

About Swan labelling of

## **Candles**

**Draft for hearing, 21 June – 7 September 2007**

**Background to ecolabelling**



**Nordic Ecolabelling**



In 1989, the Nordic Council of Ministers decided to introduce an official voluntary ecolabelling scheme, the Swan. The organisations/companies listed below administer the Swan ecolabelling scheme on assignment from their respective national governments.

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Quotations may be made provided that Nordic Ecolabelling is stated as the source.

# Swan labelling of Candles – Background

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## **Abbreviations used in the criteria document and the background document**

CO <sub>2</sub>	Carbon Dioxide
CMR	Carcinogenic, mutagenic and toxic to reproduction
EC	European Communities
EMAS	Eco Management and Audit Scheme
EN	European Norm
EU	The European Union
ISO	International Standardisation Organisation
LCA	Life Cycle Assessment
NO <sub>x</sub>	Nitrogen Oxides
PAH	Polycyclic Aromatic Hydrocarbons
RPS	Relevance, Potential and Stearability
VOC	Volatile Organic Compound



## 1 Summary

The purpose of this document is to outline the background to the first generation of criteria for the ecolabelling of candles with the Swan label. This allows applicants, consumers, authorities and other interested parties to read Nordic Ecolabelling's reasons and justifications for the requirements imposed in the criteria document.

The document describes the reasons behind the choice of product group and the requirements from the perspective of Nordic Ecolabelling's Environmental Philosophy [1]. Two of the environmental goals defined in Nordic Ecolabelling's Philosophy are of particular relevance to the environmental impact of candles and relate to the following areas:

- To reduce the emission and effect of substances harmful to users health.
- To reduce emission of gasses having an impact on climate change (as CO<sub>2</sub>).

In addition to these environmental targets the Environmental Philosophy specifies a number of means by which the vision of sustainability should be achieved. For example, nature must not be exposed to systematic increases in the concentration of substances deriving from the ground. There is also reference to the factor 4 and factor 10-concept, which states that we will need to increase the efficiency of our use of natural resources, materials and energy by a factor of 4 in the short term and a factor of 10 in the longer terms.

Justification for the requirements is also provided by the potential environmental gains offered by the ecolabelling of candles and the scope for controlling and documenting the requirements.

## 2 Basic facts about the criteria

### Products that can be labelled

All candles can carry the Swan label if they meet the requirements in the criteria document. Dinner candles (taper and slender candles), square candles (pillar or column candles), tealights, graveyard candles, garden candles and candles for decoration can be Swan labelled if they meet the requirements.

Candles made entirely from paraffin cannot receive the Swan label – see Section 4.3.1, requirement O3 for an explanation.

Scented candles cannot receive the Swan label because fragrances are prohibited in the criteria document due to the risk of allergy.

Oil lamps are not considered candles and cannot receive the Swan label. If emission from the indoor use of oil lamps can be controlled better than today Nordic Ecolabelling will consider the Swan labelling of such products.

In the future Nordic Ecolabelling can consider including other kind of candles and their fittings.

## **Motivation for Swan labelling**

The idea of ecolabelling this product group arose from an inquiry from a manufacturer of candles. Even though Nordic Ecolabelling had not been contacted by this manufacturer, the product group was considered interesting because of the simple fact that it is a consumer product imposing a high health risk for the consumer when used. Furthermore the burning of candles is responsible for an important negative impact on the local and global environment. This is obvious in a report made by 2.0 LCA Consultants from December 2004 [2] where candles are mentioned as one of the most relevant product groups to ecolabel in a Life Cycle Assessment (LCA) perspective.

Nordic Ecolabelling hereafter conducted a survey in order to analyse the possibilities of ecolabelling this product [3]. The study concluded that potential existed for improvement based on a light-RPS assessment (see Chapter 4 for details). The criteria development of the product group was initiated in early 2007.

## **Version and validity period of the criteria**

This is the first version of the criteria document for the Swan labelling of candles. The validity period of this criteria document will be XXX years. (Will be decided later).

