

Swan-labelled

**Chemical building products**

**Document for hearing**

**Background to ecolabelling**

**19 December 2007**

## Contents

1	Summary .....	1
2	General comments on the criteria .....	1
2.1	Products that are eligible for a Swan Label .....	1
2.2	Background to the Swan labelling of chemical building products .....	2
2.3	The version and duration of the criteria document .....	3
2.4	The Nordic market .....	3
2.5	Other schemes for ecolabelling chemical building products .....	4
3	About the development of the criteria .....	4
3.1	The goal of developing criteria .....	4
3.2	About the development of these criteria .....	5
3.3	Project participants .....	5
4	The background to the criteria .....	6
4.1	Guidelines governing the requirements .....	6
4.2	Backgrounds to the requirements that are imposed .....	6
4.2.1	General environmental requirements .....	7
4.2.2	Adhesives .....	15
4.2.3	Sealants .....	16
4.2.4	Fillers .....	16
4.2.5	Outdoor paints and varnishes .....	17
4.2.6	Requirements as to packaging, labelling, consumer information and recycling systems .....	17
4.2.7	Quality management and the requirements of the authorities .....	18
4.3	Requirements that were not imposed .....	18
5	Future criteria .....	19

## 1 Introduction

The purpose of this document is to describe the background to the first version of the criteria for the ecolabelling of chemical building products with the Swan Label. This will give applicants, consumers, public authorities and other interested parties the opportunity to read the arguments behind Nordic Ecolabelling's selection and definition of the requirements in the criteria document.

The background document describes the reasons underlying the selection of this particular product group for Swan-labelling and the ways in which the requirements contained in the criteria document have been assessed from the perspective of Nordic Ecolabelling's Environmental Philosophy<sup>1</sup>. Two environmental goals defined in this philosophy are of particular relevance with regard to the environmental impact of this product group. They are:

- The reduction of emissions of harmful substances and their effects on the health of consumers.
- The reduction of emissions of gasses that have a negative effect on climate change.

In addition to these environmental goals the Environmental Philosophy outlines a number of ways in which the vision of sustainability might be realised. These include the Factor 4 and Factor 10 concept, which states that we must increase the efficiency of our exploitation of the Earth's resources, materials and energy by a factor of 4 in the short term and a factor of 10 in the long term.

The selection and formulation of the requirements in the criteria document is based on the potential environmental improvements achievable by ecolabelling chemical building products in relation to the scope that exists for documenting and controlling compliance with these requirements.

## 2 General comments on the criteria

### 2.1 Products that are eligible for a Swan Label

Chemical building products encompass liquid or unhardened products for use in building work, both indoors and outdoors and on various substrates. At present the product group encompasses the following products for use by amateur and professional users:

- Sealants
- Adhesives
- Fillers
- Outdoor paint and varnish

Adhesive for industrial uses for purposes other than building work, e.g. in furniture production or the production of building panels, are not included in the product group since these products are encompassed by a separate criteria document: “Adhesives”. Similarly, paint and varnish for indoor use are not included in the product group since these products too are encompassed by a separate criteria document entitled “Indoor paints and varnishes”.

Relevant liquid or unhardened products in addition to those specified in the criteria document and that qualify as chemical building products may be included in the criteria document at a later date. Nordic Ecolabelling determines whether new products may be included in the product group. Contact Nordic Ecolabelling in the event of inquiries about extending the product group to include other chemical building products that are not already encompassed by separate Swan-labelling criteria.

Solid building products such as insulating materials and plastic products, pure concrete etc. are not eligible for Swan-labelling under these criteria. In the case of solid building products, criteria for Swan-labelling already exist in the case of, for example, houses, windows and external doors, floors, furniture and fixtures and fittings (including internal doors and stairs), building panels, durable wood etc.

## **2.2 Background to the Swan labelling of chemical building products**

The development of criteria for houses and the marketing conducted by Nordic Ecolabelling in connection with other product groups and the charting of classifications of chemical building products on the basis of product safety data sheets conducted for Nordic Ecolabelling by a consultant have shown that a need exists for a scheme for ecolabelling chemical building products. Criteria already exist for similar product groups, e.g. adhesives (the Swan Label), indoor paint and varnish (the Swan and the Flower) and lubricants (the Swan), but none for fillers, joint sealants and outdoor paints.

Extensive literature exists on the subject of chemical building products and their effects on health and the environment. Reports prepared by public authorities and the industry indicate that ecolabelling may represent a means of steering developments in the direction of more environmentally friendly products. In addition a number of voluntary schemes exist, which emphasise indoor climate, quality or environmental properties.

The introduction of criteria for chemical building products may have synergy effects on marketing and criteria development within other Nordic Ecolabelling product groups in which chemical building products are used. Thus the introduction of a Swan Label for chemical building products may represent an advantage to licence-holders and future licence-holders within the product areas houses, hotels, supermarkets/grocery stores, windows, furniture, building panels, outdoor furniture and playground equipment, durable wood, wooden compost bins etc.

Moreover, the Swan-labelling of adhesives, filler and the like may represent an environmental benefit if these products are used in connection with, for example, Flower-labelled ceramic tiles. This because the trade associations for stone and tile

producers in Sweden and Norway have emphasised that the greatest effects on health and the environment occur during the application phase, i.e. the application of adhesive, laying, grouting and cleaning. Thus Swan-labelled chemical building products may supplement the benefits of choosing ecolabelled products.

Against the background of a light RPC study, i.e. a report aimed at analysing relevance, potential and controllability with regard to chemical building products, a preliminary study on chemical building products commenced in 2004. In 2006 the process of developing criteria for chemical building products commenced, the preliminary study having shown that the product group was suited to ecolabelling.

### **2.3 The version and duration of the criteria document**

This is a consultative document – the consultation process will take place between 19 December 2007 and 10 March 2008.

