
Extra fine tip	*(0.65 mm> diameter)*	*with refill 1200 m*

Table 30.2: Roller ball pens ISO 14 145

Roller ball pens are tested in accordance with ISO 14 145 Part 1 (article 5) :		
Broad tip	*(diameter> 1.2 mm)*	*with refill 200 m*
Medium tip	*(1.2 mm > diameter > 0.75 mm)*	*with refill 400 m*
Fine tip	*(0.75 mm > diameter > 0.55 mm)*	*with refill 600 m*
Extra fine tip	*(0.55 mm> diameter)*	*with refill 800 m*

Table 30.3: Roller ball pens with gel ink ISO 27668:2009 Gel ink ball pens and refills

Roller ball pens with gel ink, tested in accordance with ISO 27668:2009 Gel ink ball pens and refills:		
Broad tip	*(> 1.2 mm)*	*with refill 100 m*
Medium tip	*(1.2 mm > diameter > 0.75 mm)*	*with refill 200 m*
Fine tip	*(0.75 mm > diameter > 0.55 mm)*	*with refill 400 m*
Extra fine tip	*(0.55 mm > diameter > 0.40 mm)*	*with refill 600 m*

✉ Test report in accordance with the requirement, showing that the requirement is fulfilled.

Background to the requirement
This requirement is new, as the previous version of the criteria did not include equivalent quality requirements. For ballpoint pens there are standardised tests to state the ballpoint pens' writing length, as a way of expressing the ballpoint pens' useful life.

The requirement must ensure a good lifetime for the stated types of writing instruments and thereby ensure that the writing instrument's environmental impact is reduced in relation to an equivalent writing instrument with a shorter lifetime. This e.g. means a more resource efficient ballpoint pen.

Writing length
The test standards for writing length chosen are identical with the standards used for the French Ecolabel NF Environnement NF400 for writing instruments. Here, ISO 12 757 is stated for ballpoint pens, ISO 14 145 for roller ball pens, and ISO 27668:2009 for Gelink-ball pens, ink ball pens and refills. As the criteria require refill options for this particular type of writing instrument, the tables state the requirement levels for writing instruments with a refill option.

Quality of pens
Pens' overall lifetime is a combination of writing length and the durability of the holster. It is therefore a requirement that the applicant describes how the holster can be used for a minimum of 2 ink cartridges. The choice of materials may affect durability, and a description must therefore be given of the durability of the material selected for the holster. This can be as user tests, load or wear test, or an account of how the product has been on the market for over a year, and there have no significant complaints concerning the durability of the product. Holsters of hard plastic are considered to have sufficient durability.

K31 Marker pens/felt-tip pens (not white board)

The pen must be tested for resistance to drying out. It must be documented that the pen can lie without its cap without drying out during the period of time stated below in Table 31.

Table 31, Marker pens/felt-tip pens.

Marker pens and their ink must have the capacity not to dry out during the following periods of time;	
Permanent marker pens	5 h
Non-permanent marker pens	5 h
Colour felt-tip pens with washable ink	48 h
Colour felt-tip pens with extra washable ink	48 h

The test is performed in the following conditions:

The writing instrument without cap/lid is placed horizontally with the tip downwards in a climate chamber with a controlled temperature and humidity in accordance with ISO 554 Standard atmospheres for conditioning and/or testing. Temperature and humidity are maintained at 23°C and 50% RH, respectively, during the test.

After the time stated in Table 34 it is tested whether the pen can still write.

✉ Documentation as a test report that the pen does not dry out, in accordance with the requirement.

Background to the requirement
This requirement is new, as the previous version of the criteria did not include equivalent quality requirements. The product's lifetime influences the overall environmental impact. Caps are used on felt-tip pens to ensure that they do not dry out. Yet there is a need to ensure that the pen has a certain resistance to drying out and can thus be left uncapped for a certain time, so that the pen's writing length is not reduced. It is therefore a requirement that the product does not dry out too quickly when the writing instrument is left uncapped.

No standardised tests are found for resistance to drying out and requirement levels from the French Ecolabel NF Environnement NF400 for writing instruments, for different types of writing instrument, is used.

