

About Nordic Ecolabelled

**Panels for the building, decoration and  
furniture industries**

**Draft of background document to version 5 of the criteria**

**3 August 2010**



**Nordic Ecolabelling**

# Nordic Ecolabelled panels for the building, decoration and furniture industries - Background to ecolabelling

Draft for comment 010/5.0, 3 August 2010

## Contents

<b>1</b>	<b>Introduction</b> .....	<b>1</b>
<b>2</b>	<b>General facts about the criteria</b> .....	<b>1</b>
2.1	Products that can be labelled.....	1
2.2	Justification for Nordic Ecolabelling.....	3
2.3	The Nordic market.....	4
2.4	Other labels .....	5
<b>3</b>	<b>About the revision</b> .....	<b>9</b>
3.1	Purpose of the revision .....	9
3.2	About this revision.....	10
<b>4</b>	<b>Justification of the requirements</b> .....	<b>11</b>
4.1	General information about the requirements .....	12
4.2	Justification of the product group definition .....	13
4.3	Justification of the new, amended and unchanged requirements.....	14
	Raw materials.....	14
	R2 Wood, bamboo and willow (changed).....	14
	R3 Biocides (unchanged) .....	14
	R4 Timber from certified forests (changed).....	14
	R5-R7 Paper and cardboard (changed in part) .....	15
	R9 Dust emissions (changed).....	16
	K10 Radioactive substances (unchanged).....	16
	Chemical products .....	17
	R11 Classification of chemical products (changed) .....	17
	R12 Cleaning chemicals (unchanged) .....	17
	R13 Undesirable substances in chemical products – including surface treatments (changed) .....	18
	R14 Content of free formaldehyde in chemical products (changed).....	19
	R15 Environmentally harmful substances in panels (changed).....	20
	R16+R17 Environmentally harmful substances and VOC in surface treatments (changed) .....	20
	Energy and origin of raw materials.....	21
	R18 and R19 Energy requirements (changed).....	21
	R20 Emissions to air (changed) .....	25
	R21 - Emissions to water (unchanged).....	26
	R22 Formaldehyde (changed) .....	26
	R23-33 Other requirements in regard to ecolabelled products (changed).....	27
4.4	Justification for the omission of requirements .....	27
	Old R4 Amount of recycled material .....	27
	Old R6 Heavy metals in recycled materials.....	27
	Old R14.....	27
	Old R15 option of requirement R16 or R17 on surface treatment.....	27
	Old R24 Production waste .....	27
	Old R25 Recycling system for products.....	27
4.5	Justification to evaluated requirements .....	28
	R9 Dust emissions .....	28
<b>5</b>	<b>Changes from the previous version</b> .....	<b>29</b>
<b>6</b>	<b>References</b> .....	<b>30</b>

# 1 Introduction

The criteria for the ecolabelling of panels for the building, decoration and furniture industries were first adopted by the Nordic Ecolabelling Board in October 1992. Version 2.0 was adopted on 16 June 1995. Version 3 was adopted on 10 December 1998. Version 4.0 was adopted on 19 March 2003 and is valid until 31 December 2011.

The new revised criteria for panels, version 5, will be adopted by the Nordic Ecolabelling Board in December 2010. This background document describes the requirements that are specified in the draft criteria.

The criteria have been revised in parallel with the criteria for furniture and fitments and the criteria for outdoor furniture and play equipment. The requirements are as far as possible harmonised. Where differences do occur, these are explained in the background document.

## 2 General facts about the criteria

### 2.1 Products that can be labelled

Definition of the product group

- *Wood-based panels comprising at least 85% wood in terms of weight, with or without laminate finishes*
- *Plasterboard*
- *Mineral-based acoustic panels*
- *Solid wood (with finish) that has been assembled in panel form (for instance, by the consumer)*

*Panels for both indoor and outdoor use can carry the Nordic Ecolabel. Uses for the panels can be found in interior lining of ceilings, walls and floors, in the exterior wind-proofing of walls and ceilings and in the manufacture of furniture and fitments, such as desks, cabinets, etc.*

The criteria do not pertain to metal panels or facing panels and panels that are used primarily to insulate against heat/cold loss, irrespective of the materials used in these panels. Neither do the criteria pertain to pure HPL (High Pressure Laminate) panels nor to plastics-based panels, such as those used in bathrooms.

Wood-based panels containing at least 85% by weight wood can be ecolabelled. 85% by weight refers to the dry weight of the panel. The other components are various proportions of adhesives, urea and wax.

There are many types of wood-based panels such as plywood, chipboard and OSB (relatively new on the Nordic market). The descriptions below of various wood-based

panels are taken from a report on wood products (here in translation) from the Swedish Forest Industries Federation<sup>1</sup>.

“Plywood panels are generally made of an odd number of veneer plies that are glued together. The veneers are normally orientated at right angles. Plywood can be made of different types of wood, in different thicknesses and of different grades. The most common woods used for plywood in Sweden are spruce and pine. Other woods include beach, birch, oak and tropical woods. Various grades are available, designed for different applications.

Fibreboard comprises industrially produced wood fibres that are matted together. Hot pressing consolidates the board and reforms the natural fibre bonds in the wood. Varying the pressure produces different types of fibreboard. Fibreboard is characterised by a production process that does not use adhesives. There is a wide range of fibreboard with different thicknesses, formats and designs. Based on the density of the board, fibreboard can be categorised as hardened, hard, medium and porous board.

Chipboard comprises wood chips and binding agent. In production, chips coated with adhesive are pressed together to make large boards. Urea-formaldehyde resin is commonly used as the adhesive. For moisture resistant fibreboard, the adhesive is reinforced with melamine. There are fibreboards designed for flooring, walls, ceilings and under-roofing as well as furniture and fitments. Moisture-resistant fibreboard is made for damp environments.

Oriented Strand Board (OSB) is a relatively new product which can be described as a hybrid of chipboard and plywood. Panels are produced by gluing long chips at high pressure and temperature. The chips at the surface of the board lie in lengthwise while chips in the centre of the board lie crosswise. The chips can be made of coniferous and deciduous wood. Adhesives include phenol formaldehyde resin (PF) and melamine urea phenol formaldehyde resin (MUPF).

Acoustic panels are panels with the primary function of absorbing sound. Panels that have a sound-absorbing effect only when used in combination with other materials, such as perforated plasterboard panels (which have to be used in combination with, for example, rockwool/mineral wool), are for the purposes of this document not regarded as sound-absorbing panels. Acoustic panels can contain mineral wool (glass wool or rockwool), wood wool, cement or perforated plaster.

High-pressure laminate (HPL) is a compact laminate comprising multiple layers of sulphate paper and phenolic resin with a decorative finish. The decorative paper finish is impregnated with melamine resin. The compact laminate and surface layer are pressed together at high pressure and temperature. The finished product comprises roughly 65% paper by weight. Nordic Ecolabelling has chosen not to set requirements

---

<sup>1</sup> Att välja trä – trävaror och träprofiler till bygget, Skogsindustrierna (2004)  
<http://www.tramarknaden.com/LitiumDokument20/GetDocument.asp?archive=3&directory=748&document=3328>

exclusively for HPL. HPL can be used as a surface layer on Nordic Ecolabelled panels<sup>2</sup>, See Section 4.2 for more information on the product group definition.

Wood-based panels can also be given a foil or direct laminate finish. Foils are made of paper and plastic, such as ABS. This is then glued to the supporting material. Direct laminates, unlike high-pressure laminates, do not comprise phenolic impregnated kraft paper. Direct laminates comprise a melamine reinforced decorative paper that is pressed at high pressure and temperature. This produces a very durable material<sup>3</sup>.

Panels intended for assembly by the customer may be permitted to be labelled if they have been surface treated, that is painted, oiled, treated with lye or similarly finished. Ordinary untreated planed and unplaned wood panels are not eligible to carry the Nordic Ecolabel.

Nordic Ecolabelling is positive to extending the product group definition during the next revision of the criteria if the environmental benefits can be established and if the level of quality can be assured.

## 2.2 Justification for Nordic Ecolabelling

The product group represents a selection of products with similar functions but that address different needs and applications. Different panels are not always interchangeable. The various types of panel contain different raw materials and thus their method of production varies considerably. The various production processes thus impact differently on the environment when considering emissions to the ground, water and air. The criteria are based on an evaluation of environmental impact from a lifecycle perspective for each product type. The criteria emphasise the factors that the panel manufacture is able to influence, such as:

- Raw materials
- Energy consumption
- Emissions of SO<sub>2</sub>, CO<sub>2</sub> and dust
- Formaldehyde and content of radioactive substances
- Recycling
- Packaging
- Chemical products and their content of adverse substances.

---

<sup>2</sup> Bygghandboken 1-2007, Utvändigt kledning med plattor:  
<http://www.steni.com/download2.asp?DAFID=244&DAAID=42%29> (27.04.2010)

<sup>3</sup> Direct laminates:  
[http://www.direktlaminat.se/old\\_direktlaminat/produkter%20att%20bearbeta/ytmaterial/ytmatdow.htm](http://www.direktlaminat.se/old_direktlaminat/produkter%20att%20bearbeta/ytmaterial/ytmatdow.htm)  
(27.04.2010)

## 2.3 The Nordic market

The Swedish manufacturers of wood-based panels, acoustic board and plasterboard are shown in Table 1. There are also many importers and many other names and trademarks, though these are primarily resellers.