### **2.4 The Nordic market**

Approximately 80% of all chemical building products are purchased by professional craftsmen and approximately 20% by DIY consumers. It has been difficult to find sales figures for the Nordic market for the individual product groups corresponding to the product groups in the criteria document. Accordingly there are no relevant and comparable figures for sales of chemical building products.

Sales of building products are conducted in different ways for the individual product groups and in the individual Nordic countries.

In **Denmark** sales are conducted via business-to-business, via wholesale centres, via DIY centres, stores and department stores. In addition sales over the Internet are increasing. A number of retail DIY superstores have opened in recent years, and some of these have expressed an interest in ecolabelled products. For example, Bauhaus took part in the European Union's ecolabelling campaign in 2004, and Bauhaus' outlets carry various ecolabelled products, for example oil for wooden floors, cleaning products and textiles. Moreover, the product ranges of a number of chains that sell paint and the like include various ecolabelled indoor paints. Similarly, Bilka, one of Denmark's biggest chains of hypermarkets, carries ecolabelled paints and tinting systems in their hypermarkets. Thus in Denmark a market already exists for ecolabelled products, into which ecolabelled chemical building products would fit well.

The fact that more DIY superstores are opening indicates that the DIY market is growing. Increasing competition may apply pressure on prices and quality, and here the introduction of ecolabelled chemical building products could help to safeguard the quality of the products.

In **Finland** sales are generally (70-80%) to professional craftsmen, contractors or building firms. Finnish DIY chains are favourably disposed towards the Swan-labelling of chemical building products and will give ecolabelled products priority in their stores.

**Sweden** has about 10 chains of DIY stores. Interest in ecolabelled products is greatest amongst chains that focus on professional craftsmen. One of these chains is working with SIS Miljömärkning to extend the number of ecolabelled products available and to raise the profile of the ecolabelled products.

**Norway** has 8 chains of DIY stores. Some of these chains are favourably disposed towards increasing the range of environmental products on offer, but wish to leave responsibility for this to their suppliers. Others are seeking to raise their environmental profile and are accordingly moving in the direction of including ecolabelled products in their purchasing procedures.

## **2.5 Other schemes for ecolabelling chemical building products**

A wide range of different schemes exist within the field of chemical building products and each of these schemes focuses on different parameters such as health, environment and quality. Because the range of schemes is so broad, it is difficult for professional craftsmen and DIY consumers to determine what constitutes the best choice. Here the Swan-label could help to bring clarity, since the Swan is widely known and will make choosing between multiple products easier.

Since such a wide range of schemes exists, we will list the schemes that apply for the various types of building products: The Flower (the EU ecolabel), Blaue Engel (the German ecolabel), AELA (Australian ecolabel), EPD (Environmental Product Declaration), M1 (the Finnish indoor climate label), Danish indoor climate label, the Joint Council for Creative and Hobby Materials' A, B, C or D label, CE-labelling, ECOProducts, the P symbol (a scheme operated by SP Technical Research Institute of Sweden and the Swedish Institute for Technical Approval in Construction), VTT (Technical Research Centre of Finland), and the Danish MAL codes for indoor climate.

A number of data bases exist, including MilaB which performs environmental assessments of building materials and classifies them as “Recommended”, “Acceptable” or “Avoid”. The goal of the BASTA database is to phase out the use of particularly dangerous chemicals in building products. The Norwegian Building Materials database NOBB and the CoBuilders information database contain building-related products, in which ecolabelled products are flagged and entered under their Swan or Flower logo, making it easy to search for ecolabelled products.

Finally, various corporations such as NCC and Skanska issue lists of prohibited materials to manufacturers. These however do not always function as absolute requirements.

## **3 About the development of the criteria**

### **3.1 The goal of developing criteria**

The goal of developing the criteria has been to compile a criteria document for chemical building products comprising various different products to which additional

product groups can be added at a later stage, to enable the consumer – both professionals and amateurs – to choose chemical building products that have a minimal negative impact on health and the environment and that are of a high quality. An additional goal has been that the products should have as little impact on the indoor climate – and thereby the consumer – as possible. Since it must be possible to expand the criteria document by adding further product groups, emphasis has been placed on including as many general requirements as possible – even at the risk of some of the requirements lacking relevance for the individual product group. Moreover, for this reason declarations have been drafted for both manufacturers and suppliers of raw materials with a view to facilitating the documentation process.

It is hoped that when they have been approved, the criteria will be recognised by manufacturers, importers and wholesalers, builders merchants, architects, consultants and DIY consumers.

### **3.2 About the development of these criteria**

This background document is the first for this product group and will serve as a background document to version 1.0 of the criteria document for chemical building products. Against the background of a light RPC study, i.e. a report aimed at analysing relevance, potential and controllability with regard to chemical building products, a preliminary study on chemical building products commenced in 2004. In 2006 the process of developing criteria for chemical building products commenced, the preliminary study having shown that the product group was suited to ecolabelling. Various interest groupings were contacted during the criteria development process. The National Institute of Technology in Oslo compiled a report for ecolabelling Norway with the support of the Norwegian State Housing Bank. The report reviews the constituent substances of chemical building products and looks at what requirement should be imposed from the perspective of ecolabelling chemical products within the product areas adhesive, joint sealants and fillers. The report will be published when it has been completed and will thus function as a supplement to this present background document.

### **3.3 Project participants**

The criteria development process commenced in September 2006. Until 2007 the project group comprised Elisabeth Magnus (PM, Norway), Heidi Belinda Bugge (PGA, Denmark), Hannu Mattila (PGA, Finland), Svante Sterner (PGA, Sweden). Marketing Manager Randi B. Rødseth (Norway) assisted the Project Manager in the work on market analysis in cooperation with Marketing Managers Hanna Pulliainen (Finland) and Karl Johan Wall (Sweden).