K32 Felt pens - only Whiteboard

It must be possible to remove writing on a whiteboard using a whiteboard sponge.

The pen must be tested for resistance to drying out. It must be documented that the pen can lie uncapped for at least 5 hours without drying out.

The test is performed in the following conditions:

The writing instrument without cap/lid is placed horizontally with the tip downwards in a climate chamber with a controlled temperature and humidity in accordance with ISO 554 Standard atmospheres for conditioning and/or testing. Temperature and humidity are maintained at 23°C and 50% RH, respectively, during the test.

After 5 hours is tested whether the pen can still write.

✉ Documentation as a test report that the pen does not dry out, in accordance with the requirement.

Background to the requirement
See the background to the requirement K31.

K33 Pencils and pencil leads

Hardness defined by the European scale (H-B) cf. Table 33, for pencils and pencil leads must be tested in accordance with ISO 15184 or BS 3900-E19. The tested hardness must be shown on the pencil or pencil lead packaging. Equivalent standards may be used, as approved by Nordic Ecolabelling.

Table 33: Hardness scale for pencils and pencil leads.

9H	8H	7H	6H	5H	4H	3H	2H	H	F	HB	B	2B	3B	4B	5B	6B	7B	8B	9B
Hardest	→					Medium				→					Softest				

✉ Test report showing hardness tested in accordance with one of the standards stated in the requirement, and photo showing that hardness is shown on the pencil or pencil lead.

Background to the requirement
This requirement is new, as the previous version of the criteria did not include equivalent quality requirements. For pencils and leads for refillable pencils, the degree of hardness is an important quality parameter, so that standardised measurement and providing information on hardness to the consumer are important.

A pencil's hardness is defined according to the scale shown in Table 33, which ranges from "H" (for hardness) to "B" (for blackness), and "F" as the point halfway between HB. The system was developed by an English pencil manufacturer in the 20th century[56].

Mitsubishi Pencil has 22 hardness types from 10H to 10B and has thus expanded the scale[57].
There is no standardised test to test the hardness of pencils. The pencil hardness scale is, however, used to test the hardness of painted surfaces. This is e.g. performed in ISO standard 15184:1998 Paints and varnishes – Determination of film hardness by pencil test. The test methods BS 3900-E19 and ISO 15184 are alternatives of the same standardised test method that is used to determine the hardness of coatings using a series of pencils of known hardness. These standards can also be used in the opposite way, so that a coating with a know hardness is used to determine the hardness of the pencil.

K34 Pastel paints, crayons and coloured pencils

Chalk, crayons and coloured pencils must be tested for satisfactory quality in relation to the characteristics for which the product is marketed, either directly or indirectly via product type. The test may be the applicant's internal quality test, a consumer test with at least 10 independent test persons, or a test to compare with an equivalent product, such as a triangle test.

✉ Description of the test, including the method selected and test result. If a consumer test is used, a copy of the completed and signed test reports must be submitted. A report describing which test persons and how many were asked must also be attached, as well as a summary of the results.

Background to the requirement
This requirement is new, as the previous version of the criteria did not include equivalent quality requirements. Within the group of chalk, crayons and coloured pencils, there are products of very different types and materials composition. Different application techniques are used. This composition and application to achieve different expressions makes it difficult to set uniform quality requirements of crayons and coloured pencils. Yet producers have a clear idea of the characteristics of their products and it is therefore possible to require a user test to be performed in order to assess whether these characteristics are also found for the product.

[56] H. Petroski; The pencil: A history of design and circumstance. 1990, p. 157
[57] http://www.mpuni.co.jp/product/category/pencil/uni/spec.html (Japanska - browser translate) 2013-03-15

There are examples of products that are marketed with the characteristics:
oil pastels with a "soft and creamy consistency". "Pastels can be diluted with turpentine or oil and applied with a brush" or "water-soluble crayons".

Further information on various characteristics can be seen below in Table 37.