Table 1. Overview of panel manufacturers

Company name	Type of panel
Byggelit	Chipboard
Swedspan	Chipboard
Vänerply	Plywood
UPM	Plywood
Karlit	Fibreboard
Masonite	Fibreboard
Ecophon	Acoustic board
Parafon	Acoustic board
Gyproc	Plasterboard
Danogips	Plasterboard
Norgips	Plasterboard
Formica	Worktops

In Sweden, Norway and Denmark, panels are sold to the furniture industry and consumers in DIY stores. Players on the market include the entire chain from production and retail and trade outlets to the consumer or trade customer, see Figure 1. In many construction projects, the technical solution is determined at an early stage by the architect, structural engineer or similar. Planning and the emphasis of environmental issues determine the products bought by trade customers.

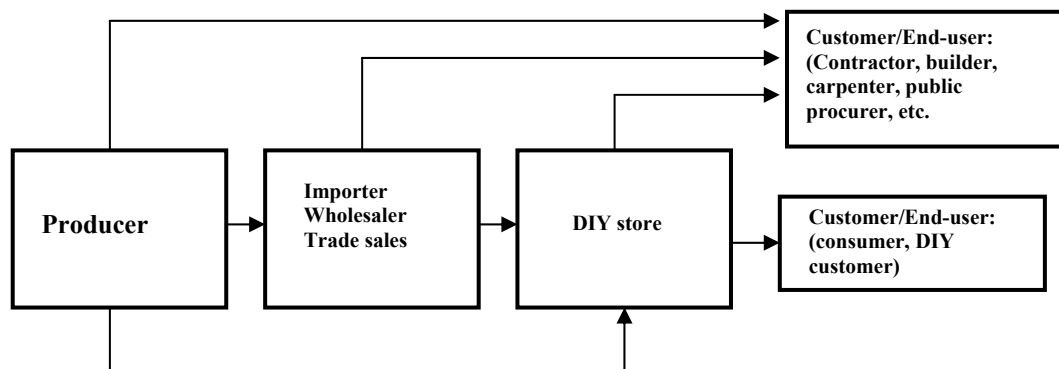


Figure 1 The figure shows the flow of goods and various market players, such as producers, resellers, buyers and users.

## 2.4 Other labels

### Ecolabels

Type 1 ecolabels make choice easiest for the consumer. Products are approved according to set environmental requirements and an independent third party verifies that the producer fulfils the criteria. Such an ecolabel stipulates fixed limit values for the product. These requirements are based on a cradle-to-grave assessment and developed in accordance with the ISO 14 024 standard. Products that do not fulfil the requirements are excluded. Nordic Ecolabel requirements are updated in an open process with input from the authorities, consumers, industry, researchers, environmental groups and trade. The requirements are formulated to promote the best products. Other official ecolabels that are members of the Global Ecolabelling Network and that have established criteria for panels are:

- The Blue Angel, a German ecolabel administered by the Federal Environmental Agency (FEA)<sup>4</sup>. They have criteria for “Low-emission Composite Wood Panels RAL-UZ 76” (11 licenses).
- EcoLogo<sup>5</sup> is a Canadian ecolabel that is administered by Environment Canada. They have criteria for: “Construction Framing Materials and Assemblies” (0 licences, 02.01.2009), “Gypsum Wallboard” (1 producer with approx. 200 trade names, 02.01.2009) and “Fibreboard from Recycled Resources” (0 licenses, 02.01.2009).
- The Eco Mark<sup>6</sup> is a Japanese ecolabel administered by the Japan Environment Association (JEA). They have criteria for: “Boards Made of Wood or the Like, Building Products (Materials for Interior Work)” and “Soundproof and Vibration-Proof Mats” (approx. 100 licences).
- The Good Environmental Choice Label<sup>7</sup> is an Australian ecolabel administered by the Environment and Development Foundation. They have criteria for: “Wood Panels”, “Recycled and Reclaimed Timber” and “Environmentally Preferable Concrete and Concrete Products”.
- Korea Ecolabel<sup>8</sup> is a Korean ecolabel that is administered by the Korea Environmental Labelling Association (KELA). They have criteria for: “Wall and Ceiling Finishing Materials”.
- Green Mark<sup>9</sup> is a Taiwanese ecolabel administered by the Environmental Protection Administration Government of the Republic of China. They have criteria for: “Products made from recycled wood”, “Building Material Made from Recovered Wastes” and “Recycled Construction Materials”.

---

<sup>4</sup> The Blue Angel, Germany’s official ecolabel. Available at: <http://www.blauer-engel.de/en/index.php> (02.01.2008)

<sup>5</sup> EcoLogo is the official Canadian ecolabel. Available at: <http://www.ecologo.org/en/> (02.01.2008)

<sup>6</sup> The Eco Mark, Japanese ecolabel. Available at: <http://www.jeas.or.jp/english/> (02.01.2008)

<sup>7</sup> Good Environmental Choice Label, Australian ecolabel. Available at: <http://www.geca.org.au/AELAhistory.htm>(02.01.2008)

<sup>8</sup> Korea Ecolabel, Korean ecolabel. Available at: [http://www.koeco.or.kr/eng/business/business01\\_01.asp?search=1\\_1](http://www.koeco.or.kr/eng/business/business01_01.asp?search=1_1) (02.01.2008)

<sup>9</sup> Green Mark, a Taiwanese ecolabel. Available at: <http://greenliving.epa.gov.tw/GreenLife/green-life/english.aspx> (02.01.2008)

- Environmental Labelling Program in China<sup>10</sup> is a Chinese ecolabel administered by the State Environmental Protection Administration (SEPA). They have criteria for: “Phosphorus Gypsum Building Materials” and “Lightweight Wall Boards”.
- Environmental Choice<sup>11</sup> is an ecolabel from New Zealand that is administered by the New Zealand Ecolabelling Trust. They have criteria for “Gypsum Plasterboard”.
- The eco-label of the Czech Republic<sup>12</sup> is an official ecolabel administered by The Czech Ministry of the Environment. They have criteria for: “Wood-based agglomerated materials and products made of them”.

The EU Eco-label, which is the European Union’s official ecolabel, does not have criteria for panels but has recently adopted criteria for wooden furniture<sup>13</sup>.

In Germany and Austria in particular, much attention is paid to the environmental and health aspects of building materials. There are several lifecycle-based product certification systems that are eager to promote building material that is organic and made from natural materials, such as the German “natureplus-Seal of Quality”<sup>14</sup>. Natureplus is an international organisation for future-oriented building that has more than 100 participants in Europe. The criteria comprise a document with basic requirements and product specific requirements such as “Timber and Wood Materials” and “Dry Wall Construction Boards”.

### **Other labels**

There are a host of other labels used for panels. The criteria vary and not all set environmental requirements. Some are certificates of conformity and quality labels, such as the CE label for building products<sup>15</sup> and the P-mark<sup>16</sup>. The CE label enables the free trade of products throughout the EU/EES area without additional approvals, adaptations or re-analysis. The label is designed to notify national authorities that the manufacturer guarantees that: the product conforms to safety, health and environmental requirements and that the stipulated inspection procedure has been observed. The CE label involves a self-assessment without the independent inspection of most panels. For panels designed for construction applications with specific durability requirements, third-party inspection is only required of the manufacturer's

---

<sup>10</sup> Environmental Labelling Program in China, a Chinese ecolabel. Available at: [http://www.sepacec.com/cecen/\(02.01.2008\)](http://www.sepacec.com/cecen/(02.01.2008))

<sup>11</sup> Environmental Choice, an ecolabel in New Zealand. Available at: [http://www.enviro-choice.org.nz/\(02.01.2008\)](http://www.enviro-choice.org.nz/(02.01.2008))

<sup>12</sup> Available at: [http://www.ekoznacka.cz/\\_C12572570032F2DB.nsf/\\$pid/MZPMSFIV17VH\(02.01.2008\)](http://www.ekoznacka.cz/_C12572570032F2DB.nsf/$pid/MZPMSFIV17VH(02.01.2008))

<sup>13</sup> The EU Ecolabel criteria for Wooden Furniture  
Available at:

[http://ec.europa.eu/environment/ecolabel/ecolabelled\\_products/categories/wooden\\_furniture\\_en.htm](http://ec.europa.eu/environment/ecolabel/ecolabelled_products/categories/wooden_furniture_en.htm)  
(15.10.2009)

<sup>14</sup> Natureplus, organisation for sustainable building. Available at: [http://www.natureplus.org/en\(02.01.2008\)](http://www.natureplus.org/en(02.01.2008))

<sup>15</sup> About the European CE label. Available at: <http://www.euroinfo.se/ny/hem/ce-markning/skrivyta/vad-ar-cemarkning.html> (02.01.2008)

<sup>16</sup> The P-mark from SP Technical Research Institute of Sweden. Available at: [http://www.sp.se/sv/units/certification/product/p\\_mark/sidor/default.aspx](http://www.sp.se/sv/units/certification/product/p_mark/sidor/default.aspx) (02.01.2008)

self-inspection system. The products themselves are not inspected. The P-mark is the quality label of the SP Technical Research Institute of Sweden.