In October 2007 there was a major change in the composition of the project group and since that time it has consisted of Lene Møldrup (PM, Denmark), Kerstin Sahlen (PGA, Sweden) and Randi B. Rødseth (PGA, Norway) – Finland has down-prioritised. Elisabeth Magnus (Norway) functions as resource person for the group.

## 4 The background to the criteria

Nordic Ecolabelling applies an RPC system for the purpose of analysing and describing the justification for the individual requirements. RPC stands for Relevance, Potential and Controllability:

**Relevance** is assessed against the background of the environmental problems caused by the product group and the scope of these problems. *“Does an environmental problem exist? If yes, how great is the problem?”*

**Potential** is assessed by investigating the potential for making environmental improvements to the product group by for example distinguishing between the products as they exist today and the way in which the product might look in the future if possible changes are introduced into, for example, production. *“Can anything be done about the environmental problem?”*

**Controllability** is described as the scope that ecolabelling has for remedying an environmental problem. Whether it is possible in technical terms – or realistic in political terms – for ecolabelling to have an influence on the problem. *“Can the Swan Label do anything about the environmental problem?”*

### 4.1 Guidelines governing the requirements

Nordic Ecolabelling has formulated the requirements in the criteria document with the following considerations in mind:

- The number of requirements has been kept to a minimum.
- The requirements have been formulated in such a way that they are easily understood.
- Declarations have been drafted for completion by manufacturers and raw material producers to make it simple and easy to certify compliance with specific requirements.

Key factors in the criteria development process have been that the requirements should be clearly formulated, that they are easily documentable and accordingly that they will enjoy extensive credibility, at the same time as which they motivate manufacturers to put in place measures that offer environmental improvements. Generally speaking, the requirements have been selected against the background of an assessment of the effect of the product group on the consumer and the surrounding environment – both indoor and outdoor – during the course of the life cycle of the product. In those areas in which legislation or action plans have been adopted in the Nordic countries these are reflected in the criteria on the principle that ecolabelling should impose environmental requirements that go beyond those imposed by local/national authorities.

### 4.2 Backgrounds to the requirements that are imposed

This section discusses the background to the requirements imposed in the criteria document. Where differentiated requirements are imposed these are described. As a general rule requirements are imposed which are relevant to two or more product

groups. Requirements which are relevant only to an individual product group are discussed under the individual product group in question.

#### **4.2.1 General environmental requirements**

Unless otherwise stated, the requirements in the chapter headed “General Environmental Requirements” apply to all ingoing substances. Ingoing substances are all substances in the product, including additives (e.g. preservatives or stabilisers) in the ingredients, but not pollutants deriving from the raw material production stage. Pollutants are traces from the raw material production process present in the finished product in concentrations of less than 100 ppm (0.01 weight %), but not substances that have been deliberately added to a raw material for a purpose, irrespective of quantity. This means that pollutants that are present in quantities in excess of 100 ppm are counted as ingoing substances and are required to meet the requirements applicable to ingoing substances.

##### **O1 Information about the product**

The product must be described to ensure that it falls within the product group definition and accordingly that it is possible to document the other requirements in the criteria document. Moreover, it is important for Nordic Ecolabelling to have detailed knowledge of Swan-labelled chemical building products. Without this knowledge it will not be possible to assess what criteria are relevant and what criteria should be imposed on the product in the future. To do so, Nordic Ecolabelling will need information on the formula of the product. During the criteria development process it became clear that some products form part of an entire system that taken as a whole safeguards the performance of the products. Accordingly it is important that the system in its entirety should be ecolabelled to secure clear communication about what is ecolabelled and what is not.

##### **O2 Classification of the product**

Nordic Ecolabelling's aim is that the effects of the products on health and the environment should be as limited as possible. Accordingly, products classified in accordance with Directive 67/548/EEC and Directive 1999/45/EC as amended as harmful to the environment, highly toxic, toxic, harmful to health, corrosive, sensitising, carcinogenic, mutagenic, harmful for reproduction, explosive, oxidising or highly flammable are not eligible for an ecolabel.

##### **O3 Classification of ingoing chemical substances**

For the same reasons as described in O2 above, no ingoing substances may be classified as carcinogenic, mutagenic or harmful for reproduction in accordance with Directive 67/548/EEC or 1999/45/EC as amended. An exception applies in the case of formaldehyde, for which special requirements are specified in O7. Section O7 discusses the background to the exemption applicable to formaldehyde.

In addition, requirements are imposed with regard to the environmental classification of the ingoing substances. The mapping conducted on the basis of product safety datasheets reveals that chemical building products may contain substances classified as environmentally harmful, substances that are not readily degradable – substances that may cause problems today and in the future. For this reason the requirement is

imposed that substances classified as N R50/53, N R51/53, R52/R53, N R50, R52 or R53 in Directive 67/548/EEC and Directive 1999/45/EEC as amended may be present in the respectively mentioned weight percents and by 4% by weight in total. This represents almost the adoption of the requirements imposed in the provisional Flower Criteria for Outdoor Paint and Varnish.

#### **O4 The risk phrases applicable to ingoing chemical substances**

No ingoing chemical substances must be allotted the following risk phrases or combinations thereof: R23, R24, R25, R26, R27, R28, R33, R39, R42, R48, R49, R68. An exception to this requirement applies in the case of preservatives used for preserving the product and present in total in quantities of less than 1,000 ppm (0.1 weight %, 1.000 mg/kg) as well as organotin compounds (see O5) allotted risk phrases R23, R24, R25, R26, R27, R28, R39, R48 or combinations thereof. The exemption applies because in Nordic Ecolabelling's experience the preservatives used in paints carry several of the aforementioned risk phrases and these preservatives cannot be substituted.

