

# **Background memo version 1.0**

**for**

**the Nordic Ecolabelling of**

**Panels for the building, decorating  
and furniture industry**

**Draft proposal 1 for version 4.0**



## Joint Nordic ecolabelling

In November 1989, the Nordic Council of Ministers adopted a measure to implement a voluntary, positive ecolabelling scheme in the Nordic countries. The scheme is administered by the Nordic Ecolabelling Board. The board among other things choose product groups and lay down the final criteria. Secretariats in the participating countries are responsible for implementing the scheme on national level.

The objective of ecolabelling is to provide information to consumers to enable them to select products that are the least harmful to the environment. Ecolabelling is intended to stimulate environmental concern in product development and a sustainable society.

In its work on ecolabelling Nordic Ecolabelling follows the ISO 14024 standard: "Environmental labels and declarations - Type 1 ecolabelling - Principles and Procedures". The product groups and environmental and performance requirements selected by Nordic Ecolabelling reflect the objectives, principles, practices and requirements of the standard. ISO 14024 includes the requirements that criteria should be objective, reasonable and verifiable, that interested parties should be given the opportunity to participate and that their comments are evaluated.

The criteria are based on evaluation of the environmental impacts during the actual products' life cycle. The criteria set requirements towards a number of these factors. Upon approved application all products found to meet the criteria are awarded the environmental label.

Due to new knowledge and production methods the criteria must be updated regularly. New revised criteria are presented at least 1 year prior to the expiry date. During the period of validity minor corrections may be adopted. This will normally not affect already approved licences.

A handling fee is paid upon submission of a complete application. The turnover value of the product determines the additional annual fee.

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# **Ecolabelling of panels for the building, decorating and furniture industry**

Background memo 1.0 to Draft 1 to version 4.0, 4 December, 2002

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## **Introduction**

The criteria for the ecolabelling of panels for the building, decorating and furniture industry were first adopted by the Board of Nordic Ecolabelling in October 1992. Revised criteria were adopted on 16 June 1995. The second revision commenced in the spring of 1997 and revised criteria were adopted on 10 December 1998. This criteria document has been extended twice and will now remain in force until March 2004. New criteria must be adopted no later than 12 months before the expiry of the present criteria document.

The current document, valid from 10 December 1998 until March 2004, was revised in 2001 and 2002. A new proposal has now been circulated for comment, the deadline for proposals being 1 January 2003. The new criteria, Criteria for panels for the building, decorating and furniture industry, version 4, will, it is intended, be adopted by the Board of Nordic Ecolabelling in March 2003 and have a period of validity of at least three years.

This document describes the changes and background to the changes that have come about as a result of the revision process. For the sake of convenience this chapter follows the same numbering as the consultation proposal, in which Chapter 1 describes the environmental requirements and Chapter 2 encompasses the other requirements specified in the criteria document.

The revision has been conducted in cooperation with a technical group headed by Ecolabelling Norway. The first meeting of the technical group took place on 3 November 2000. The original technical group was made up of the following people:

- Janicke Garmann, Ecolabelling Norway, Project Manager (PM)
- Tom Karlsen of Gyproc
- Helena Maria Westholm of Architects EFEM
- Henrik Skovbo of Novopan
- Per Ole Braathen of Statsbygg
- Eija Simonen of Schauman Wood
- Anders Ulf Clausen of Rockwool
- Kent Lövestedt of Byggelit
- Unni Larsen of OPAK
- Susanne Møller, Ecolabelling Secretariat, Product Group Manager (PGM), Denmark
- Anders Moberg SIS Miljömärkning, PGM, Sweden
- Ismo Halonen, SFS Miljömärkning, PGM, Finland

Since then the following changes have taken place:

- Lise Kristin Sunsbj, Ecolabelling Norway, took over as PM in January 2002
- Magnus Persson, Byggelit, replaced Kent Lövestedt in June 2002
- Jacob Paulsen, SIS Miljömärkning, took over as PGM in January 2002
- Harri Hotulainen, SFS Miljömärkning, replaced Ismo Halonen in January 2002

## **Other ecolabelling schemes for panels**

European (as at November 2002)

- P-märkning in operation in Borås in Sweden
- Indoor climate labelling, Denmark and Norway
- Der blaue ängel, Germany: Federal Environmental Agency (FEA)