Environmental declarations provide detailed environmental information without stipulating requirements regarding the product itself. There are no predetermined limit values. The benefit of such declarations depends on the purchaser's knowledge of environmental aspects related to the product. To establish an environmental product declaration requires that product category rules (PCR) exist or are established. Examples of such an environmental declaration are the Swedish Ecocycle Council's building product declarations<sup>17</sup> and EPD (environmental product declarations, Sweden)<sup>18</sup>. ECOprodukt<sup>19</sup> is a Norwegian collaborative project between NAL (National Association of Norwegian Architects), Sintef Building and Infrastructure and Norsk Byggtjeneste AS. ECOprodukt is based on the manufacturer's environmental characteristics or similar information and evaluates product characteristics in regard to the indoor environment, content of substances that are dangerous to the environment and health, resource consumption and global warming potential.

Environmental management systems structure environmental efforts and continual improvements are made towards goals set by the company. Such a system is a management tool for the company itself. The company maps its environmental impact and creates procedures for purchasing and environmental information. The most common environmental management systems are EMAS, developed in Europe, and ISO 14 001, which is an international standard. Such systems are not particularly visible outside of the company. Such systems do not prohibit products that are environmentally less suitable. Panels are also subject to various labels regarding the indoor environment. The Danish/Norwegian "Inneklimamerke"<sup>20</sup> is common to Norway and Denmark. Since 2005, Dansk Indeklima Mærkning has also managed the secretariat for the Norwegian indoor climate label. According to this system, panels are categorised based on a declaration of emissions. There is also a Finnish label that has been developed by the Building Information Foundation (RTS) and Finnish Society of Indoor Air Quality and Climate. The goal of the label is to improve the development and use of products with low emissions. There are three emissions classes for building products. M1 includes products with the lowest emissions while M3 includes materials that have high emissions. Nordic asthma and allergy organisations have their own labelling systems that assess the level of emissions from materials.

In addition, there are various labels for raw materials. Examples are FSC<sup>21</sup> (Forest Stewardship Council) and PEFC<sup>22</sup> (Programme for the Endorsement of Forest Certification schemes). These systems include forestry standards and traceability

---

<sup>17</sup> Byggvarudeklarationer – Kretsloppsrådets riktlinjer, BVD 3. Available at

<http://www.kretsloppsradet.se/home/page.asp?sid=5287&mid=2&PageId=45786> (02.01.2008)

<sup>18</sup> The international EPD@system. Available at: <http://www.environdec.com/pageId.asp> (02.01.2008)

<sup>19</sup> ECOProdukt. Available at: <http://www.arkitektur.no/?nid=122327> (02.01.2008)

<sup>20</sup> Dansk Indeklima Mærkning, Available at: <http://www.teknologisk.dk/specialister/253> (05.02.2009)

<sup>21</sup> Forest Stewardship Council (FSC). Available at: <http://www.fsc.org/> (05.02.2009)

<sup>22</sup> Programme for the Endorsement of Forest Certification schemes (PEFC). Available at:

<http://www.pefc.org/internet/html/>

(05.02.2009)

regulations that ensure that the wood raw materials are derived from sustainable sources. The regulations consider the origin of the raw material and set environmental and ethical requirements on the forestry that is practiced. FSC has accredited supervisory bodies that assess whether forestry is conducted in compliance with the regulations of the FSC standard in question. In addition, there is a certification for traceability that shall guarantee that it is possible to trace wood raw material from forest to end product. The FSC regulations do not include requirements on emissions, energy consumption or other environmental impact during the lifecycle of the product. FSC has three main labelling categories:

- FSC Pure – 100% of the raw material is sourced from FSC certified forests.
- FSC Recycled – the raw material comprises 100% recycled material.
- FSC Mixed Sources – at least 70% of the raw material comes from FSC-certified forests or is recycled material, while the remaining proportion comes from another controlled origin.

## **3 About the revision**

### **3.1 Purpose of the revision**

The purpose of this revision is to clarify the environmental benefits of Nordic Ecolabelled panels and in particular review the following points:

- renewable raw materials, both with regard to origin (virgin fibre or construction waste) and limit values.
- non-renewable raw materials with regard to primary production and recycling requirements.
- paper and cardboard since these have been too extensive.
- radioactivity to clarify the requirement.
- formaldehyde to simplify the requirement and evaluate the limit value based on environmental relevance and market conditions.
- chemicals with regard to trivial low limits.
- energy consumption as to whether the limit values can be tightened.

Energy and the climate are the primary areas of focus. During the revision, particular attention has been paid to the energy requirements and their connection to CO<sub>2</sub> emissions. Energy and the climate are environmentally relevant focus areas. During the revision, the project group has evaluated the possibility to set requirements that promote the products of each product type that are the best from an energy perspective.

The product group definition was reviewed based on market research.

## 3.2 About this revision

As a basis for this revision, the following investigations have been conducted:

- Market research
  - Interviews
  - Analysis of stakeholders and current affairs
  - Evaluation of current criteria at licensees
  - Analysis of other ecolabels, see 3.4
- LCA report, see 4.3, R18/R19
- Scientific reports<sup>33</sup>, 43
- Information from:
  - Authorities<sup>21</sup>, 31
  - Trade organisations<sup>17</sup>, 28
  -

The revision has been performed by a workgroup in close dialogue with manufacturers, authorities, research centres and other stakeholders in order to gain a comprehensive view of all relevant parameters. The workgroup comprised:

Area coordinator:	Elisabet Magnus
Project manager	Jakob Waidtlöw
PGM Denmark	Heidi B Bugge
PGM Norway	Kristian Kruse
PGM Finland	Harri Houtulainen
PGM Sweden	Jacob Paulsen/Gun Nycander/Jimmy Yoler

## 4 Justification of the requirements

Ahead of this revision, Nordic Ecolabelled commissioned an LCA report to map the most significant environmental aspects of the product group (ref 40.).

The report investigated several wood-based panels, such as plywood and MDF. The general conclusion is that production has the greatest environmental impact (emissions and energy consumption) alongside the operations of suppliers, such as forestry and sawmills. The conclusion for plasterboard is the greatest environmental impact arises during production, and that energy consumption is the most significant aspect. Additionally, the suppliers of paper and cardboard cause a contribution of between 7% and 28% of the environmental impact, depending on the parameter in focus. Another conclusion is that requiring a certain proportion of recycled plaster would not provide environmental benefit since synthetic plaster is already used by the industry. Roughly 20% of the total material in plasterboard comes from recovered sources.

This section describes the background to the requirements. Table 2 shows which requirements have been changed, which have been omitted and which are unchanged.

**Table 2:** Overview of changes to requirements from version 4 to version 5

Requirement in old criteria document	Requirement in new criteria document	Unchanged	Change *	Omitted	New
R1 Wood raw materials	R2		+		
R2 Biocides	R3	Unchanged			
R3 Certified timber	R4		+		
R4 Recycled material				Omitted	
R5 Heavy metals	R8	Unchanged			
R6 Heavy metals in recycled material				Omitted	
R7 Bleaching of paper	R5		+/-		
R8 Emissions of COD	R6		+/-		
R9 Surfactants	R7	Unchanged			
R10 Chemical products	R11-R14		-		
R11 Chemical substances	R13		+		
R12 Environmentally harmful substances	R15+R16	Unchanged			
R13 Cleaning chemicals	R12	Unchanged			
R15 Chemical requirements, surface treatment	R16+R17		+/-		
R14 Plastic, surface treatment				Omitted	

R16 Chemical requirements, surface treatment	R17		+ -		
R17 Chemical requirements, surface treatment	R17		+ -		
R18 Energy consumption	R18-R19		+		
R19 Emissions, CO <sub>2</sub> , SO <sub>2</sub>	R20		+		
R20 COD, water	R21	Unchanged			
R21 Dust emissions	R9		+		
R22 Formaldehyde	R22		+		
R23 Radioactive substances	R10	Unchanged			
R24 Production waste				Omitted	
R25 Take-back system				Omitted	
R26 Packaging, recycling	R23	Unchanged			
R27 Packaging, plastic	R24	Unchanged			
R28 User manual	R25	Unchanged			
R29 Regulatory requirements	R26	Unchanged			
R30 Environment and quality	R27-R32	Unchanged			
R31 Marketing	R33	Unchanged			

\* The “+” sign means that the requirement has been tightened while the “-” sign means the requirement has been relaxed. “+ -” means that some parts of the requirement have been tightened while other parts have been relaxed.

15 of the requirements are the same as previously and four requirements have been omitted. R4 required a minimum proportion of 30% of recycled material or recycled material in products based on non-renewable raw materials. The omission of R24 and R25 is justified under Section 4.4. Requirement R4 was omitted for mineral-based materials but remains applicable to plastic materials. R6 on heavy metals in non-renewable raw materials is included in requirement R8. R15 previously allowed flexibility to fulfil either R16 or R17 on the surface treatment of panels. This is not included in R16 and R17. Section 6 provides a brief overview of the changes made between version 4 and version 5.

#### **4.1 General information about the requirements**

The requirements are categorised by raw materials, chemical products, the source of energy and raw materials, emissions from production, product requirements, waste management, packaging and quality and environmental requirements. Several of the requirements apply only to panels containing a certain proportion of a specific material. Examples of such requirements are those on paper and cardboard and mineral raw materials.