#### **O5 Organotin compounds**

The product must not contain organotin compounds. An exemption to this applies in the case of fillers where the product is a single compound hardening system. In this case tributyltin (TBT), dibutyltin (DBT), dioctyltin (DOT) and triphenyltin (TPT) may be used as catalysts and may be present in quantities of 0.1 weight % in silicone products and PUR polymers with silanes instead of isocyanates (sealants and assembly foam) and 0.25 weight % in MS polymers (MS polymers are a silane terminated polyol. MS polymers are highly elastic and are used for sealing facades and floors.)

Organotin compounds are present as catalysts in sealants that harden by cross-linking. The content of tin catalyst will depend on the cross-linking system used and the quantity of silicone or polymer present in the product. The quantity of tin catalyst used will be determined by the requirements of the individual product. If excess amounts are added, the filler will form a skin too rapidly and it will be difficult for the user to achieve a satisfactory, smooth seal before it hardens. If too little is added, the sealant will not harden properly and its mechanical properties and durability will be compromised. The surface of the seal will be tacky and will attract dirt.

Tributyltin (TBT) is classified as XN;R21 T;R25-48/23/25 XI;R36/38 N;R50/53, dibutyltin (DBT) is classified as XN;R21/22 XI;R41 R43 T;R48/25 N;R50/53, dioctyltin (DOT) and triphenyltin (TPT) are classified as T;R23/24/25 N;R50/53. They are all included on the list over unwanted substances. Tributyltin (TBT) is the organotin compound into which most investigations have been conducted. TBT has been shown to cause endocrine disruption in marine organisms. The effects of the other organotin compounds are not as well known, but they are suspected of having the same effects as TBT. Thus the use of organotin compounds in consumer products represents an increase in the overall impact on the environment. According to manufacturers contacted by Nordic Ecolabelling, these organotin compounds cannot be excluded as catalysts in the curing process. Nordic Ecolabelling excluded organotin compounds in its criteria document for houses. However, following the consultative process this was amended since the responses stressed that organotin compounds cannot be replaced in sealants. Although this was some years ago, Nordic Ecolabelling

is under the impression that it is still not possible to substitute organotin compounds in sealants. The report<sup>2</sup> on organotin does not provide an unambiguous response to whether organotin compounds in sealants could realistically be substituted. Nordic Ecolabelling has therefore opted to limit the quantity permitted in the finished product. The requirements are differentiated in such a way that account is taken of whether the products are based on silicone or on polymers.

Since organotin compounds have problematical properties, in future criteria document Nordic Ecolabelling will chart which organotin compounds are used in sealants and work towards prohibiting the use of organotin compounds in all Swan-labelled chemical building products. The organotin compounds mentioned above may be used in limited quantities in order to encourage applicants to develop their products, i.e. substitute organotin compounds, in order to continue to hold a Swan Label for their sealant products.

#### **O6 Preservatives**

No preservatives added to products or raw materials must be bioaccumulable in accordance with OECD test methods 107, 117 or 305 and the content of isothiazolinone compounds in the product must not exceed 15 ppm (0.0015 weight %, 15 mg/kg). An exception applies in the case of products in the category outdoor paints and varnishes where the content of isothiazolinone compounds in the product must not exceed 1,000 ppm, and the content of mixtures of 5-chloro-2-methyl-2H-isothiazol-3-one (CAS No. 26172-55-4) and 2-methyl-2H-isothiazol-3-one (CAS No. 2682-20-4) (3:1) must not exceed 15 ppm (0.0015 weight %, 15 mg/kg).

Nordic Ecolabelling's experience has been that outdoor paint and varnish contend with such a high level of water activity that it is necessary to add greater quantities of isothiazolinone compounds than in the case of other chemical building products. There are indications that it is not necessary to apply more than 15 ppm in adhesive, sealants and fillers – we hope that the consultative process will shed more light on this question.

#### **O7 Formaldehyde**

Formaldehyde is permitted as a pollutant in newly produced polymers in concentrations of no more than 200 ppm (0.02 weight %, 200 mg/kg) provided that the content of free formaldehyde in the end product does not exceed 10 ppm (0.001 weight %, 10 mg/kg). Nordic Ecolabelling's experience has been that newly produced polymers may contain traces of monomers in the form of formaldehyde. Since this represents a trace/pollutant from the production process of the raw material, formaldehyde is permitted in newly produced polymers in concentrations of no more than 200 ppm (0.02 weight %, 200 mg/kg).

Formaldehyde (CAS No. 50-00-0) or formaldehyde-releasing substances must not be added to products except in the case of products in the category outdoor paints and varnishes. Formaldehyde is a toxic and sensitising substance that may have a carcinogenic effect. As far as possible formaldehyde must therefore be limited or omitted.

Since Nordic Ecolabelling's review of the product groups did not reveal the presence of formaldehyde in other product groups than outdoor paints and varnishes, an exemption has been formulated for this product group since complete exclusion is not viable. Products in the outdoor paint and varnish category may therefore contain free formaldehyde (from formaldehyde or from formaldehyde-shedding substances), provided that the content in the end product does not exceed 10 ppm (0.001 weight %, 10 mg/kg). Nordic Ecolabelling's experience has been that products in the outdoor paint and varnish category may need to contain formaldehyde, and this product category is accordingly exempted from the requirement that formaldehyde must not be added to chemical building products.

### **O8 Residual monomers**

Residual monomers in polymers may cause harm to health, for example because of their allergenic or carcinogenic properties. This impact is considered to be sufficiently serious for it to be necessary to impose a special requirement limiting the total content of monomers in polymers. The requirement is accordingly imposed that the polymer may as a maximum contain 100 ppm of residual monomers classified as highly toxic (Tx), toxic (T), harmful to health (Xn) or harmful to the environment (N) in newly produced polymers. The monomer content falls over time since many monomers are volatile compounds. Accordingly the requirement relates to newly produced polymer since it is important to reduce the impact at source and to this end it is most practical for the polymer producer to perform the analysis.