## **Market**

It has not been easy to find market data for candles from the Nordic market, but other data shows the significant use of candles by Nordic consumers. Information hereafter comes from the British Candlemakers Federation [4]:

95% of the buyers of candles in the United Kingdom are women. The sale of candles in the United Kingdom has doubled in the period from 1995-1999. Candles are bought all year round with a peak at Christmas. 1 billion candles are burned every year in the United Kingdom (1999). The production of candles in the United Kingdom in 1999 is estimated to be more than £120 million.

In Scandinavia, 20 times as many candles are used as in the United Kingdom (1999).

Several manufacturers and dealers use statements about health damage and environmental performance to promote their candles through web-sites and other PR-channels. Often these statements are connected to arguments against using candles based on paraffin and other petrochemicals, because these are said to be more damaging to health and the environment than candles based on non-mineral natural resources like palm stearin, bee wax or soy oil. This is not the whole truth, but the fact that the impact on climate change can be lowered by not using candles based on petrochemicals seems to be true. Furthermore, many health damaging additives which are often common in candles based on petrochemicals are normally not found in candles based non-mineral natural resources (of vegetable and animal origin). For this reason, it seems most candle makers offer a range of candles made from non-mineral natural resources as an alternative to standard candles made of paraffin. It is difficult to say how large the production is of candles based on non-mineral natural resources, but it seems indisputable, that it is a growing market. In Denmark it is estimated that  $\frac{1}{4}$  of the candle market consists of candles based on non-mineral natural resources [4].

In Table 1 below you will find data showing the size of the European market of candle production in year 2000. It has not been possible to find more recent data.

Land	Population in millions	Production in tons	Import in tons	Export in tons	Consumption in tons	Consumption p.person in grams
Norway	4,3	7 000	10 500	4 500	13 000	3 023
The Netherlands	15,2	82 800	26 900	59 400	50 300	3 309
Finland	5,0	8 500	2 000	2 500	8 000	1 600
Switzerland	6,9	7 200	11 550	1 732	17 018	2 406
Denmark	5,2	5 800	10 200	3 800	12 200	2 346
Germany	80,3	117 400	82 873	67 699	32 571	1 651
Sweden	8,7	15 500	11 800	9 200	18 100	2 080
Australia	7,8	3 850	6 750	2 800	7 800	1 000
Ireland	3,5	1 468	2 290	60	3 398	1 057
Belgium	10,0	11 481	3 000	7 200	7 281	728
Great Britain	58,0	9 700	2 495	3 469	8 726	150
France	58,9	18 500	19 710	5 510	32 700	555
Italy	57,1	40 000	15 900	15 800	40 100	702
Spain						
Total/average	320,9	329 199	205 968	183 670	351 497	1 095

Table 1. The European market for candles year 2000. Reference: [10].

### Other labels on candles

Environmental Choice Program (Terrachoice in Canada) is today the only official eco-label with criteria for the ecolabelling of candles [6] according to the website for the Global Ecolabelling Network (GEN) [7].

RAL in Germany also has criteria but is more a quality label with a small range of requirements on environmental impact and health hazards [8].

Many official standards and documents for guidance also have requirements for safety and quality. Among others can be mentioned the ISO standards prEN15426, prEN15493 and prEN15494. These standards are under preparation. The Association of European Candle Manufacturers also gives such guidelines for manufacturers [9].

Some of the manufacturers of candles have certified environmental management systems in place, such as ISO14001 or EMAS.

This forms a vision proposed by the authors of the Nordic Council of Ministers report on the role of the Swan Label in relation to environmental management [10]. According to page 14:

*"A significant part of the data necessary to document and confirm the requirements of the ecolabelling scheme is generated by the producer's environmental management system. The environmental management system also organises the necessary documentation and environmental reporting can be used to report to the ecolabelling organisations."*

### **3 About criteria development**

#### **Purpose of criteria development**

The object of this criteria development has been to establish requirements to protect consumer health and the environment when burning candles. The final criteria should help the manufacturers of candles to make candles less harmful to health and the environment, and help them to promote this with an official third part certification. Furthermore consumers should be able to choose candles that they can be sure have a minimum damaging impact on health and the environment.