- 1) BASIC CRITERIA FOR THE AWARD OF THE ENVIRONMENTAL LABEL Low-emission Composite Wood Panels RAL-UZ 76 (11 licences)
- 2) BASIC CRITERIA FOR THE AWARD OF THE ENVIRONMENTAL LABEL Recycled Gypsum Products RAL-UZ 60 (0 licences)

Non-European (as at November 2002)

- Canada: Terra Choice Environmental Service Inc, Environment Canada, has criteria for plasterboard, one licence
- Japan: Japan Environment Association (JEA) has criteria for building panels based on 100% recycled materials (approx. 100 licences)
- Korea: Korea Environmental Labelling Association (KELA) has licences for architecture and civil engineering, not specified

### The market

The following table provides an overview of sales of some types of building panels in Denmark, Finland, Iceland, Norway and Sweden. The information is from 1996 and 1997.

Table 1: The market for building panels (1997)

<b>Total sales</b> (approximate figures)					
	<b>Type of pa</b>	Chipboard (1000 m <sup>3</sup> )	Plywood (1000 m <sup>3</sup> )	Fibreboard (million m <sup>2</sup> )	Plasterboard (million m <sup>2</sup> )
<b>Nordic co</b>		1 600	650	78	77
<b>Country</b>	Norway	250	180 (*)	16 (*)	15 (*)
	Sweden	480	176	36	39
	Finland	180	130 (*)	6 (*)	18 (*)
	Denmark	690	170	20	5,3
	Iceland	9	5	0,002	0,004

(\*) 1996-figures

### General background to the definition of the product group and the structure of the criteria

The definition of the product group is as follows:

"Panel materials made of for example wood (for example veneer, woodfibre, chips), gypsum and minerals (rockwool and glasswool), for indoor and outdoor use. The functions might include indoor cladding of ceilings, walls and subfloors or outdoor windproofing of walls and roof sheathing, and the production of furniture and fittings such as benches, cupboards etc.

Sound-absorbent panels are panels that on their own perform a sound absorbing function. Panels that provide sound absorption only in combination with other materials, e.g. perforated gypsum plasterboard that has to be used in combination with, for example, mineral wool, are not counted as sound-absorbent panels in this context.

The criteria do not encompass facing panels and panels that are used primarily to insulate against heat/cold loss, irrespective of the materials used in the panels."

Some of the products that fit the definition of building panels (particularly mineral wool panels) are closely related to insulation products. It has therefore been necessary to delimit the product group by specifying that panels that have as their primary function insulation against heat or cold loss are not encompassed by the product group.

In some cases, the requirements imposed on sound-absorbent panels differ from those imposed on other panels. For this reason sound-absorbent panels are defined in the document.

Some of the building panels encompassed by the criteria are also used in furniture production (for example kitchens) and for this reason the inclusion of other types of panels used for such purposes in the product group, e.g. worktops made of stainless steel etc. was considered. It has been concluded however that this type of panel should not be included in the product group, since they do not serve a supportive function, this being the primary function of a building panel.

The product group "panel materials" represent a range of products which perform similar functions but meet different requirements. The available products are made up of a variety of raw materials and the use of a variety of technologies. These various production processes have different effects on the external environment in terms of emissions to the ground, water and air.

The criteria are based on an assessment of environmental impact during the life cycle of the product. The criteria emphasise factors that manufacturers are able to influence, such as:

- **Raw materials and additives**

Products may be based on one of the following: 1) Renewable raw materials; 2) non-renewable raw materials or 3) combinations thereof. Raw materials may also consist of waste and recycled materials. Requirements are imposed as to the various raw materials used.

The use of additives must be assessed from the perspective of any harmful effect they may have on health and the environment. Requirements are imposed as to the maximum permitted quantity of environmentally harmful substances in the panel.

- **Energy and emissions of SO<sub>2</sub>, CO<sub>2</sub> and dust.**

The purpose of imposing requirements as to energy consumption during panel production is to reduce overall consumption of electrical energy and energy from other sources and to contribute to a reduction in emissions of SO<sub>2</sub> and CO<sub>2</sub>. Dust emissions must also be limited.

- **Formaldehyde and radioactive substances**

Requirements are imposed as to panels containing formaldehyde-based additives and panels that may contain radioactive substances. This with the aim of reducing the negative impact of substances of this nature.

- **Waste processing / recycling / packaging**

Measures must be implemented to reduce quantities of waste generated in the production process. Products must be designed with a view to recycling. Construction and demolition waste makes up a significant portion of the waste generated in the Nordic countries. Much of this waste is dumped, but there is a trend in the direction of increased reuse (as recycled materials and energy sources). The criteria are intended to stimulate increased use of recycled materials.