### **O9 Plasticizers – Phthalates**

Under the requirement applicable to phthalates, no phthalates must be classified as highly toxic (Tx), toxic (T), harmful to health (Xn) or to the environment (N); no phthalates must be included on the EU list of 118 substances considered to cause endocrine disruption, or potential endocrine disruption and no phthalates must be bioaccumulable in accordance with OECD test methods 107, 117 or 305. The requirement has been formulated against the background of a review of the properties of the phthalates Di(2-ethylhexyl)phthalate (DEHP), Dibutylphthalate (DBP), Butylbenzylphthalate (BBP), Butylbenzylphthalate (BBP), Diallylphthalate (DAP), Diisobutylphthalate (DIBP), Diisononylphthalate (DINP), Diisodecylphthalate (DIDP), Dimethylphthalate (DMP), Diethylphthalate (DEP) and Di-n-octylphthalate (DNOP) and the fact that phthalates are present in adhesives and sealants which often come into direct contact with the user.

Based on the information available to Nordic Ecolabelling the requirement will entail that DEHP, DBP and BBP will be excluded via requirement O3 since they are classified as harmful for reproduction. DEP is excluded since this substance is classified as harmful to health (Xn). DIBP is excluded since it must be self-classified as environmentally harmful (N). DINP and DIDP are excluded since they are on the EU list of 118 substances considered to cause endocrine disruption or potential endocrine disruption.

### **O10 Heavy metals**

Heavy metals or compounds thereof: Cadmium, lead, chromium VI, mercury, arsenic, barium (except barium sulphate), selenium and antimony must not be present in the product or in the ingoing chemical substances. However, ingoing substances may

contain traces of these substances deriving from impurities. The trace quantities of the individual heavy metal must not exceed 100 ppm (0.1 mg/kg, 0.01 by weight %). These are the same requirements as are imposed in the provisional Flower Criteria for Outdoor Paint and Varnish. Requirements are imposed on heavy metals since they are problematical in terms of health and the environment. Note that selenium is not a metal, but it interacts with numerous metals in the environment and has therefore been included in the requirement.

### **O11 Titanium dioxide**

Chemical building products containing more than 3 per cent by weight of titanium dioxide may cause significant pollution since the production process for titanium dioxide is associated with emissions of sulphate, SO<sub>2</sub> and chloride. For this reason requirements have been imposed as to emissions from the production of titanium dioxide, and these requirements are stricter than the present requirements applicable in the EU. Accordingly this will represent an environmental benefit within the EU, but also outside the EU in countries that are not subject to Directive 92/112/EC of 15 December 1992. The Directive contains more requirements than are discussed here. Nordic Ecolabelling has opted to focus on emissions since it is important that the requirement should have potential, relevance and be controllable.

### **O12 Ingoing substances in powder form**

The requirement is imposed that substances in powder form must be added in closed system, in a suspension or by means of a method that ensures a dust free working environment.

### **O13 Nano particles**

Nano metals, nano carbon compounds and/or nano fluorine compounds must not be actively added to chemical building products unless documentation exists that they will not cause problems in terms of health and the environment. For these purposes, nano particles are defined as microscopic particles where at least one of the dimensions is less than 100 nm. Nano metals include nano silver, nano gold and nano copper. Nano metals such as nano silver and nano copper are under particular observation since they are found in a wide range of products from socks to refrigerators and are used to achieve an antibacterial effect. Substances such as nanosilver are classified by the EPA in the United States as biocides. There is particular concern that emissions of nano silver to waste water and spreading by other means may eliminate useful bacteria and cause resistance in bacteria. A general ban on nano particles would not be controllable since materials exist that are less than 100 nm that are not viewed as problematical.

### **O14 Other requirements applicable to ingoing chemical substances**

A number of requirements specify substances that must not be present in the product. The reasons are given below:

**APEO<sup>3,4,5</sup>**: Alkylphenoethoxylates and alkylphenol derivatives, i.e. substances which release alkylphenols during degradation, must not be used in ecolabelled chemical building products. APEOs may occur in binding agents, dispersant agents, thickening agents, siccatives, foam inhibitors, pigment pastes, wax etc. APEOs have a number of properties that are problematical in terms of health and the environment. APEOs are

not readily degradable according to standardised tests for determining ease of degradability, they have a tendency to bioaccumulate, they are found in high concentrations in wastewater sludge, degradation products of APEO, alkylphenol and APEO with one and two ethoxy groups are highly toxic to aquatic organisms and certain alkylphenols are suspected of causing endocrine disruption. Alkylphenols and bisphenol A belong to the more potent of these oestrogen chemicals that may be released with waste water.

Raw materials containing APEO can be replaced with APEO-free raw materials based on three groups of surfactants: alkylsulphates, alkylethersulphates and alcoholethoxylates. These three groups of surfactants are readily degradable under both aerobic and anaerobic conditions and toxic or highly toxic to aquatic organisms.

Alkylsulphates and alkylethersulphates are not regarded as bioaccumulable, although certain alcoholethoxylates (long-chained with few ethoxylate units) are potentially bioaccumulable. Although the substitute surfactants are toxic or highly toxic to aquatic organisms, the substitution does offer an environmental benefit since the substitutes break down rapidly. Moreover, the degradation product nonylphenol, which may cause endocrine disruption, can be avoided by substituting APEO.

**Halogenated organic compounds<sup>6</sup>:** Organic compounds containing the halogens chlorine, bromine, fluorine or iodine must not be present in ecolabelled chemical building products. Halogenated organic compounds include a range of substances that are harmful to health or the environment, are highly toxic to aquatic organisms, carcinogenic or harmful to health in other ways. Halogenated organic compounds do not break down readily in the environment, which increases the risk of harmful effects. The requirement is therefore imposed that halogenated organic compounds must not occur in chemical building products. This means that brominated flame retardants, chloroparaffins, perfluoroalkyl substances and certain plasticizers must not be present in Swan-labelled chemical building products.