## **4.2 Justification of the product group definition**

Nordic Ecolabelling performed a market survey in 2008 among licensees and other manufacturers. One conclusion was that licensees had not noted an increase in sales due to ecolabelling their products and thus did not have plans to renew their licences. In light of this survey, the focus of this revision has been on requirements related to products currently holding a Nordic Ecolabel. In all likelihood, the broadening of the product group definition will be evaluated along with the evaluation of future criteria.

Nordic Ecolabelling has therefore decided to limit the product group to the following four types of panel for the building, decoration and furniture industries:

- Wood-based panels made up of a least 85% wood in terms of weight, with or without laminate finishes
- Plasterboard
- Mineral-based acoustic panels
- Solid wood (with finish) that has been assembled in panel form (for instance, by the consumer)

Common to these product types is that they are simple and well-known types of panel with distinct applications. Specialised panels require more detailed and carefully balanced quality requirements to ensure that ecolabelled such maintain the same quality standards as other products. Nordic Ecolabelling does not have this expertise at present. There is also comprehensive environmental data for the selected types of panels that enables the establishment of relevant requirements to distinguish the best panels from environmental and quality aspects.

The criteria do not pertain to metal panels or facing panels and panels that are used primarily to insulate against heat/cold loss, irrespective of the materials used in these panels. The energy savings produced by insulation panels is of primary importance. Nordic Ecolabelling has however chosen not to include specific insulation panels since their performance is not solely dependent on the materials in the product but also the building design and factors such as airtightness.

Neither do the criteria pertain to pure HPL (High Pressure Laminate) panels nor to plastics-based panels, such as those used in bathrooms. HPL panels can be used in wetrooms and to laminate worktops. These products have a different function from the other types of panel for building, decoration and furniture. The criteria are not designed to stipulate relevant requirements for this type of product. A worktop with a laminate surface can however be Nordic Ecolabelled and is then considered a panel with surface treatment.

The product group includes assembled panelling since these fulfil the same function as other building panels such as for ceilings, walls and subfloors.

## 4.3 Justification of the new, amended and unchanged requirements

### Raw materials

#### R2 Wood, bamboo and willow (changed)

The manufacturer must have full traceability of wood, bamboo and willow that is not certified to ensure that the raw materials is not sourced from forest environments meriting protection due to their high biological and/or social value. This requirement is designed to make producers more aware of which raw materials their products comprise. If there is reason to suspect that wood, bamboo or willow from such sources is used, Nordic Ecolabelling may demand documentation proving the contrary. Ultimately, the licence may be revoked.

The requirement has been changed and now demands a declaration that wood raw materials is not derived from:

- Protected areas or areas designated by policy with the objective of becoming protected.
- Areas where ownership or rights of exploitation are unclear.
- Illicitly felled trees and/or fibre raw material.
- Ancient virgin forest and forest of high value meriting protection.
- Genetically modified trees or plants.

The manufacturer must also demonstrate how it ensures the exclusive use of traceable wood, bamboo and willow and declare the types used and their geographic origin. The tightened criteria are easier to check. The purpose of this formulation is also to make it clear that Nordic Ecolabelled panels fulfil the requirements stipulated in public procurement. If a product comes from forest that is certified to an approved forestry standard and has been documented in R4, documentation according to this requirement is not necessary.

#### R3 Biocides (unchanged)

Lumbar (felled wood) must not be treated with biocides classified as type 1A or 1B<sup>23</sup> by WHO. Such substances impact negatively on the environment.

#### R4 Timber from certified forests (changed)

Forestry impacts the environment. To reduce this environmental impact, products based on round timber raw materials must contain at least 70% (spruce, fir, birch, tropical woods) timber (50% for other types) that is certified according to a standard for sustainable forestry. Of the Nordic woods, softwood (spruce and fir) is certified. The availability of wood from certified forests varies greatly between the Nordic countries. In 2008, there were 103 million hectares of FSC-certified<sup>24</sup> forest and 200 million hectares of PEFC-certified<sup>25</sup> forest in the world. The availability of wood

---

<sup>23</sup> WHO website, [www.who.int/pcs](http://www.who.int/pcs)

<sup>24</sup> Global FSC certificates: type and distribution April 2008. Available at: <http://www.fsc.org> (02.01.2009)

<sup>25</sup> Statistical figures on PEFC certification. Available at: <http://register.pefc.cz/statistics.asp> (02.01.2009)

from certified forest is expected to increase in the coming years. Nordic Ecolabelling can help increase the proportion of wood from certified forests in Nordic Ecolabelled panels. Nordic Ecolabelling approves forest standards (e.g. national standards) that fulfil the requirements stipulated in Appendix 2 (Declaration 1, page 2) of the criteria document.

Version 4 required 30% certified timber or 50% sawdust/wood chips/shavings (or a combination of these).

The requirement has been tightened from 30% to 70% for certified timber from spruce, pine, birch and tropical woods, and 50% for certified timber of other types of wood. This means the requirement is harmonised with other Nordic Ecolabel criteria. See also the background document to the ecolabelling of furniture and fitments.

Fibreboards are not subject to the requirement on certified timber. Previously, sawdust, shavings and similar were rest products. Today, these are commercial raw materials for biofuels. The price of these materials has risen. Today, manufacturers using chips, fibre, etc. must search for possible raw materials. Waste fractions from forestry are to an increasing extent being used as a source of energy. These include fractions that the producer chips but that lack sufficient traceability data regarding certified forestry. There is therefore a risk of prohibiting the raw material required for fibreboard if one requires that the fractions must come from certified forests or be a by-product of another process.

Fibreboard is not subject to requirements regarding a specific threshold value for percentage of certified raw material. The proportion of certified raw material can be used in R18 and R19 on the source of energy and raw materials. The proportion must in such a case be supported by the documentation requirement for R3.

Panels must also fulfil a calculation regarding the consumption of energy and raw materials (R17 and R18). A minimum quantity of certified timber is required and recycled raw materials are promoted. This means that the previous requirement of either 30% certified wood or 50% sawdust/chips/waste wood/recycled fibre (or a combination of these) is now included in the requirements on energy and raw materials.

There is no requirement regarding the proportion of bamboo or willow that is certified or that a certain proportion is organically cultivated. The reason for this is that there is currently a limited supply of bamboo from certified sources. Requirement R3 ensures that bamboo and willow are sourced from sustainable forest/plantations.

#### R5-R7 Paper and cardboard (changed in part)

Requirement R5-R7 apply to products that contain more than 5% by weight paper and cardboard. The requirement on bleaching using chlorous bleaching agents has been changed to prohibiting chlorine gas for bleaching fibre. The requirement has been changed so that it is harmonized with other Nordic Ecolabel requirements<sup>26</sup>.

---

<sup>26</sup> Paper products – Basic module, version 1.0. 9 October 2003

The requirement on the emission to water of COD is unchanged. The requirement on surfactants includes test method OECD 301 A-F (readily biodegradable) and OECD 302 A-C (potentially biodegradable). For small quantities of surfactants the classification potentially biodegradable is sufficient since it is assumed that the quantity of paper or cardboard is small and the environmental impact of such products is limited in comparison to the rest of the panel.

#### **R8 Heavy metals in mineral raw materials (changed)**

Single raw materials can contain elevated concentrations of heavy metals. Examples include mined plaster (natural plaster), synthetic plaster from the purification of the flue gases from coal-fired power stations, glass wool made from recycled glass and mineral wool made of stone. It is important that the level of heavy metals is sufficiently low that it does not create problems when the product is recycled. The limit value has been set based on regulatory requirements for soil quality, i.e. the limit values for products that are released into the ground such as sludge from sewage treatment plants. In this way, the disposal of the product will not increase concentrations of heavy metals at the landfill site.

Requirement R8 is a combination of the previous requirements R5 and R6. See also Section 5.4. The limit values are for trivalent chrome since hexavalent chrome is prohibited by requirement R13. The background document for furniture and fitments also recommend trivalent chrome in preference to hexavalent chrome in metal coatings.

#### **R9 Dust emissions (changed)**

Emissions of dust and soot to the air are the most important local environmental aspect for many producers. The problem is greatest for companies that use non-renewable raw materials.

The requirement on dust emissions has been changed and applies only to dust from mineral raw materials. The limit value of 10 mg dry dust/m<sup>3</sup> air is recommended by the Danish Environmental Protection Agency and county administrative boards in Sweden. The value for wet dust is kept at 25 mg/m<sup>3</sup> since wet dust is much more difficult to filter.

Discussions with manufacturers have confirmed that the limit values for the emissions of wet dust from mineral production are relevant. Current BAT recommends a value for total particle emissions<sup>27</sup> of 20-50 mg/m<sup>3</sup>.

#### **K10 Radioactive substances (unchanged)**

The requirement is unchanged. The background to the requirement is that radioactive substances can cause health problems during production and during the use of the product. According to the Swedish Radiation Safety Authority, this value was still pertinent in 2008.

---

<sup>27</sup> Integrated Pollution Prevention and Control (2001), Reference Document on Best Available Techniques in the Glass Manufacturing Industry, European Commission

## **Chemical products**

### R11 Classification of chemical products (changed)

The requirements on chemical products apply to the product as delivered to the manufacturer. R11 is by and large the same requirement as in version 4 but is now tabulated. The requirement has been tightened with the prohibition of chemical products that are classified as R39 (Danger of very serious irreversible effects) and R43 (May cause sensitization by skin contact).