#### **About criteria development**

This background document is the first for this product group, and will serve as a background to version 1.0 of the criteria document for candles. The criteria were adopted by Nordic Ecolabelling on XXX (date will come later).

In 2006, Nordic Ecolabelling was contacted by a candle manufacturer requesting the establishment of ecolabelling criteria for candles. Based on that contact and on the knowledge from the LCA-report mentioned earlier [2] Nordic Ecolabelling conducted a "light RPS" study in summer 2006, which includes a more detailed description of the relevance, potential and steerability (RPS) – see Section 4.1 for a more detailed description of the RPS. The preliminary study indicated that the product group was suitable for ecolabelling, and development of ecolabelling criteria was initiated in early 2007.

The work on developing the criteria document and setting the requirements was conducted by a project manager at Nordic Ecolabelling, Kristian Dammand Nielsen from Ecolabelling Denmark, with help from a reference group and chosen manufacturers, dealers and experts.

The reference group was:

<b>Name</b>	<b>Company</b>	<b>Web-site</b>
Helmut Gutberlet	Sasol Wax, Germany	<a href="http://www.sasolwax.com">www.sasolwax.com</a>
Constanze Gillé	Europäische Gütegemeinschaft Kerzen	<a href="http://www.kerzengute.com">www.kerzengute.com</a>
Jean-Claude Barsacq	Association of European Candle Manufacturers, France	<a href="http://www.europecandles.com">www.europecandles.com</a>
Bert M. Wagenaar	Spaas Kaarsen, Belgium	<a href="http://www.spaas.be">www.spaas.be</a>
Olle Skog	Delsbo Candle, Sweden	<a href="http://www.delsbocandle.se">www.delsbocandle.se</a>
Olle Kihlström	Liljeholmens Stearinfabrik, Sweden	<a href="http://www.liljeholmens.se">www.liljeholmens.se</a>
Markus Nummela	Finnmari, Finland	<a href="http://www.finnmari.fi">www.finnmari.fi</a>
Harri Palo	Kirkkohallitus, Finland	<a href="http://www.evl.fi">www.evl.fi</a>
Risto Letho	Helsingfors Församling, Finland	<a href="http://www.evl.fi">www.evl.fi</a>
Ilkka Sipiläinen	Kyrkans miljödiplom, Finland	<a href="http://www.evl.fi">www.evl.fi</a>
Kalle Huikko	Suomenkerta, Finland	<a href="http://www.suomenkerta.fi">www.suomenkerta.fi</a>
Jarmo Hutri	Suomenkerta / Havi Candle Factory, Finland	<a href="http://www.suomenkerta.fi">www.suomenkerta.fi</a>
Rune Røyseth	Strand & Skaar, Norway	<a href="http://www.strandogskaar.no">www.strandogskaar.no</a>
Reidun	Kortmans Lysfabrikk, Norway	<a href="http://www.kortmanlys.no">www.kortmanlys.no</a>
Geir Arne Opdahl	Lysstøperiet AS, Norway	<a href="http://www.lysstoperiet.no">www.lysstoperiet.no</a>
Inge Villumsen	Artic Lys & Design, Norway	<a href="http://www.artic-lys.no">www.artic-lys.no</a>
Lene Dekkø	Løvli Lysstøperi, Norway	<a href="http://www.lovlily.no">www.lovlily.no</a>
Tormod Tønseth	Løiten Lys, Norway	<a href="http://www.loiten-lys.no">www.loiten-lys.no</a>
Marianne Hornholt	Klintonborg Lys, Denmark	<a href="http://www.klintonborg.dk">www.klintonborg.dk</a>
Sanne Lundby	DekoKrea, Denmark	<a href="http://www.dekokrea.dk">www.dekokrea.dk</a>
Thomas Olesen	Diana Lys, Denmark	<a href="http://www.diana-lys.dk">www.diana-lys.dk</a>
Malene Teller Blume	Coop, Denmark	<a href="http://www.coop.dk">www.coop.dk</a>
Kerstin Lindvall	ICA, Sweden	<a href="http://www.ica.se">www.ica.se</a>
Karin Carlsson	Ecolabelling Sweden	<a href="http://www.svanen.nu">www.svanen.nu</a>
Aina Seland	Ecolabelling Norway	<a href="http://www.ecolabel.no">www.ecolabel.no</a>
Karin Bergbom	Ecolabelling Finland	<a href="http://www.ymparistomerkki.fi">www.ymparistomerkki.fi</a>
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Kristian Dammand Nielsen	Ecolabelling Denmark, nordic project manager for candles	<a href="http://www.ecolabel.dk">www.ecolabel.dk</a>
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The purpose of ecolabelling candles was developed in the criteria making process and represents a sustainability target, although without the social dimension. The criteria are designed to promote the development of products that:

- do not use substances that are harmful to health and the environment
- contribute as little as possible to pollution of the external environment

Since the criteria are normally revised every three to five years, each version of the criteria document represents a step in the direction of achieving the above goals. This first version of the criteria is expected to take the first step towards the sustainability target.

## **4 Justification of criteria**

According to several manufacturers, authorities and consumer organizations there is an important potential in improving the health and environmental impact of burning candles.

There are a number of sources of information on health and environmental effects. But no detailed Life Cycle Assessments (LCA) seems to be among the published sources. Some reports outline specific topics of concern regarding burning candles. These topics are primarily focused on the emission of chemicals and particles from the burning of candles [4,11,12,18]. These issues are in focus because of their negative impact on the local environment and consumer's health. Another important issue is the negative impact on the global environment when burning candles. Such impact could be the emission of CO<sub>2</sub> having a negative effect on climate change. It could also be the use of finite resources such as oil for making paraffin instead of the use of stearin e.g. from palm trees. When screening literature it does not seem as though these global problems have been investigated at all in the context of the production and burning of candles. Therefore it is hard to know the size of the environmental global problem. In this document personal communication with manufacturers and technicians gives some idea about the relevance of the global environmental problem concerned with the production and burning of candles.

### **4.1 Life cycle investigations and RPS**

Because of the lack of data it has not been possible to conduct a full scale Life Cycle Assessment (LCA) of the production and use of candles. We have data for some health risks and for emission of certain chemicals thought to damage the local environment [4,11,12,18]. And we have some knowledge on the possible impact on the global environment that production and burning of candles can have. This information has been used to make a "life cycle screening" in order to point out where it is relevant to set up requirements for protecting environment, consumer health, quality and safety. The conclusion is, that in the production of candles requirements should limit the use of wax based on petrochemicals and in general additives expected to be a risk for consumer health and environment. After production and before use, the candles should meet test requirements for the emission of certain chemicals and particles. Further, rules for safety and consumer guidance should prevent accidents when the candle is in use and improve candle burning in order to assure satisfactory quality, safety and emission levels of chemicals and particles. The following text describes how in detail.

Nordic Ecolabelling also uses another tool to describe the justification for requirements that are to be met for the award of a Swan license. This Tool is the RPS-system where both the product group itself will be analyzed and each requirement in the criteria document will be motivated. This is also done in section 4.3.

The RPS is:

- **Relevance** is assessed on the basis of the environmental problems caused by the product group and the scope of such problems. *“Is there an environmental problem and, if so, how great is the problem?”*
- **Potential** is evaluated against the background of the potential for environmental gains that exists within the product group in question, for example the distinction between existing products and technical innovations that are viewed as realistic within the near future. *“Can anything be done about the environmental problem?”*
- **Steerability** is a measure of the degree to which ecolabelling can influence the activity, problem or requirement. If it is possible in a technical or political context. *“Can the Swan label do anything about the environmental problem?”*

#### 4.2 Environmental requirements and other requirements

Nordic Ecolabelling has formulated the requirements with the following formal aims:

- Keep the number of requirements low.
- Formulate requirements that are easily understood.
- Create templates relating to the procedures and instructions needed at the manufacturers in order to fulfil the requirements (will come later).
- Create templates for suppliers to make it less time consuming to document requirements to chemicals (will come later).

It has been emphasised that the requirements must be easy to document, while at the same time encouraging the producer to introduce environmental improvements or rewarding producers that have already done so.