**Isocyanates<sup>7, 8</sup>:** Isocyanates are allergenic and cause asthma and some, such as TDI, are also carcinogenic. For this reason special regulations have been enacted governing working with materials containing more than 0.5% isocyanates. Moreover, isocyanates are toxic to organisms in the environment.

Nordic Ecolabelling has opted to exclude isocyanates because of their problematical properties. Nordic Ecolabelling excluded isocyanates in the criteria document for houses. However, following the consultative process this was changed, since the consultative responses stated that isocyanates could not be replaced in PUR foam. This was some years ago, and it is Nordic Ecolabelling's understanding that substitutes now exists for isocyanates in chemical building products.

**Naphtha<sup>9</sup>:** Naphtha may be carcinogenic and may contain various impurities that are harmful to health and/or the environment. For this reason naphtha must not be used in Swan-labelled chemical building products. The undertaking that the product does not contain naphtha must be given by the raw material producer or the producer of the chemical building product on the basis of the raw material producer's declaration. Naphtha may be present in chemical building products such as paint and varnish, for

this reason naphtha is generally excluded by requirements applicable to the classification of ingoing substances and limited by the VOC requirements (Kp is between 20°C and 75°C). To ensure that they are not present in chemical building products, be it in raw materials or the products themselves, Nordic Ecolabelling has opted to impose specific requirements.

**Bisphenol A** has CAS No. 80-05-7 and is classified as XI;R37-41 R43 REP3;R62 is on the effects list, the list of undesired substances and the EU's list of substances that cause endocrine disruption and must therefore not be present in ecolabelled chemical building products. Epichlorohydrine / 1-chloro-2,3-epoxypropane CAS no. 106-89-8 is classified as CARC2;R45 R10 T;R23/24/25 C;R34 R43. Bisphenol A in combination with epichlorohydrine is found in certain sealants containing epoxy resin, such as Bisphenol A (epichlorohydrine) epoxy resin CAS no. 25068-38-6, which is classified as Xi; R36/38 R43 N; R 51/53. Bisphenol A (epichlorohydrine). Thus epoxy resin is not excluded by the requirements applicable to the classification of ingoing substances or requirements as to the risk phrases applicable to ingoing substances, but has as a general point of departure contains substances which are encompassed by these requirements. Nordic Ecolabelling has therefore opted to impose the specific requirement that ingoing substances must not contain Bisphenol A compounds.

**Parfume** can not be present in Swan labelled chemical building products since parfume does not have a function in the use of the chemical building products. Nordic Ecolabelling have not experienced that parfume occurs in building product but since parfume is gaining footing in many products then Nordic Ecolabelling wants to avoid future use of parfume in chemical building products.

### **O15 Volatile organic compounds (VOC)**

Volatile organic compounds are a source of particular concern because of their inherent properties. *“Organic solvents may be absorbed through the lungs and the skin and cause injuries to a number of organs. The injuries may be acute or chronic. Acute injuries following the inhalation of vapour manifests itself in the form of headaches, fatigue etc. Moreover, organic solvents may irritate mucus membranes in the eyes, nose and throat. Organic solvents degrease the skin and may cause eczema. Long-term exposure to organic solvents may result in chronic injuries to the brain and the nervous system. Symptoms include memory failure, nervousness and irritability and over time serious mental changes, e.g. depression. Certain organic solvents cause other irreversible effects on health such as cancer and harm to the unborn child. Moreover, certain organic solvents contribute to the greenhouse effect, some to the formation of photochemical ozone and some to degradation of the ozone layer.”* [10]

Volatile aromatic compounds must not be actively added to any chemical building product but may be present as a residual trace or pollutant in quantities of no more than 100 ppm (0.01 weight %, 100 mg/kg).

Volatile organic substances, that include a benzene ring, are referred to as volatile aromatic compounds and are highly stable. The expression “aromatic compounds” refers to benzene, toluene, mixed xylenes, orthoxylene, paraxylene, metaxylene (generally known as BTX). Benzene is used in the production of styrene, cumene and cyclohexane. Toluene is mostly used for producing benzene, phenol and toluene-

diisocyanate<sup>11</sup>. The requirements applicable to volatile aromatic compounds are contained in the VOC requirements of the individual product groups, since volatile aromatic compounds are a subgroup of volatile organic compounds.

Nordic Ecolabelling has decided against imposing the specific requirement that toluene must not be added to raw materials or products, even though toluene may be present in chemical building products such as adhesive and paint, since the requirement is formulated in such a way that toluene must not be actively added but may only be present as a trace or pollutant in a maximum quantity of 100 ppm (0.01 weight %, 100 mg/kg), which is Nordic Ecolabelling's general threshold for what is defined as ingoing substances. Moreover, toluene CAS no. 108-88-3 is classified as F;R11 XI;R38 XN;R48/20-65 REP3;R63 R67 and is accordingly excluded under the requirements applicable to the classification of ingoing substances.

Different requirements apply to the highest permitted quantity of VOCs in the various types of chemical building products. This is because the various building products serve different functions and accordingly have different contents of volatile organic compounds in order to ensure the efficiency of the product. Volatile organic compounds are defined here as volatile organic compounds with an initial boiling point that is lower than or equal to 250°C measured at a normal pressure of 101.3 kPa.

The requirement applicable to adhesives is such that special glues that require frost-proofing may contain up to 6.0 weight % organic volatile organic compounds. Other adhesives may contain a maximum of 1.0 weight per cent volatile organic compounds whereas wallpaper paste must not contain any volatile organic compounds.

The requirements applicable to sealants are that they may contain a maximum of 3.0 weight % volatile organic compounds.

The requirement applicable to fillers is that they may contain a maximum of 3.0 weight % volatile compounds in the paste mixed for use.