The proposed requirement for the classification of chemical products is based on the criteria for Nordic Ecolabelling of chemical building products but is less extensive. The requirements on chemical building products prohibit almost all products classified as dangerous to health or the environment. Regarding panels, the use of raw materials and energy are more important and accordingly the chemical requirements are more lenient. The products are also used by an industry that sets requirements on the working environment, unlike Nordic Ecolabelled chemical products which may be used by consumers. Nordic Ecolabelling considers that the proposed classification requirement prohibits the most problematic chemical products that are used during panel manufacturing.

Exemptions to the requirement on added products apply for chemical products used for high-pressure laminates (HPL). HPL is made of plastic impregnated kraft paper (phenol based) with a decorative surface (melamine based). Uncured phenol is a strong neurotoxin<sup>28</sup>. Accordingly, producers are now required to demonstrate that toxic chemicals in the final product are no longer reactive. Regulatory requirements govern the working environment.

Requirements are set for the chemical products used during the production of wood-based panels. These are commonly various proportions of adhesives, urea and wax. Dispersants, foaming agents, adhesives, wax and water repellents are used in plasterboard.

There is still an exemption for free formaldehyde in chemical products, now detailed by requirement R14.

### R12 Cleaning chemicals (unchanged)

The use of alkylphenolethoxylates such as surfactants in cleaning agents is now strictly limited by the authorities in Europe. Their use has however not yet ceased. The use of solvents with an aromatic content >1% is still widespread for heavy-duty applications. The limitation of such substances for the cleaning of production equipment is unproblematic since there are now less environmentally hazardous alternatives.

Chemical products are regulated according to R12 only.

---

<sup>28</sup> Byggemiljøets materialvurderingsliste. Byggenæringens miljøsekretariat i Norge. Available at: <http://www.byggemiljo.no/getfile.php/Filer/Publikasjoner/Materialvurderingsliste%20revidert%203%20juli%202008.pdf> (07.01.2009)

### R13 Undesirable substances in chemical products – including surface treatments (changed)

This requirement has been changed from version 4. Three substances have been added:

Bisphenol A, perfluorooctanoic acid (PFOA) and its salts, esters, and compounds and perfluorooctane sulphonate (PFOS). These substances have been included in the criteria since they are problematic substances, the use of which Nordic Ecolabelling wishes to minimise. The Norwegian Pollution Control Authority has proposed far-reaching limitations on these substances<sup>29</sup>.

#### *Bisphenol A*

Excerpt from the consequence investigation: "Bisphenol A, CAS nr 80-05-7, is used in the following relevant areas and products: Plastics and epoxy miscures, building constructions, paints and coatings, adhesives (bonding agent and hardener) and polyhydric alcohol for polyurethane production. Bisphenol A can be released into the environment during the production process and the substance has displayed endocrine disruption on fish and snails. The primary source of terrestrial exposure is from spreading sludge from sewage works. There is a need to reduce the environmental risk in several areas of use. Users are not subject to direct exposure but may consumer products with polycarbonates and epoxy resin components contain bisphenol A. A Norwegian survey displays wide variations in the free bisphenol A in products on the market, from 10 mg/kg monomer to approximately 2,500 mg/kg. Exposure may arise if there are residual monomers or if polymers get damaged or degrade, such as epoxy paints, wood fillers and adhesives. Emissions to the environment during a product's service life or disposal may cause indirect exposure to humans."

#### *Perfluorinated and polyfluorinated alkyl substances (PFAS)*

Perfluoroalkyl substances are also known as perfluoroalkyl surfactants and perfluoroalkyl acids (PFAS). These are a group of chemical compounds that contain a fully fluorinated alkyl chain and a group that makes the compound slightly soluble in water. This group of compounds is fundamentally different from most other chemicals since they are neither lipophile nor hydrophile but bind readily with the surfaces of particles. The compounds are primarily used for their surface characteristics and water and fat repelling properties. They are used in various industrial and consumer products for their low surface energy, high chemical and thermal stability, low refractive index, high electric insulation and good corrosion resistance. Important products include floor wax and polish, paints and varnishes, depressants and cleaning agents, impregnating agents for textiles and leather, and fire extinguishers.

Perfluoroalkyl substances are very persistent (stable) and decompose very slowly. The compounds are slightly water and fat soluble. They accumulate when they bind to the surface of particles or tissue. They bind to proteins and can be found in high concentrations at the top of the food chain. A Nordic screening survey found PFAS compounds in all the tested samples and the highest levels in marine mammals. The report

---

<sup>29</sup> Konsekvensutredninger av forslag til regulering av visse miljøgifter i forbrukerprodukter. Vedlegg 4. [http://www.sft.no/artikkel\\_42872.aspx](http://www.sft.no/artikkel_42872.aspx). Norwegian Pollution Control Authority (SFT). Norway, 2008.

concluded that PFAS are found in significant levels in the Nordic environment<sup>30</sup>.

Perfluorooctane sulphonate is a focus PFAS since it is toxic to aquatic organisms, birds and bees<sup>31</sup>.

#### *Chlorinated paraffins*

Chloroparaffins are a relatively large group of substances that are categorised by chain length and chlorine content:

- \* medium chain (MCCP) C14-17
- \* long chain (LCCP) >C17

Chloroparaffins are chemically stable and decompose slowly. They are readily taken up in the food chain and have a high bioaccumulating potential. This applies in particular to short chain chloroparaffins. Chloroparaffins can be found in the air, surface water and marine environments, aquatic organisms, foodstuffs and mother's milk<sup>32</sup>. Chloroparaffins are used as a flame retardant in cables and as plasticizers in coatings, plastics and caulk.

Alkyl sulphates and alkyether sulphates are not considered bioaccumulating but simple alcohol ethoxylates (long-chained with few ethoxylate units) are potentially bioaccumulating. Even if substitute surfactants are toxic or very toxic to aquatic organisms, they are an environmental benefit if they degrade more rapidly. In addition, substituting APEO avoids nonylphenol degradation products, which can cause endocrine disruption.

#### R14 Content of free formaldehyde in chemical products (changed)

Formaldehyde can be found in the urea-based adhesives used for various types of panel. There is no viable alternative today. Formaldehyde is one of the most important ingredients. The majority of the formaldehyde is chemically bound. The adhesive must contain a small quantity of free (unreacted) formaldehyde in order to cure. This formaldehyde is emitted (evaporates) during the curing process. The emitted formaldehyde is primarily a health issue. Industry has worked hard to reduce formaldehyde emissions. There are adhesives with as little as 0.2% by weight of free formaldehyde. There are however still products on the market that contain roughly 1% by weight of free formaldehyde.

Formaldehyde does not comply with R11. This makes an exception necessary for the adhesives used in panels to be able to produce a Nordic Ecolabelled panel at all.

---

<sup>30</sup>Kallenborn, R., Berger, U., and Järnberg, U., 2004. Perfluorinated alkylated substances (PFAS) in the Nordic environment.

<sup>31</sup> "Kartlegging av utvalgte nye organiske miljøgifter 2004. Bromerte flammehemmere, perfluoralkylstoffer, irgarol, diuron, BHT og dicofol" SFT: 927/2005. Available at: [http://www.sft.no/miljoreferanse\\_\\_\\_37630.aspx](http://www.sft.no/miljoreferanse___37630.aspx) (visited 5. August 2009)

<sup>32</sup> Miljøstatus i Norge, a Norwegian website with information on environmental status and developments. The website has been developed by the environmental directorate on assignment from the Ministry of the Environment. Available at: <http://www.miljostatus.no/Tema/Kjemikalier/Noen-farlige-kjemikalier/Klorerte-parafiner/> (visited 29.09.2009)

The proposal for requirement R14 (exempt from R11):

“The content of free formaldehyde in chemical products added to Nordic Ecolabelled panels must not exceed 0.3% by weight. The content of free formaldehyde in chemical products for rockwool must not exceed 0.5% by weight.”

The proposed limit values are the same as in version 4. However, chemical products for laminated wood and glulam have been omitted and chemical products for mineral wool added. Binding agents for mineral wool can today not be produced with levels lower than 0.4% by weight free formaldehyde.

Panels can be produced with chemical products that do not contain formaldehyde. For example, methylene diphenyl diisocyanate (MDI) can be used as a binding agent. The monomers polymerise to polyurethane producing a bond. There are also binding agents for mineral wool panels that are produced from renewable raw materials.

#### R15 Environmentally harmful substances in panels (changed)

The limit value is based on data from a wide range of chemical products. The requirement specifies limit values per kg of panel (0.5 g/kg panel) to provide just reflection of the potential environmental impact. In addition, the requirement allows the manufacturer greater flexibility to choose chemicals that ultimately reduce environmental impact.

Ammonia and ammonia solution are used as components of binding agents in some panels. The requirement now includes an exemption if ammonia which is classified as R50 due to its high pH value is included at concentrations above 24%. This classification disappears at concentrations of 24% or less. It is therefore unnecessary to include ammonia in the calculation of potential environmentally dangerous substances in the finished panel.

#### R16+R17 Environmentally harmful substances and VOC in surface treatments (changed)

The requirement still allows flexibility by way of choice. The manufacturer can choose to document the use of products with a low content of solvents and environmentally harmful substances. Alternatively, the manufacturer can document the emission of each solvent and content of environmentally harmful chemicals per functional unit. Accordingly, the requirement does not control the choice of technology in the same way as current criteria. The functional unit is surface area (m<sup>2</sup>).