Generally, the requirements have been selected on the basis of an assessment of the effects of the products on health and the environment during its life cycle. In addition, an assessment has been made of the potential for environmental benefits, while ensuring that gains in one area do not entail problems in a second area.

Other key factors are the importance of formulating clear criteria that are documentable and offer a high degree of credibility. Where the Nordic authorities have legislation in place or have stated goals or attitudes in an area, this will be taken into account since it is intended that the ecolabelling requirements should be stricter than applicable legislation in the area.

### **4.3 Justification for each requirement**

#### **4.3.1 Environmental requirements**

##### **O1 Description of materials**

The materials in the candle shall be described. “Material” refers to all components in the candle like stearin, paraffin, wax, oil, fat or other substances. Materials in the wick and the wick foot shall also be described. Wick type and number (batch number) shall be submitted with the application. Any other materials (for example cups/containers encircling the candle) sold as parts of the product also have to be described. This gives Nordic Ecolabelling an opportunity to point out what requirements in the criteria document which are necessary to meet.

##### **O2 Description of chemical additives and coatings**

The chemical additives in the candle shall be described. “Chemical additives and coatings” refer to all chemical products, lacquers and dyestuffs added to the candle, wick and other material (cover, cup, container) being a part of the sold product. This gives Nordic Ecolabelling the opportunity highlight the requirements in the criteria document that are necessary to meet.

##### **O3 Amount of wax from renewable raw materials**

The criteria document requires the candle to consist of minimum 90% renewable raw materials (see definition in the criteria document). The reason for this requirement is first of all the aim for Nordic Ecolabelling [1] to promote the use of renewable natural resources (for instance animal and vegetable material) rather than the use of finite resources (like mineral oil and other petrochemical products).

Furthermore, the total net release of CO<sub>2</sub> into the atmosphere is higher when using petrochemistry (for instance paraffin) instead of animal or vegetable waxes. This is because the CO<sub>2</sub> contained in petrochemicals comes from oil extracted from the earth's crust and is released into the atmosphere when a candle is burnt. When burning candles made of animal or vegetable waxes (like stearin from palm trees, beeswax and soy oil) CO<sub>2</sub> is also released, but this CO<sub>2</sub> comes from nature and returns to nature when the candles are burned. In light of this, it is tempting to claim that such candles are CO<sub>2</sub>-neutral (as several manufacturers do). But this is not entirely correct since all products require energy for production and transportation, and this energy normally comes from fossil fuels, which again release CO<sub>2</sub>. A product is only CO<sub>2</sub>-neutral if renewable energy is used throughout the entire system, including production and transportation.

Furthermore natural stearin, such as from palm oil, has shorter carbon-chains in the chemical structure than paraffin. This means that less CO<sub>2</sub> is emitted per unit candle wax when burning candles made of stearin compared to candles made of paraffin. According to a European manufacturer, CO<sub>2</sub> emissions in Europe alone can be reduced 300,000 tons a year by using candles based on renewable natural resources instead of petrochemicals. Today, candles on the European market consist on average of 85% paraffin [11]. Demanding 90% of renewable raw materials in Swan-labelled candles means that only a small proportion of the candles on the European market can be Swan-labelled. Correspondingly, only the candles with limited CO<sub>2</sub>-emissions (net-emission) can be Swan-labelled.

Animal oil from animals listed on the IUCNs Red list of threatened species must not be used due to the potential risk of hunting such animals for economic reasons.

#### **O4 Renewable raw materials**

Renewable raw materials (such as oil from palm trees) used in many candle waxes derives from areas previously covered by forest. The forests of the world cover larger areas than any other land-based ecosystem. Here there are significant ecological, economical and social interests linked to forest management. Half of the earth's original forest areas have already disappeared, most of them during the last 30 years. Of the remaining forests, three quarters are in danger of eradication. Between 1980 and 1995, 180 million hectares of forest was lost, an area equivalent to the size of Mexico or Indonesia.

Sustainable forest management is vital to the long-term utilisation of forest resources and to safeguard the rights of indigenous populations. It is also important that forest management is conducted in such a way that the natural ecosystem is not disrupted to any great extent that the biological diversity is maintained and that forests can function as recreational areas.