In the case of paints, the requirements are such that they are stricter than the legal requirements, at the same time as which allowance has been made for changes in legislation – see the next page for a comparison.

Nordic Ecolabelling  
Swan-labelled chemical building products – Background  
Document for hearing  
19 December 2007

<b>Product classification cf. 2004/42/EC</b>	<b>2004/42/EC limit in 2007</b>	<b>2004/42/EC limit in 2010</b>	<b>Highest permitted quantity specified as g/L</b>
Exterior walls of mineral substrate	75	40	25
Interior/exterior trim and cladding paints for wood and metal including undercoats	150	130	75
Interior/exterior trim varnishes and wood stains, including opaque wood stains	150	130	75
Interior and exterior minimum build wood stains	150	130	75
Primers (for exterior)	50	30	15
Binding Primers (for exterior)	50	30	15
1 pack performance coatings	140	140	100
Two-pack reactive performance coatings for specific end use such as floors			100

The requirement does not adopt the requirement in the provisional Flower criteria for Outdoor Paints and Varnishes since the industry in the Nordic countries has informed Nordic Ecolabelling that the VOC content in the Nordic countries is very low and that the requirements can therefore easily be met. Since these criteria are for use in the Nordic countries, account need therefore not be taken of the fact that far more VOCs are used in the products in Southern European countries.

#### **4.2.2 Adhesives**

##### **O16 Emissions of total volatile organic compounds (TVOC)**

Nordic Ecolabelling has chosen to impose requirements on total emissions volatile organic compounds. Compliance with the requirement depends on the size of the packaging. The reason that the requirement is related to the size of the packaging is that users will empty a 125 ml packaging unit in one session and they will accordingly not be exposed to the entire quantity of VOCs at once. The requirement that the highest permitted emission after four weeks of the total quantity of volatile organic compounds must be 0.2 mg/m<sup>2</sup>h converted to toluene equivalents is such that the product will fulfil the M1<sup>12</sup> indoor climate scheme.

##### **O17 Quality requirements for adhesives**

The requirement has been provisionally formulated in such a way that adhesives must be tested in accordance with the specified standards. The consultative bodies are requested to comment on this point, in order to ensure that quality requirements are imposed for all types of adhesives encompassed by the product group.

Nordic Ecolabelling imposes requirements on product quality because the aim of the criteria development process is to draw up a criteria document for chemical building products that will allow the consumer – professional as well as DIY – to choose

chemical building products that have the least negative impact on the environment and health and that are of a high quality.

#### **4.2.3 Sealants**

##### **O18 Volatile organic compounds (VOC)**

See O15

##### **O19 Quality requirements for sealants**

The provisional requirement is that sealants must be tested in accordance with ISO 11600. Nordic Ecolabelling has been in contact with various suppliers and has reviewed product datasheets and product safety datasheets, but without reaching any definite conclusion on whether this is a suitable standard for testing the quality of multiple types of sealants. Nordic Ecolabelling accordingly invites comments with regard to the various types of sealants for use on different substrates as well as on what documentation can be submitted on this subject.

Nordic Ecolabelling imposes requirements on product quality because the aim of the criteria development process is to draw up a criteria document for chemical building products that will allow the consumer – professional as well as DIY – to choose chemical building products that have the least negative impact on the environment and health and that are of a high quality.

#### **4.2.4 Fillers**

##### **O20 Volatile organic compounds (VOC)**

See O15

##### **O21 Quality requirements for fillers**

The provisional requirement is that the manufacturer must describe how the filler is tested in order to ensure uniform and high quality, particularly with regard to viscosity, adhesive properties, gap-filling properties, shrinkage, minimum loss and durability and those fillers for use on plasterboard must be tested in accordance with EN standard 13963.

Nordic Ecolabelling has been in contact with various suppliers and has reviewed product datasheets and product safety datasheets, but without reaching any definite conclusion on whether this is a suitable standard for testing the quality of multiple types of fillers. Nordic Ecolabelling accordingly requests comments with regard to the various types of fillers for use on different substrates as well as on what documentation can be submitted on this subject.

Nordic Ecolabelling imposes requirements on product quality because the aim of the criteria development process is to draw up a criteria document for chemical building products that will allow the consumer – professional as well as DIY – to choose chemical building products that have the least negative impact on the environment and health and that are of a high quality.

#### **4.2.5 Outdoor paints and varnishes**

##### **O22 Volatile organic compounds (VOC)**

See O15

##### **O23 Quality requirements for Outdoor paint and varnishes**

The requirements imposed on the quality of outdoor paints and varnishes are based on the requirements contained in the provisional Flower criteria for Outdoor Paint and Varnish. There are however certain differences.

Unlike the situation in the rest of Europe it is rare in the Nordic countries for outdoor floors, stone or concrete coverings to be painted. Accordingly, in the Nordic countries, it is not relevant to impose mandatory adhesion requirements for these products and the requirement from the provisional Flower criteria for Outdoor Paint and Varnish is therefore not adopted. Nordic Ecolabelling has been informed that the test for durability is relevant only for indoor floor products, and the requirement from the provisional Flower criteria for Outdoor Paint and Varnish is accordingly not adopted.

The requirement relating to artificial weather testing from the provisional Flower criteria for Outdoor Paint and Varnish is adopted, since this testing is performed in order to determine the effects of the weather on the product. The specified laboratory methods do not provide absolute figures for the products, nor do they afford the same results that natural exposure to the weather would give. However, they do provide an indication of the effects of weather on the product and of whether absolute requirements as to flaking, cracking and blistering are met.

If the product specifies that the product is breathable, is water-repellent, has fungal retarding effects, this must be documented using appropriate tests – the requirement from the provisional Flower criteria for Outdoor Paint and Varnish are adopted subject to minor modifications. For example, the words “or equivalent” are added after the aforementioned tests to enable applicants to use a different test on condition that documentation is provided to show that the test is equivalent to the test specified in the criteria document and that the level of the requirements is maintained.