The requirement is split so that hazardous substances are declared under R16 and VOC specified under R17. Both requirements allow the applicant to specify either the concentration in the chemical product or the quantity in one square metre of finished panel. The permitted limit for VOC is 5% by weight.

Both the Australian Ecolabel Program criteria for panels<sup>33</sup> and New Zealand Ecolabelling Trust criteria for plasterboard<sup>34</sup> limit VOC content to 5% by weight. The

---

<sup>33</sup> Panel Boards (2007), The Australian Ecolabel Program, Good Environmental Choice Australian Standard

<sup>34</sup> Gypsum Plasterboard Products, The New Zealand Ecolabelling Trust

EU Eco-label criteria for wooden furniture also stipulate a maximum content of 5% by weight VOC in surface treatments<sup>35</sup>.

In the process industry, solvent based surface treatments are still used, most often with effective recycling systems. In the Nordic region, significant developments have been made thanks to trade unions and trade organisations that have pursued this issue and successively phased out solvent-based surface treatments. Water based surface treatments contain 0-10% VOC. By limiting VOCs in surface treatment products to 5% by weight, Nordic Ecolabelling promotes the use of surface treatment products more suitable from an environment and work environment perspective.

Nordic Ecolabelling has chosen to reduce the limit for VOC per unit area to max. 10 g/m<sup>2</sup>. This has been done to harmonise this requirement with the draft requirement for the Nordic Ecolabelling of furniture and fitments. This requirement is based on the values for best available technology (BAT). Refer to the background document for to the Nordic Ecolabelling of furniture and fitments, version 4.0.

### **Energy and origin of raw materials**

#### **R18 and R19 Energy requirements (changed)**

A Danish LCA<sup>36</sup> of panels indicates that the energy consumed during the production phase is significant. It should however be noted that this LCA does not consider the health effects of emissions (formaldehyde, etc.), ecotoxic effects or how chemical products influence the working environment, which are key parameters in other ecolabelling criteria for panels. The reason is that these parameters are very difficult to handle in an LCA and since it is necessary to model different scenarios of what may happen with the product. Processing energy data is simpler and can be linked directly to the production of the product without requiring complicated end-use scenarios.

A review of international ecolabels (GEN)<sup>37</sup> shows that there are criteria for two dominating types of panel: plasterboard and wood-based panels.

Somewhat surprisingly, none of the reviewed ecolabels (German, Japanese, Australian, New Zealand, American) include requirements on energy consumption or CO<sub>2</sub> and sulphur emissions. The focus of the requirements is on raw materials (recycled material), chemical substances that are added to the panel, and toxic emissions (formaldehyde, VOC, etc.). Energy consumption is a difficult parameter to communicate since consumers do not consider this an important parameter for the product group.

Nordic Ecolabelling currently has information about energy consumption regarding wood-based panels, plasterboard and acoustic panels. The differences within each group of panel types are not particularly great. Based on this information, the energy requirement should not be the primary distinguishing requirement for each panel type.

---

<sup>35</sup> Wooden Furniture, Draft (2003), EU Ecolabel, European Commission

<sup>36</sup> Memo on the environmental circumstances for furniture and building panels, 1 February 2008. Perform for Ecolabelling Denmark by Marianne Wesnæs, 2.-0 LCA consultants and Kim Christiansen, Dansk Standard

<sup>37</sup> Global Ecolabelling Network, Product category Building Materials

Rather, energy consumption should be considered to ensure that Nordic Ecolabelled panels do not have an exceptionally high energy demand.

**Wood-based panels:** can be divided into three groups:

Panelling Very low energy consumption, minimum processing

Chipboard Medium energy consumption

Plywood, laminate, MDF High energy consumption (ca. 50% more than chipboard)

The most common fuel is biofuel.

**Acoustic panels:** can be divided into two groups:

Mineral wool Glass wool requires more energy per kg than rockwool. But since glass wool has a lower density, the energy demand is roughly equivalent.

Cement/wood fibre 50-150% higher energy demand than mineral wool due to the use of cement. High CO<sub>2</sub>-emissions due to chemical reaction and energy consumption. However, this type of panel lasts longer, does not contain dangerous additives, withstands indoor moisture (used in swimming baths). 2-3 times more energy is required to make white cement compared with grey cement.

All fuel used is fossil fuel.

There are four major plasterboard manufacturers. The information we have suggests that there are no significant differences between manufacturers with regard to energy consumption. The primary difference is that one manufacturer uses synthetic plaster, which is a commercial product. Synthetic plaster is recovered during the flue gas purification at coal-fired power stations. Synthetic plaster is thus generally available in the proximity of coal-fired power stations. We have data from three plants through building product declarations. There is no specification of the proportion of electricity and fuel, but it is estimated that fuel accounts for 90%. It is also likely that all fuel used is fossil fuel.

In version 4, the energy consumption requirement is specified as a formula containing the weighted consumption of fuel and electricity. Limits are also set for CO<sub>2</sub> emissions and the sulphur content of fuel to limit the use of fossil fuels. Below are the formulas for electricity and fuel consumption. Equation 1 applies to all panels except acoustic panels. Equation 2 applies to acoustic panels.

$$E = \frac{\text{Purchased electricity}}{0.7 \text{ kWh/kg}} + \frac{\text{Fuel}}{1.9 \text{ kWh/kg}} \quad (1)$$

$$E = \frac{\text{Purchased electricity}}{80 \text{ kWh/m}^3} + \frac{\text{Fuel}}{319 \text{ kWh/m}^3} \quad (2)$$

A matrix or formula provides greater flexibility for the manufacturer. If opportunities to limit electricity consumption are limited, fuel consumption can be reduced instead.

The energy requirement has been amended in the draft criteria. Several other parameters have been added into the formula above and additional requirements have been defined for different types of panel to match the new product group definition. Since different panels require different amounts of energy and different raw materials, it is only logical to set different requirements.

These differences enable the ecolabelling of the environmentally most suitable panels within each area. In addition to the aforementioned environmental parameters (fuel and electricity), the use of renewable fuels, wood raw material from certified forests and recovered raw materials. The formula includes a factor of 2.5 for the conversion to primary energy, which is the factor now applied in Nordic Ecolabelling criteria.

The formula for the new requirement is given below. A point score of 0-4 can be awarded for each environmental parameter. The better the production, the higher the score. The maximum possible score is 12.

Low energy consumption and the use of renewable fuels score highly. Renewable fuel is defined as non-fossil fuels (peat is defined as a fossil fuel). Energy use is calculated in terms of an annual average.

Energy consumption, kWh/kg panel, must encompass panel production and the production of the constituent key raw materials. Key raw materials are defined as raw materials that exceed 5% by weight of the finished product. Energy consumption during extraction of raw materials is not to be included.

The energy account for panel production must be based on data from the handling of raw materials (incoming conveyor belt on the production line) to the finished product before surface treatment, if any. The energy consumption for surface treatment or lamination is not included. In the case of the production of chemical products, such as adhesive, the energy accounts must be based on production data. The energy content of the raw material must not be included. In exceptional cases a standard value of 15 MJ/kg may be used for adhesives (solution for use), comprising 12 MJ/kg for fuel and 3 MJ/kg for purchased electricity (4:1). Nordic Ecolabelling has chosen the units kWh per kg or m<sup>3</sup>, though calculations may also be made in MJ (1 kWh=3.6 MJ).

Electricity consumption refers to electricity purchased from an external supplier. If the producer has an energy surplus that is sold as electricity, steam or heat, the sold quantity can be deducted from the fuel consumption. Only fuel that is actually used in panel production is to be included in the calculations.

Wood-based panels and plasterboard (gypsum panels):

$$P = \frac{A}{25} + \frac{B}{25} + \frac{C}{25} + \left(4 - \frac{D}{0.25}\right) + \left(4 - \frac{E}{0.85}\right)$$

**Requirement:**     **P must be at least 9.5 for chipboard and panelling**  
                          **P must be at least 8.0 for fibreboard, plywood and laminated wood panels**  
                          **P must be at least 6.0 for plasterboard**

Table 3 Environmental parameters for the points calculation for wood-based panels and plasterboard.

Environmental parameter	Requirement
A = Wood from certified, sustainable forest <sup>1</sup> (%)	See R3.
B = Proportion of recycled raw materials <sup>2</sup> (%)	-
C = Proportion of renewable fuels <sup>3</sup> (%)	-
D= Electricity consumption (kWh/m <sup>2</sup> )	Max. 1.0 kWh/kg
E= Fuel consumption (kWh/m <sup>2</sup> )	Max. 3.4 kWh/kg

<sup>1</sup>The annual proportion of wood raw material from certified forest. Ecolabelled wood from certified forest sources is described under R3.

<sup>2</sup> Recycled wood raw materials = Residual products from other industry and post-consumer materials

<sup>3</sup> Renewable fuel = Fuels other than fossil fuels and peat.

**Acoustic panels**

$$P = \frac{A}{15} + \frac{B}{25} + \frac{C}{25} + (4 - \frac{D}{50}) + (4 - \frac{E}{100})$$

**Requirement: P = 5.0**

Table 4 Environmental parameters for scoring acoustic panels.