- **Performance properties**

The products must satisfy specific technical standards and must, as far as possible, be inert in an indoor climate context.

## **1. Environmental requirements**

### **1.1 Requirements as to raw materials**

The raw material requirements are divided into two groups: renewable raw materials and non-renewable raw materials.

### 1.1.1 Requirements as to renewable raw materials

- Certified wood

Forestry operations impact on the environment. In order to reduce this environmental impact, the requirement is imposed that products based on raw materials from timber must contain at least 30% wood that has been certified in accordance with a standard for sustainable forestry. The existing document requires only 5% certification. However, the availability of certified wood has increased considerably since that time. Of the Nordic timber types, softwood, pine and spruce are certified. The availability of wood from certified forests varies from Nordic country to Nordic country. At the time of writing (2002) there are approximately 25 million hectares of FSC-certified forest and approximately 38 million hectares of PEFC-certified forest worldwide. The availability of certified wood is expected to increase over the next few years, and Nordic Ecolabelling can help to bring about an increase in the amount of certified wood used in panels. Nordic Ecolabelling approves forestry standards (e.g. national standards) that fulfil the requirements in Form 2 of the criteria document.

- Non-certified wood

Manufacturers must also focus on non-certified raw materials by ensuring that wood from forest environments that are worthy of protection for biological and/or social reasons is not used. This requirement is intended to make manufacturers more aware of the raw materials that are used in their various products. In the event of well founded suspicion that wood taken from such areas is being used in production, Nordic Ecolabelling may request documentation. Ultimately, the licence of the manufacturer in question may be withdrawn.

- Sawdust/wood shavings and/or off-cuts from sawmills and/or recycled fibres

It is important that the consumption of new raw materials be minimized. Panels made of renewable raw materials (wood) normally contain a high proportion of waste generated by other industries. This waste forms part of the raw material and/or is used as a source of energy. This in turn entails less use of virgin raw materials and/or non-renewable energy sources (oil, gas, coal). Examples of these raw materials include by-products of sawmills (sawdust/wood shavings, off-cuts etc.), sorted wood from forests. The proposal contains the requirement that 50% of ingoing woodpulp must be based on sawdust / wood shavings and/or off-cuts from sawmills and/or recycled fibres if certified wood is not used.

- Combinations

In order to increase the flexibility of the requirements, products containing a combination of virgin fibre and sawdust/wood shavings and/or off-cuts from sawmills and/or recycled fibres may use the following formula:

Requirement as to the proportion of ingoing certified wood (%) =  $- 0.6X + 30$

where X = the proportion of sawdust/wood shavings and/or off-cuts from sawmills and/or recycled fibre.

- Biocides

The requirement is also imposed that wood (timber after felling) must not be treated with pesticides that:

- are classified by the WHO as type 1A and type 1B (see the WHO home page: [www.who.int/pcs](http://www.who.int/pcs))
- contain chlorinated hydrocarbons
- are classified as environmentally harmful (R50, R50/E53, R51/R53, R52/R53, R52 or R53) in accordance with the EU classification system 1999/45/EC (with adaptations and amendments).
- are prohibited under international treaties.

Pesticides that are prohibited under international treaties encompass products that are prohibited by means of mutual agreements with other countries. At present, most of these products are prohibited by means of the other three requirements. If a pesticide satisfies the other requirements but is prohibited under international treaties, it must not be used if the wood raw material is destined for use in Swan labelled products. Moreover, the pesticides used must be approved for use in the country in which the products are used.

### **1.1.2 Requirements as to non-renewable raw materials**

- Reclaimed materials

Panels made from non-renewable raw materials (gypsum and minerals) vary considerably in terms of their percentage content of recycled materials. Location and the availability of such materials entails that some manufacturers use a high content of reclaimed materials. However, the demand for industrial waste has increased, and accordingly the availability of this type of raw material is limited.

The requirement relating to reclaimed materials used to be combined with the energy requirement in an environmental matrix. This was amended during the revision process and the consultative proposal specifies that products based on non-renewable raw materials must contain at least 30% reclaimed materials.

With a view to simplifying the energy requirement, reclaimed materials have been removed (see Section 1.3).

- Heavy metals

The requirement relating to heavy metals encompasses the primary component (5% by weight of the panel) of the product. The data on heavy metal content was reviewed by consultants in connection with the revision. The conclusion of the report was that the requirements should remain in place since these substances still occur. The stringency of the requirement has not been increased.