#### **4.2.6 Requirements as to packaging, labelling, consumer information and recycling systems**

##### **O24 Packaging**

The requirement is imposed that packaging must be resealable in order to ensure that the products can be used in multiple stages, unless documentation can be submitted that the product will always be used all at once. Moreover, the type of plastics used must be documented by the manufacturer to ensure that neither the labels nor the product packaging contain halogenated plastics. This because the incineration of halogenated plastics gives rise to pollution by halogenated compounds.

Metal packaging is heavy to transport. However, because some products may require metal packaging, the requirement is imposed that metal packaging must not be used for entities with volumes of less than 1 L unless particular health and environment-related arguments indicate otherwise.

### **O25 Label/product packaging**

In order to ensure that the Swan logo is applied correctly, a sample of the label/product packaging must be submitted – alternatively a pdf-file can illustrate this.

### **O26 Consumer information**

In order to safeguard that the product is used correctly and to minimise the impact of the product on health and the environment, consumer information must be provided.

### **O27 Recycling systems**

Relevant national rules, statutes and/or industry-wide agreements on recycling systems for products and packaging must be fulfilled in the Nordic countries in which the Swan-labelled products are sold.

## **4.2.7 Quality management and the requirements of the authorities**

The general requirements as to quality management are imposed by Nordic Ecolabelling in order to ensure that the product fulfils the ecolabelling requirements at all times.

## **4.3 Requirements that were not imposed**

There were some discussions about whether a Swan-labelled chemical building product could contain ethylenglycolethers (CAS nos. 109-86-4, 110-49-6, 110-80-5, 111-15-9, 111-77-3 and 111-90-0). Glycolethers are organochemical compounds that are formed when water is split from alcohols and glycols. (Danish EPA, [www.mst.dk](http://www.mst.dk)). Further investigations reveal that CAS nos. 109-86-4, 110-49-6, 110-80-5, 111-15-9 and 111-77-3 (DEGME) are excluded by the requirements applicable to the classification of ingoing substances and that 111-90-0 is not classified. Further investigations reveal that 111-90-0 is used primarily as a solvent in industrial paints and varnishes, cleaning products and for textile printing and dyeing (from IUCLID). Boiling point = 196°C. Accordingly this VOC is also regulated by other requirements. logPow = -0.8 so there is no potential for bioaccumulation. Biodegradability data reveal that the substance is readily biodegradable (aerobically). OECD 301 E records 90% after 28 days. Other tests also indicate aerobic biodegradability. The acute toxicity for aquatic organisms is low, none for chronic effects. LD50 values are also relatively high, although for repeated dose toxicity results are mixed. However, when it comes to toxicity for reproduction, the product appears to go clear. Nordic Ecolabelling therefore concluded that requirements are imposed that exclude problematical ethylene glycolethers and accordingly additional requirements are not imposed.

There was some discussion about whether requirements could be imposed with regard to the extraction of raw materials to ensure that this proceeded in a responsible way. This requirement has both relevance and potential, but because of the lack of controllability in the requirement, Nordic Ecolabelling decided against imposing

requirements in this criteria document. Nevertheless it will be a point for consideration in future revisions.

## 5 Future criteria

In future criteria Nordic Ecolabelling will consider:

- whether changes have occurred in the case of ethylene glycol ethers that have a bearing on whether 111-90-0 should be excluded.
- whether requirements can be imposed as to the extraction of raw materials and, if so, which raw materials this should apply to.
- whether organotin compounds can be excluded completely from all chemical building products.
- whether it is possible to impose requirements as to raw material extraction, the charting of relevant raw materials and the specification of controllable requirements.

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<sup>1</sup> Miljøfilosofi, Nordisk Miljømærkning 2000 (Philosophy, Nordic Ecolabelling 2000)

<sup>2</sup> Impact Assessment of Potential Restrictions on the Marketing and Use of Certain Organotin Compounds, prepared for European Commission Directorate-General Enterprise and Industry, RPA, October, 2007.

<sup>3</sup> Substitution af alkylphenoethoxylater (APE) i maling, træbeskyttelse, lime og fugemasser, Arbejdsrapport fra Miljøstyrelsen Nr. 46, 2003

<sup>4</sup> Nonylphenol og nonylphenoethoxylater i spildevand og slam, Miljøprojekt nr. 704, 2002

<sup>5</sup> Feminisation of fish, Environmental Project no. 729, Miljøstyrelsen, 2002

<sup>6</sup> Miljoevejledninger.dk - <http://www.miljoevejledninger.dk/index.aspx?articleid=+787+787>

<sup>7</sup> Miljoevejledninger.dk - <http://www.miljoevejledninger.dk/index.aspx?articleid=+798+798>

<sup>8</sup> Arbejdstilsynets bekendtgørelse nr. 292 af 26. april 2001 om arbejde med stoffer og materialer (kemiske reagenser).

<sup>9</sup> Wikipedia.org - <http://en.wikipedia.org/wiki/Naphtha>

<sup>10</sup> Miljoevejledninger.dk - <http://www.miljoevejledninger.dk/index.aspx?articleid=+808+808>

<sup>11</sup> BREF dokument for LVOC (Organiske kemikalier i storskalaproduktion) -

<http://www.mst.dk/NR/rdonlyres/8E0D0EE7-8888-40A0-B460-8C2183DD01D6/0/LVOCDAendelig.pdf>

<sup>12</sup> [http://www.rts.fi/emission\\_classification\\_of\\_building\\_materials.htm](http://www.rts.fi/emission_classification_of_building_materials.htm)

Besides the above mentioned references, a large amount of additional literature, articles, reports etcetera has been evaluated, different experts have been consulted. The Technical Institute in Norway has made two reports, which will be published in January, but only in Norwegian. Thanks for all contributions.