The licensee must therefore provide information on the traceability of all plant oils, i.e. it must be possible to follow the palm oil, for example, from the palm trees to the candle production site. All the plant oil must come from a sustainable forest to ensure that raw materials in the candles do not come from forest environments with high biological and/or social protection values. The requirement must be documented with the supplier's data, the name and the type of the plant and its country of origin. Nordic Ecolabelling may request further documentation if this exists. Nordic Ecolabelling may revoke the license if it is found that renewable raw materials are derived from forest environments meriting protection due to their high biological and/or social value.

#### **O5 Soot index**

All small particles emitted from the candle have a potential risk of harming the consumer's health if they are close to the candle when it is burnt [11,12,13,14,18]. This is a risk because of the impurities and chemicals (of which some have CMR effects) that reach the human lungs [13,14,18]. Soot is a range of particles (primarily 0.03-3

micrometers in diameter. The primary soot particles are ultra fine ranging in size from 0.01 to 0.2 micrometers in diameter, and they may eventually aggregate into clusters [13]). Soot particles cannot normally be seen by the human eye. But the black spot on a white wall (or a filter in the laboratory) reveals the emission of the small particles. The small particles can be metals, sulphuric acid, VOC's and Poly Aromatic Hydrocarbons (PAH). When measuring particles indoors the result has been that the highest concentration of particles (240,000 particles per m<sup>3</sup>) is generated from burning candles indoors [15]. It has also been found that particles can absorb the rays from the sunlight and thereby contribute to the global warming.

An international standard (prEN 15426) is under development in order to measure the soot emission in a standardised way all over the world. For practical reasons, this standard must be followed. It also makes measurements and results more reliable.

## **O6 Chemicals, substances, preparations, additives, lacquers and dyes**

Chemicals, substances, preparations, additives, lacquers and dyes containing substances that may cause harm to human health and the environment will be limited in the criteria document. The limit value is 0.01% by weight of substances and will in practice mean that no substances of the above mentioned kind may be detected in the candle. This criterion complies with Council Directive 67/548/EEC of 27 June 1967 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances, and its subsequent amendments.

## **O7 Azo dyes**

Certain azo dyes can cleave into aromatic amines which may be carcinogenic. Such dyes are therefore not permitted in Swan-labelled candles. These aromatic amines are listed in the criteria document.

## **O8 Heavy metals**

Heavy metals can be found in the dyes used to colour the candle. They may also be added to the candle for other reasons. Some wicks contain heavy metals (lead) to improve burning efficiency, though this seems to be phased out in most countries. All heavy metals are more or less toxic to the environment and human health and many have a potential CMR-effect on humans. Some of the worst heavy metals are banned from use in the Swan-labelled candles while the use of others is strictly limited by criterion O6. This criterion also covers wick, wick foot and added dyes, lacquers and other chemicals.

## **O9 Aromatic solvents**

Candles may emit aromatic solvents such as styrene, benzene, toluene, acetone and PAH (Polycyclic aromatic hydrocarbons). These kind of solvents are among the group of chemical compounds known as CMR (see abbreviations in the beginning of this document), and therefore not permitted in the production of the candle. Some aromatic solvents are naturally components of paraffin due to its petrochemical origin. It is therefore not possible to ban such solvents completely in the 10% paraffin that may be used in the candle. A study has shown that in general emissions of these compounds are very low from various types of candle (stearin, paraffin and bee wax) if not added actively to the candle during production [18]. Burning 30 candles in a room does not emit the same quantity of aromatic solvents as smoking a cigarette.

## **O10 Halogenated solvents**

Halogenated solvents such as dioxin can be emitted from the candle when burning. These kinds of solvents are also among the group of chemical compounds known as CMR, and for this reason banned from use in the production of the candle.

## **O11 Total amount of organic solvents**

Organic solvents are generally health damaging because of CMR risk (see above) and/or the risk of dissolving human tissue e.g. brain tissue. Because of that a strict limit has been set up for the content of organic solvents in the candle. The same study as mentioned above [18] shows little emission of organic solvents from burning candles. But the risk is potential and therefore a limit of content has been set up with a level leaving only extremely small quantities of organic solvent content possible.