Certain raw materials may contain increased quantities of heavy metals in relation to background levels, for example in soil. These raw materials include mined plaster (natural gypsum), gypsum from the treatment of flue gases in coal-fired power stations, glass wool from returned glass and mineral wool from rock. It is important that the heavy metal content should not be so high that it creates problems when it comes to recycling the products.

The stringency of the requirements has been set on the basis of the soil quality thresholds imposed by the authorities, i.e. the threshold values applicable to products that will end up in the ground, e.g. sludge from treatment plants. In this way, dumping the products will not entail an increase in heavy metal levels around the dumping site.

In some cases, the reclaimed material mixed into the product contains very high levels of one or more heavy metals deriving from special additives used in the raw material for the original product. One example of this is chromium in recycled glass. A second example is lead in recycled glass from households. The source of the lead includes crystal, certain types of labels and lead caps from wine bottles. Reducing the lead content of glass returned by households has proved to be difficult.

In light of this, the requirement as to the content of chromium in primary components based on reclaimed material has been set at a higher level value (800 mg/kg) than is the case for other primary components (500 mg/kg). This is to encourage recycling. In the case of lead, however, the requirement is the same for the various primary components (50 mg/kg). This is because of a Danish proposal for regulations on the content of lead (max 50 mg/kg) in products to which lead has been added deliberately. Danish environmental authorities have interpreted the definition as including glass wool panels. If it is not possible to reduce the

lead levels sufficiently, the manufacturer may mix the recycled glass with other raw materials (e.g. recycled glass from the production of windows).

### **Paper and board**

This requirement encompasses products in which paper and board are present. This requirement does not encompass paper and board used for surface treatment.

There has been no change to the requirement that bleaching must not involve the use of compounds with a chlorine content or the requirements as to emissions of COD to water.

The surfactant requirement has been amended to include test method OECD 301 A-F (readily degradable) as well as OECD 302 A-C (potentially degradable). The requirement in the criteria document for printing paper is stricter in that only a small proportion of surfactants can be potentially degradable. However, on the other hand this requirement applies only to surfactants used in the de-inking of recycled fibres. A requirement as to potential degradability is sufficient as regards surfactants used only in small quantities since it is assumed that the quantity of paper and board will be small and the environmental effects of such production is low compared with the rest of the building panel.

## **1.2 Requirements as to chemicals**

The possibility of making the chemical requirements less complicated was discussed during the revision process and to this end consultants were retained by Nordic Ecolabelling in October 2001 to consider the chemical requirements. As part of this work, the chemical requirements were also assessed. It was recommended that some of the substances on the negative list in the existing criteria should be removed because they do not occur in building panels. The substances in question are: halogenated organic binding agents, polychlorinated biphenyls, phthalates, aziridine and polyaziridines, pigments and additives based on tin, cadmium, mercury and their compounds.

However, it was recommended that the prohibition against halogenated flame-retardants, alkyl phenols, alkyl phenol ethoxilates and other alkyl phenol derivatives, as well as lead and chromium-based compounds should be retained.

This was discussed at the first meeting of the technical group, but the experts were of the view that there was a danger that the criteria would be diluted and accordingly that we should retain the existing chemical requirements. One argument in favour of retaining the requirements is that plastic foil (for surface treatment) was not investigated in the consultants' report. Acquiring documentation on these products is difficult.

As a result, only small changes have been made to the chemical requirements. These changes are discussed in the individual sections.

### **1.2.1 General**

- Classification of products

The existing criteria contain the requirement that chemical products used in panels must not be classified as carcinogenic, harmful to the reproductive or genetic system, toxic or allergenic (allergenic when inhaled) in accordance with the regulations on health hazards in Denmark, Finland, Iceland, Norway or Sweden.

This requirement has now been amended and the new requirement provides that chemical products must not be classified as carcinogenic, harmful to the reproductive or genetic systems, toxic or allergenic when inhaled in accordance with regulations on the classification and labelling of hazardous chemicals and/or the EU classification system 1999/45 EC (with adaptations and amendments). Under Dangerous Preparations Directive all chemical

manufacturers are required to classify their products. Even so, manufacturers must still follow the classification and labelling requirements for hazardous chemicals in some Nordic countries, since in some Nordic countries the requirements are stricter than those applied elsewhere in Europe.

The formaldehyde exception has not been changed.

- Contents of and additives in chemical products  
The requirements have not been changed.