Table 34[58]. Qualitative characteristics

	Waterproof pencils	Watercolour pencils, Aquarellstifte	Pastels	Charcoal, monochrome pins	Pencils
Pigments	High organic and inorganic pigments in high concentrations			High quality pigments in high concentrations	Graphite, sometimes the addition of soot
Fastness	High light fastness, but depending on colour			Highest lightfastness	
Colour Palette	Opposite coloured pencils for school and preschool wider colour palette. The respective colours can be purchased individually at the highest long-term colour match.			-	-
Lead diameter	Unlike standard coloured pencils usually larger lead diameter (depending on the application between 2 mm and 6 mm)				Depending on the hardness. The diameter soft mines is usually larger than the hard mines.
Requirements for substrates	Low	With certain techniques suitable substrate is a prerequisite.	Rough, porous surface necessary. Whenever possible, use special paper. Colour smear does not adhere to smooth surfaces.		Low
Adhesion to the substrate	High	High	Low (colour application must be fixed)		High, easily correctable

1.9 Label, consumer information and recycling systems

Background to the requirement
The requirement is new for this product group. For products with labels or product packaging the Nordic Ecolabel including licence no, must be shown, so that the purchase and consumer can see which products hold the Nordic Ecolabel.

K35 Information to the customer

The licence holder must recommend that refills are used for the product types where this is offered in accordance with requirement K4. This information must be shown on any label, packaging or product sheet.

✉ Label, packaging and product sheet.

Background to the requirement
The requirement is identical with the requirement in the previous version. The criteria require refill options for specific products in this product group. The requirement is to

[58] http://ewima-isz.de.dd8436.kasserver.com/cms/front_content.php?idcat=163 2013-03-14

achieve a longer lifetime for the products and thereby reduce the overall environmental impact in relation to the product's achieved function. In order to utilise the refill option, it is important that this information is stated on any label, packaging or product sheet.

K36 Recycling system

Relevant national regulations, laws and/or industry agreements concerning recycling systems for products and packaging must be fulfilled in the Nordic countries where the Nordic Ecolabelled products are marketed.

✉ Documentation from the applicant on connection to existing recovery/treatment agreement.

Background to the requirement
The requirement is identical with the requirement in the previous version. The requirement's purpose is to ensure that the Nordic Ecolabelled products are subject to relevant recycling systems in the Nordic countries.

8 Changes from the previous version

Table 8: Overview of requirement changes on the revision from version 3 to version 4:

Revised criteria (4.0)	Previous criteria (3.0)	Comment
General		*The product group's requirement is expanded to include paint, glue and tape for office and hobby use.*
K2	*New requirement*	*A new requirement is made of a certain proportion of renewable and recycled raw materials in the product.*
K3	*New requirement*	*A new requirement is made that excludes used of metal in the packaging, holsters, reels or application components for the Nordic Ecolabelled product. The requirement has certain exemptions and triviality limits.*
K4	*K2*	*Refill requirement of felt-tip pens is removed as it is not realistic that the user will make use of this refill option. Also a new requirement that one-off tape dispensers are not permitted, as there must be a refill option.*
K5	*New requirement*	*Requirement that individual packaging may not be used for writing instruments, hobby paint and glue. Containers for glue and paint are not considered to be packaging, but part of the product.*
K6	*K5-K8*	*The requirement level for the classification of the chemical element of the product is not amended in this revision. The requirement is updated from CLP.*
K7	*K5-K8*	*The requirement level for the classification of the chemical element of the product is not amended in this revision. The requirement is updated from CLP. The prohibition of classification with the risk codes R20 and/or R21 (H302, H312) is amended to solely concern products for children and office/hobby paint and crayons.*
K8	*K5-K8*	*Heavy metals in chemical compound; The requirement was also made in the previous version of the criteria. The requirement now concerns all chemical compounds in the expanded product group and is updated with regard to the specific heavy metals.*
K9	*K5-K8*	*VOC: The requirement is amended slightly, as the previous exemption for the requirement for 1-methoxy-2-propanol (CAS 107-98-2) in permanent marker pens has been removed. At the same time, a maximum content for 1-propanol (CAS 71-23-8) in the final chemical compound of maximum 10% w/w has been inserted. New VOC definition is added.*
K10	*K5-K8*	*Halogenated organic solvents The requirement was also made in the previous version of the criteria. The requirement now includes all chemical compounds in the expanded product group. This version has*