## **O12 Fragrance**

Some candles contain fragrances to make them attractive to consumers and in some cases to conceal odours generated by the constituent materials when the candle is burnt. Fragrances in candles can also be used to irritate insects and make them avoid the area around the candle. Nordic Ecolabelling imposes requirements on fragrances used in a wide range of products that are intended to come into direct contact with the consumer. The reason for this is that many of these substances are known to cause allergies. All fragrances are potential allergenic (including fragrances in nature) and are essentially not needed in candles, the fundamental purpose of which is to provide pleasant lighting. This is why all fragrances are prohibited from use in Swan-labelled candles.

### **O13 Phthalates**

Phthalates have been found in several candles [11] including ordinary white candles with no scent. Because of the potential risks associated with phthalate's CMR-effects a total ban on actively adding phthalates to candles has been an important issue. Even though much discussion takes place about the risk connected with the use of different phthalates, all are banned in this criteria document since studies show that they all (more or less) impose a risk to the human health [15,16].

### **O14 Other parts**

Candles made for outdoor use are often sold with a container or cup covering the candle to make it possible for the candle to burn even though rain or wind makes it difficult. Such containers or cups can be made of plastic, glass, metal or other material. This is also the case for tea lights used indoors where aluminium often surrounds the wax. Such covering materials are often thrown out in the normal household waste container with no waste sorting. In many countries such waste goes to landfill. Therefore it is a requirement that the material covering the candle shall be biodegradable. If this is not the case the material shall be reusable or recyclable (only an alternative if national installations make recycling possible). Information to consumers about this aspect and where to discard the materials for reuse or recycling shall then be written clearly on the packaging. In this way it is possible to direct the used material to a system for improved environmental waste management.

### **O15 Wick**

Wicks are normally made of cotton. Some wicks contain paper fibres to stiffen the wick. It has been normal to stiffen the wick with metals, for instance lead, tin or zinc, but this is no longer a normal praxis. It can still occur though and therefore there is a criterion against the use of metals in the wick for the reasons given under O8.

### **O16 Packaging**

Packaging (including labels) containing PVC or other plastic containing chlorinated material must not be used. The reason for this is the risk of negative environmental impact if the manufacture and disposal of PVC packaging takes place without the technical installations and facilities required by good environmental practice [16]. Candles must not be packaged individually since this creates a higher amount of packaging than packaging several candles together. In future criteria, Nordic Ecolabelling will assess the viability of a requirement to how packaging can support high transport efficiency when transporting candles.

### **4.3.2 Other requirements**

#### **O17 Legislation and regulations**

The Swan label is meant to be stricter than national legislation in the country in which the products are manufactured. But to be sure that production follows basic regulations in the country where the candles are made, the licensee must guarantee adherence to safety regulations, working environment legislation, environmental legislation and conditions/concessions specific to the operations at all sites where the Swan-labelled product is manufactured. If it comes to the knowledge of Nordic Ecolabelling that such national laws are not met by the manufacturer, Nordic Ecolabelling may revoke the license.

#### **O18 Swan licence administrator**

It is necessary for Nordic Ecolabelling always to know with which person to communicate concerning the Swan-licensed products and production. Therefore the company shall appoint a person responsible for ensuring the fulfilment of Swan requirements, and a contact person for communications with Nordic Ecolabelling.

#### **O19 Documentation**

A copy of all documentation submitted during and supporting the application for a Swan label must be kept by the license applicant. The reason is that it should always be possible for the Swan label administrator in the company to find documentation and to communicate with Nordic Ecolabelling about the documentation.

#### **O20 Planned changes**

If changes are planned in the production of Swan-labelled candles these may affect the ability of the manufacturer to meet the requirements in the criteria document. Therefore, written notice must be given to Nordic Ecolabelling of planned changes that have a bearing on Swan requirements. Nordic Ecolabelling will then advise the licensee as to what actions to take to have the planned changes approved by Nordic Ecolabelling.