Environmental parameter	Requirement
A = Wood from certified, sustainable forest <sup>1</sup> (%)	See R3.
B = Proportion of recycled raw materials <sup>2</sup> (%)	-
C = Proportion of renewable fuels <sup>3</sup> (%)	-
D= Electricity consumption (kWh/m <sup>3</sup> )	Max. 200 kWh/m <sup>3</sup>
E= Fuel consumption (kWh/m <sup>3</sup> )	Max. 400 kWh/m <sup>3</sup>

<sup>1</sup>The annual proportion of wood raw material from certified forest. Ecolabelled wood from certified forest sources is described under R3.

<sup>2</sup> Recycled wood raw materials = Residual products from other industry and post-consumer materials

<sup>3</sup> Renewable fuel = Fuels other than fossil fuels and peat.

The proportion of certified raw material and the proportion of recycled raw material is calculated as a proportion of the total constituent raw materials. This value shall include adhesives but not surface treatments and coatings (such as laminates, paper and cardboard). A raw material cannot be classified as both recycled and from certified forests. Shown below is an example calculation of how the requirement can be applied to panels.

*Example calculation for panels:*

*Wood from certified, sustainable forest: 0%.*

*Recycled wood raw materials: 50%. (sawdust)*

*Proportion of renewable fuels: 80%.*

*Electricity consumption: 0.5 kWh/kg*

*Fuel consumption: 1.3 kWh/kg*

$$P = \frac{0}{25} + \frac{50}{25} + \frac{80}{25} + (4 - \frac{0,5}{0.25}) + (4 - \frac{1,3}{0.85}) = 9.7. \text{ The panel fulfils the requirement.}$$

**R20 Emissions to air (changed)**

The purpose of this requirement is to stimulate a transition from non-renewable to renewable sources of energy. Emissions shall be calculated for the use of fossil fuels such as coal, oil and gas in manufacturing and for the production of primary constituents that comprise more than 5% of the product. The documentation submitted to Nordic Ecolabelling shall display calculations. The limit values for CO<sub>2</sub> are set so that the alternative energy sources must have lower CO<sub>2</sub> emissions than natural gas.

The limit values for SO<sub>2</sub> are set so that the alternative energy sources must on average contain less than 0.1% S by weight.

The requirement has been tightened for all panel types. A review of emissions from different panels shows that the better panels can be produced with lower emissions of CO<sub>2</sub> and SO<sub>2</sub>.

The calculations shall not include organic chemical products. This means that cement is subject to the requirement. It is also clarified that the requirement is in regard to emissions produced through energy consumption. The use of cement is an example of a process in which a proportion of CO<sub>2</sub> emissions arise from a chemical reaction. This occurs during the calcination of limestone or some other form of calcium carbonate. The process removes carbon dioxide forming calcium oxide (often called burnt lime or simply lime). These chemical emissions of CO<sub>2</sub> shall not be included in the calculation of emissions. In this way, Nordic Ecolabelling wishes to stimulate the use of biofuels in cement production. The chemical reaction is reversible and after many years, the released CO<sub>2</sub> will be recaptured in a carbonation reaction.

#### R21 - Emissions to water (unchanged)

The background to this requirement is that producers must limit the emission of substances with a high chemical oxygen demand.

#### R22 Formaldehyde (changed)

The background to this requirement is that formaldehyde is a threat to health during the manufacturing and use of the product. Pure formaldehyde is classed as R23/R24/R25, R34, R40 and R43<sup>38</sup>.

During the development of EU Eco-label criteria for wooden furniture it became apparent that German manufacturers are able to produce panels with formaldehyde emissions that are roughly 50% of E1 (the current limit value).

In face of the information above, the requirement on formaldehyde has been changed in the draft criteria from E1 (8 mg formaldehyde/100 g dry matter or 0.13 mg formaldehyde/m<sup>3</sup> air) to half the value of E1 for all panels except MDF, for which a level of 5 mg formaldehyde per 100 g dry matter. The reason behind this change is the advances in the wood panel industry. Above all, legislation in California has driven developments since the USA is a major market for Nordic furniture producers. The new requirements for panels stipulate limit values that are roughly half the previous values, but that also vary between panel types.

The EU Eco-label criteria for wooden furniture stipulate E1 as the limit value for wood-based panels prior to surface treatment and requirements on free formaldehyde in products<sup>35</sup>.

Nordic Ecolabelling's reasoning regarding formaldehyde emissions is described in more detail in the background document for Furniture and Fitments, version 4.0.

---

<sup>38</sup> The Swedish Chemicals Inspectorate, EU-side harmonised compulsory classification and marking, KIFS 2005:5, page 192.

### R23-33 Other requirements in regard to ecolabelled products (changed)

This requirement is general and not justified further in this background document. The changes primarily regard the shift to a new criteria document template.

## **4.4 Justification for the omission of requirements**

### Old R4 Amount of recycled material

The requirement on recycling makes an important statement and is designed to promote the use of residual products (waste) in new products in order to save natural resources.

The requirement on the proportion of recycled material has however been removed for inorganic raw materials. This is since the requirement does not have a controlling effect. Industrial plaster and crushed glass are used regardless since this is economically most profitable. These materials are no longer waste but used as raw materials. It is not possible to produce mineral materials such as rockwool and cement from recycled materials. There are panels currently available made of these raw materials that in many respects are highly suitable from an environmental perspective. It is undesirable to eliminate such products based on an ineffective raw material requirement. The use of recycled materials is awarded points under requirements R17 and R18 on the source of energy and raw materials.

### Old R6 Heavy metals in recycled materials

Previous versions of the criteria contained a limit value based on regulatory requirements on soil quality. The requirement on recycled materials only differs to that on virgin material with regard to levels of chrome. 800 mg/kg is permitted in recycled materials compared to 500 mg/kg in virgin material. It was previously argued that chrome levels in recycled glass are high (>500 mg/kg). More recent samples from recycled bottles show that the limit value of 800 mg/kg far exceeds the chrome level in these bottles making the dual limits redundant. The requirement on heavy metals in recycled materials and virgin materials has been combined in R7 Heavy metals in mineral raw materials.

### Old R14

Now included in R13.

### Old R15 option of requirement R16 or R17 on surface treatment

R15 previously offered the choice of one of two other requirements (R16 or R17). In the new criteria, this choice is offered by R15 and R16.

### Old R24 Production waste

The current requirement is comparable to Nordic regulatory requirements. The requirement can therefore be omitted from the criteria document.

### Old R25 Recycling system for products

The requirement has been omitted since at present there is no working system for material recycling (such as wood-based panels) and since waste produced during manufacturing is generally recycled. Since the requirement in practice is ineffective it has been removed from the criteria document.

## 4.5 Justification to evaluated requirements

### R9 Dust emissions

Dust from wood in many cases represents a significant source of energy that is economically viable to use. In several countries, the authorities set a maximum limit for dust emissions to air.

Requirements on wood dust have been discussed since Danish air quality guidelines are stringent in this area. However, all the Nordic factories visited (chipboard manufacturers) proved to have dust levels far over this limit value. In the Nordic area it is the local authorities that determine the limit values for wood dust based on environmental relevance and economic viability. In light of this, finding a suitable and effective limit value is not considered possible. The Danish air quality guidelines have a blanket limit for all types of dust, while studies have shown that it hardwood dust that poses a risk of cancer and not spruce or pine, which are used in panel production in the Nordic area. A study performed in 2008 by the Danish national working environment research centre (NFA) shows that differentiating between softwoods and hardwoods is not ideal with regard to health effects<sup>39</sup>. This proffers that wood dust from hardwood is no more inflammatory or genotoxic than that from softwood.

---

<sup>39</sup> Lange, J. B. (2008). EFFECTS OF WOOD DUST: Inflammation, Genotoxicity and Cancer. Ph.d. thesis. Faculty of Health. Science at the University of Copenhagen, Denmark

## 5 Changes from the previous version

The categorisation of raw materials is more specific. Chemical products and other constituent products and raw materials are handled separately. In version 4 of the criteria, it is difficult to determine how far to regress for various types of constituent products such as laminates and mineral wool.

### **Raw materials**

Raw material requirements are established for the following groups:

Wood-based raw materials, R2-R4

Paper and cardboard, R5-R7

Mineral raw materials, R8-R10

### **Chemical requirements**

The requirements have been divided into two sections: one regarding chemical products and another regarding chemical substances in the panel.

### **Changed requirements (numbering according to old criteria)**

R1 Wood raw materials

The documentation requirement has been extended. Names of wood and purchasing procedures are required.

R3 Timber for certified forest

The requirement on the proportion of sawdust, waste wood, etc. has been removed. The requirement applies only to solid wood.

R10 Classification of chemical products

The requirement has been split. The requirement is unchanged regarding classification. Regarding free formaldehyde in adhesives for mineral wool, the limit value is now 0.5%.

R12 Compounds and additives in chemical products

The requirement is the same but the panel manufacturer must provide a declaration in addition to the declarations by the producers of the chemical products.

R15-R17 Surface treatment

The requirement levels are unchanged by the requirement is reworded. The requirement on environmentally dangerous substances is contained in one requirement and that on VOC in the other.

R18 Energy consumption

The requirement is now a matrix requirement providing a comprehensive evaluation of electricity, renewable fuel, proportion of recycled raw materials and the proportion of wood from certified forests. The point score necessary is different for acoustic panels, chipboard and fibre/laminated/glulam panels.

R21 Dust emissions

The requirement now differentiates between wet and dry dust. The requirement on wet dust is unchanged but the limit for dry dust is tightened to 10 mg dust/m<sup>3</sup> air.