Revised criteria (4.0)	Previous criteria (3.0)	Comment
		been tightened, however, in terms of contamination with PCB (polychlorinated biphenyls) and on the same page an easing of PCB residues in the pigment.
K11	*New requirement*	*Prohibition of endocrine disrupters in the chemical compound. Only applies to products for children and paint and crayons.*
K12	*New requirement*	*Requirement of maximum content for specific PAH in Carbon Black. Only applies to products for children and paint and crayons.*
K13	*New requirement*	*Residual monomers: Requirement of the content of residual monomers in the polymer on more than 1% w/w polymer*
K14	*K5-K8*	*Preservatives: The requirement is tightened with a concentration limit for isothiazolinones and a further tightening of the concentration limit for the compound of 5-chloro-2-methyl-2H-isotiazol-3-on (CAS no 26172-55-4) and 2-methyl-2H-isotiazol-3-on (CAS-no 2682-20-4) (3:1).*
K15	*K4*	*Perfume: The requirement is specified. The prohibition now also includes aroma or other aroma compounds (e.g. essential oils, plant oils and plant extracts).*
K16	*K15*	*The nano requirement is reworded in this version of the criteria and it is specified that polymer emulsions are not considered to be nano material, and where there is an exemption from the requirement.*
K17	*K9 + K19*	*Recycled fibres in paper: K9 and K19 are amalgamated. K9 (product) is tightened from the previous version, in which the ratio was 50%, to the current 60% w/w. K19 (packaging) Relaxed from 70% to 60% w/w.*
K18	*K12*	*Timber raw materials - origin and chain of custody: The requirement is updated to be harmonised with the Nordic Ecolabel's latest wording of the requirement for origin of chain of custody. The requirement is also extended to include bamboo.*
K19	*K11*	*Certified timber: The requirement is updated to be harmonised with the Nordic Ecolabel's latest wording. The requirement has been tightened from the previous version, so that 70% certified wood is now required, compared to 50% in the previous version. The requirement is also extended to include bamboo.*
K20	*K13 + K17*	*Metal Heavy metals and coating. The requirement has been tightened so that it now includes all metal elements with the exception of the tip and ink cartridge in ballpoint pens. Tightened so that surface treatment with zinc is not permitted either. Also now a triviality limit for metal components of less than 5 g.*
K21	*K16*	*Additives in plastic: The requirement of additives in plastic is expanded to include CMR substances, phthalates and halogenated organic compounds in general.*
K22	*K16*	*PVC and PVDC. The requirement in the previous version prohibited the use of chlorinated plastic. The requirement is reworded to be more specific. It is now also clear that the requirement concerns both product and packaging.*
K23	*New requirement*	*For natural latex and synthetic latex (SBR) Requirement of content of 1,3-butadien, and selected PAH*
K24	*K14*	*The requirement is eased to only prohibit surface treatment or foliation of the last 3 cm of the pencil or coloured pencil.*
K25	*New requirement*	*For felt-tip pens, paint and glue, the packaging must be re-sealable, so that the product does not dry out.*
K26	*K3*	*Children's safety - unchanged*
K27-K34	*New requirement*	*Quality requirement of the products*
K35	*K18*	*Information to the customer - the requirement is unchanged*
K36	*K21*	*Recycling system – the requirement is unchanged*

Revised criteria (4.0)	Previous criteria (3.0)	Comment
K37-K45	*K22-K30*	*Updated to the Nordic Ecolabel's latest wording of these general quality and environmental management requirements*

9 New criteria

In coming criteria it will be relevant to investigate whether for specific products there may be a resource or weight limitation in relation to the functional unit. This is particularly relevant for writing instruments - especially ballpoint pens.

It will also be relevant to assess for which requirements there are high RPS (Relevanse, Potential, Steerability) to set for recycled materials and whether the requirement of the proportion of renewable or recycled materials can be tightened.

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Internetsiderne er besøgt i perioden januar til maj 2013.

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