#### **O21 Unplanned nonconformities**

If unplanned nonconformities occur in the production of Swan-labelled candles they may affect the ability of the manufacturer to meet the requirements in the criteria document. Therefore, written notice must be given to Nordic Ecolabelling the minute such unplanned nonconformities are registered. Nordic Ecolabelling will then advise the licensee as to what actions to take regarding the unplanned nonconformities.

## **O22 Traceability**

The overview of all parts of the production process of ecolabelled products is a central issue. Where do the raw materials come from, what chemicals and dyes are added to the raw material and who is supplying other components like the wick and a possible container surrounding the candle? This is important in order to be sure that the requirements in the criteria document are met. Therefore the licensee must have a traceability system for the production of the Swan-labelled candles.

## **O23 Training**

To be certain that the requirements in the criteria document are met throughout the production process, all employees and contractors that are part of daily operations must have the know-how to ensure fulfilment of Swan requirements.

## **O24 Take-back system**

Some countries have well-established recycling systems which are an improvement of the environmental practice if used. Relevant national regulations, legislation and/or agreements within the sector regarding the recycling systems for products and packaging shall therefore be met in the Nordic countries in which the Swan labelled candles are marketed.

## **O25 Marketing**

Marketing of ecolabelled products can be confusing if you are not familiar with the rules concerning the use of environmental marketing statements laid down by international authorities. Therefore Swan-labelled candles must comply with "Regulations for Nordic Ecolabelling" 12 December 2001 or later versions regarding marketing to the international standards.

## **O26 Fire safety**

Candles can be the cause to unwanted fires if not used appropriately. The licensee must therefore follow the standard EN 15493 on fire safety. This standard is under development.

## **O27 Product safety labels and warnings**

Candles can emit more soot particles and other environmental and health damaging substances if they are not used in the correct way. The licensee must therefore follow

the standard EN 15494 on product safety labels and warnings. This standard is under development.

#### **4.4 Requirements that were rejected during criteria development**

##### **Aerosols**

Aerosols, like soot, are particles emitted from the candle. These can also damage the consumer's health if he/she is close to the candle when it is burning in the same way as soot (see O5). Aerosols are mentioned in the literature [11] as an important particle emission damaging health and environment. But the difference between soot and particles can be discussed – and maybe there is no difference at all. A requirement concerning aerosols has been left out in the early criteria development because the requirement for soot index in O5 is said to be sufficient to cover the risk generated from emission of particles from burning candles (pers. comm. Lars Gunnarsen, Danish Building Research Institute, 25 April 2007).

##### **Sulphur**

Sulphur can be emitted from the burning candle and is a significant source to pollution of the environment. But such emissions are connected to the emission of soot and other particles [15] and will therefore automatically be limited by criterion O5.

##### **Metal impurities**

It has been shown that small amounts of impurities from metals can be released from the candle when burning [11]. This can for example be impurities coming from dyes in the candle. But the amount has been shown to be more than 100 times below the limit value set by the authorities in Denmark [11], and therefore a limit value has not been included in this criteria document.

## **5 Future requirements**

In future requirements Nordic Ecolabelling will among other things consider whether to:

- Increase the percentage of wax produced from renewable resources (see definition in criterion O3) from 90% to 95%. (O3 in the criteria document). The reason for promoting the use of wax produced from renewable resources is described under O3 and O4 in this document. However a small amount of paraffin is normally used to stabilize the candle. This use should still be possible.

- In version 3 of the criteria: increase the percentage of wax produced from renewable resources from 95% to 100%. By that time it is a hope and an expectation that other materials for stabilizing the candle than paraffin can be used.
- Have a requirement as to how packaging can support high transport efficiency when transporting candles. The reason for this is that transport of products is a potential risk for environment – especially climate change.

## 6 Expected environmental effects

The criteria are intended to encourage manufacturers to:

- avoid substances that are harmful to health and the environment
- avoid materials that are non-renewable

Nordic Ecolabelling expects to promote and speed up the reduction in health and environmental impact from candles by ecolabelling. Ecolabelling is in particular expected to contribute to the reduction of harmful chemistry and particles and reduce the use of wax based on petrochemicals (especially paraffin).

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