#### R22 Formaldehyde

The requirement has been changed from E1 to ½E1, i.e. from 0.13 mg formaldehyde/m<sup>3</sup> air to 0.065 mg formaldehyde/m<sup>3</sup> air (with the exception of MDF, for which the permitted level is 25% higher).

#### R25 Recovery systems

The wording has been changed slightly. It is no longer required that residual products can be used as a raw material in equivalent products.

### **New requirements (numbering according to new criteria)**

#### **Omitted requirements (numbering according to old criteria)**

R4 on the proportion of recovered material has been omitted.

R6 on heavy metals in recovered materials has been included under the general requirement on heavy metals. This means that the limit value has been lowered from 800 mg/kg to 500 mg/kg. All other limit values on heavy metals are the same for both virgin and residual products.

R14 has been moved to R13.

R15 made reference to two alternatives R16 and R17. In the new criteria, this choice is offered by R15 and R16.

### **Wood raw material (summary)**

In future criteria, the following areas will be evaluated.

- Harmonization of requirements as regards emission with the requirements set by Danish/Norwegian indoor climate labelling and further studies concerning requirements to indoor climate.
- Energy requirements for the manufacturing of panels.

## **6 References**

<sup>1</sup> Att välja trä – trävaror och träprofiler till bygget, Swedish Forest Industries Federation (2004)  
<http://www.tramarknaden.com/LitiumDokument20/GetDocument.asp?archive=3&directory=748&document=3328>

<sup>2</sup> Byggdetaljer 1-2007, Utvändig kledning med plane plater:  
<http://www.steni.com/download2.asp?DAFID=244&DAAID=42%29> (27.04.2010)

<sup>3</sup> Direktlaminat:  
[http://www.direktlaminat.se/old\\_direktlaminat/produkter%20att%20bearbeta/ytmaterial/ytmattow.htm](http://www.direktlaminat.se/old_direktlaminat/produkter%20att%20bearbeta/ytmaterial/ytmattow.htm)  
(27.04.2010)

<sup>4</sup> The Blue Angel, the official German ecolabel. Available at: <http://www.blauer-engel.de/en/index.php>  
(02.01.2008)

<sup>5</sup> EcoLogo, the official Canadian ecolabel. Available at: <http://www.ecologo.org/en/> (02.01.2008)

- <sup>6</sup> The Eco Mark, Japanese ecolabel. Available at: <http://www.jeas.or.jp/english/> (02.01.2008)
- <sup>7</sup> Good Environmental Choice Label, Australian ecolabel. Available at: <http://www.geca.org.au/AELAhistory.htm> (02.01.2008)
- <sup>8</sup> Korea Ecolabel, Korean ecolabel. Available at: [http://www.koeco.or.kr/eng/business/business01\\_01.asp?search=1\\_1](http://www.koeco.or.kr/eng/business/business01_01.asp?search=1_1) (02.01.2008)
- <sup>9</sup> Green Mark, a Taiwanese ecolabel. Available at: <http://greenliving.epa.gov.tw/GreenLife/green-life/english.aspx> (02.01.2008)
- <sup>10</sup> Environmental Labelling Program in China, a Chinese ecolabel. Available at: <http://www.sepacec.com/cecen/> (02.01.2008)
- <sup>11</sup> Environmental Choice, a New Zealand ecolabel. Available at: <http://www.enviro-choice.org.nz/> (02.01.2008) Available at: [http://www.ekoznacka.cz/\\_C12572570032F2DB.nsf/\\$pid/MZPMSFIV17VH](http://www.ekoznacka.cz/_C12572570032F2DB.nsf/$pid/MZPMSFIV17VH) (02.01.2008)
- <sup>12</sup> The Eco-label of the Czech Republic Available at: [http://www.ekoznacka.cz/\\_C12572570032F2DB.nsf/\\$pid/MZPMSFIV17VH](http://www.ekoznacka.cz/_C12572570032F2DB.nsf/$pid/MZPMSFIV17VH) (02.01.2008)
- <sup>13</sup> Ecolabel criteria for wooden furniture Available at: [http://ec.europa.eu/environment/ecolabel/ecolabelled\\_products/categories/wooden\\_furniture\\_en.htm](http://ec.europa.eu/environment/ecolabel/ecolabelled_products/categories/wooden_furniture_en.htm) (15.10.2009)
- <sup>14</sup> Natureplus, organisation for sustainable building. Available at: <http://www.natureplus.org/en> (02.01.2008)
- <sup>15</sup> About the European CE label. Available at: <http://www.euroinfo.se/ny/hem/ce-markning/skrivyta/vad-ar-cemarkning.html> (02.01.2008)
- <sup>16</sup> The P-mark from SP Technical Research Institute of Sweden. Available at: [http://www.sp.se/sv/units/certification/product/p\\_mark/sidor/default.aspx](http://www.sp.se/sv/units/certification/product/p_mark/sidor/default.aspx) (02.01.2008)
- <sup>17</sup> Building Product Declarations - Ecocycle Council guidelines, BPD 3. Available at <http://www.kretsloppsradet.se/home/page.asp?sid=5287&mid=2&PageId=45786> (02.01.2008)
- <sup>18</sup> The international EPD®system. Available at: <http://www.environdec.com/pageId.asp> (02.01.2008)
- <sup>19</sup> ECOProdukt. Available at: <http://www.arkitektur.no/?nid=122327> (02.01.2008)
- <sup>20</sup> Dansk Indeklima Mærkning, Available at: <http://www.teknologisk.dk/specialister/253> (05.02.2009)
- <sup>21</sup> Finnish Society of Indoor Air Quality and Climate. Available at: [http://www.sisailmayhdistys.fi/portal/fisiaq\\_in\\_english](http://www.sisailmayhdistys.fi/portal/fisiaq_in_english) (05.02.2009)
- <sup>22</sup> FSC, Forest Stewardship Council. Available at: <http://www.fsc.org/> (05.02.2009)
- <sup>23</sup> PEFC, Programme for the Endorsement of Forest Certification schemes. Available at: <http://www.pefc.org/internet/html/> (05.02.2009)
- <sup>24</sup> WHO's website, [www.who.int/pes](http://www.who.int/pes)
- <sup>25</sup> Global FSC certificates: type and distribution April 2008. Available at: <http://www.fsc.org> (02.01.2009)

- <sup>25</sup> Statistical figures on PEFC certification. Available at: <http://register.pefc.cz/statistics.asp> (02.01.2009)
- <sup>27</sup> Paper products – Basic module, version 1.0. 9 October 2003
- <sup>28</sup> Intergated Pollution Prevention and Control (2001), Reference Document on Best Available Techniques in the Glass Manufacturing Industry, European Commission
- <sup>30</sup> Byggemiljø materialvurderingsliste. Byggenæringens miljøsekretariat i Norge. Available at: <http://www.byggemiljo.no/getfile.php/Filer/Publikasjoner/Materialvurderingsliste%20revidert%203%20juli%202008.pdf> (07.01.2009)
- <sup>31</sup> Konsekvensutredninger av forslag til regulering av visse miljøgifter i forbrukerprodukter. Vedlegg 4. [http://www.sft.no/artikkel\\_\\_\\_42872.aspx](http://www.sft.no/artikkel___42872.aspx). Norwegian Pollution Control Authority (SFT). Norway, 2008.
- <sup>32</sup> Kallenborn, R., Berger, U., and Järnberg, U., 2004. Perfluorinated alkylated substances (PFAS) in the Nordic environment.
- <sup>33</sup> Kartlegging av utvalgte nye organiske miljøgifter 2004. Bromerte flammehemmere, perfluoralkylstoffer, irgarol, diuron, BHT og dicofol” SFT: 927/2005. Available at: [http://www.sft.no/miljoreferanse\\_\\_\\_37630.aspx](http://www.sft.no/miljoreferanse___37630.aspx) (visited 5. August 2009)
- <sup>35</sup> Miljøstatus i Norge, a Norwegian website with information on environmental status and developments. The website has been developed by the environmental directorate on assignment from the Ministry of the Environment. Available at: <http://www.miljostatus.no/Tema/Kjemikalier/Noen-farlige-kjemikalier/Klorerte-parafiner/> (visited 29.09.2009)
- <sup>37</sup> Panel Boards (2007), The Australian Ecolabel Program, Good Environmental Choice Australian Standard
- <sup>38</sup> Gypsum Plasterboard Products, The New Zealand Ecolabelling Trust
- <sup>39</sup> Wooden Furniture, Draft (2003), EU Ecolabel, European Commissions
- <sup>40</sup> Memo on the environmental circumstances for furniture and building panels, 1 February 2008. Perform for Ecolabelling Denmark by Marianne Wesnæs, 2.-0 LCA consultants and Kim Christiansen, Dansk Standard
- <sup>41</sup> Global Ecolabelling Network, Product category Building Materials <http://www.globalecolabelling.net/cgi-bin/gen.pl?type=no&val=1500>
- <sup>42</sup> The Swedish Chemicals Inspectorate, EU-side harmonised compulsory classification and marking, KIFS 2005:5, page 192.
- <sup>43</sup> Lange, J. B. (2008). EFFECTS OF WOOD DUST: Inflammation, Genotoxicity and Cancer. Ph.d. thesis. Faculty of Health. Science at the University of Copenhagen, Denmark