- Cleaning chemicals  
These requirements have not been changed. The use of alkyl phenol ethoxilates as surfactants in cleaning products has been reduced significantly but has not ceased entirely. The use of solvents with an aromatic content >1% is still widespread for particularly difficult cleaning tasks. Limiting the use of such substances for cleaning production equipment does not entail any problems because less environmentally harmful alternatives are available.

### **1.2.2 Chemical products occurring in parts other than the surface of the panel**

This requirement has not changed. The level of the requirements has been set on the basis of knowledge about a number of chemical products. The requirement is related to the quantity per kilo of panel (0.5 g/kg panel) in order to provide a greater reflection of the potential environmental impact. Moreover, this requirement gives manufacturers greater flexibility to choose chemicals that overall entail the lowest possible environmental impact.

### **1.2.3 Chemicals occurring in products for treating the surface of the panel**

The principles underlying this requirement have not been changed. The requirement is still formulated in such a way that there is flexibility through choice. The manufacturer can choose between documenting the use of products with a low content of solvents and environmentally harmful substances or documenting emissions of solvents or the content of environmentally harmful chemicals per functional unit. Accordingly, the requirement will not determine the choice of technology as is the case with the present set of criteria. The functional unit is surface, specified in terms of m<sup>2</sup>. In its present form, the requirement is harmonized with equivalent requirements proposed in the consultative document for furniture and fixtures and fittings, but with limits adapted to the treatment process for panels as described in this document.

The change that has been made relates to the classification of the products. The previous requirement was that agents used for surface treatment should as a maximum contain 2% of substances classified by the chemical manufacturer/supplier as environmentally harmful in accordance with applicable regulations in Denmark, Finland, Iceland, Norway or Sweden or in accordance with the EU classification system (18<sup>th</sup> adaptation of Directive 67/548/EEA). The reference now is to the new Dangerous Preparations Directive; agents for surface treatment must not be classified as toxic (R50, R50/R53, R51/53, R52, R52/R53 or R53) in accordance with regulations on the classification and labelling of hazardous chemicals in any Nordic country and/or the EU classification system 1999/45/EC (with adaptations and amendments).

In view of the fact that this directive has only recently entered into force, we appreciate that some manufacturers will not yet have had time to classify their products in accordance with the new provisions. Accordingly, the requirements may be documents by means of the submission of a complete formula with quantities and CAS number of the constituent substances, as well as test results and test methods for all substances present in the product (equivalent to the existing requirements).

### 1.3 Requirements as to energy consumption

This requirement has been redrafted extensively. The stringency of the requirement is relatively low for the following reasons:

- to give manufacturers time to adjust to the new situation
- because of a lack of information

- The parameters have been amended

The parameters "Consumption of purchased electrical energy", "Consumption of energy from other sources" and "Proportion of recycled material" have been removed.

The requirement is now formulated in the following way:

For all panels except sound-absorbent panels, the energy quotient is calculated on the basis of the following formula:

$$E = (\text{Purchased electricity}/0.7 \text{ kWh/kg}) + (\text{fuel}/1.9 \text{ kWh/kg})$$

***The requirement will be fulfilled if  $E \leq 2$ .***

***In the case of fibre board, the requirement is that  $E \leq 3$ .***

Sound-absorbent panels:

In the case of sound-absorbent panels the energy quotient is calculated on the basis of the following formula:

$$E = (\text{Purchased electricity}/80 \text{ kWh/m}^3) + (\text{fuel}/310 \text{ kWh/m}^3)$$

***The requirement will be fulfilled if  $E \leq 2$ .***

The values 0.7 kWh/kg for electricity, 1.9 kWh/kg for fuel and 80 kWh/m<sup>3</sup> for electricity and 310 kWh/m<sup>3</sup> for fuel are reference values that are based on information about energy consumption for various types of building panels. The principal underlying the requirement is that the consumption of the manufacturer must be equal to or lower than the reference value. At the same time, flexibility is provided by the facts that the points for electricity and fuel are added up. This means that if, for example, the value for electricity exceeds the reference value, the requirement can still be fulfilled if the value for fuel is lower than the reference value. In the case of fibreboard panels, the values may exceed the reference values by 50%, and the values will still be fulfilled.

The principle is the same for sound-absorbent panels, although the functional unit is different.

Energy consumption, kWh/kg of panel encompasses primary panel production and the production of all applicable ingoing primary raw materials. Primary raw materials are raw materials that make up more than 5% by weight of the finished panel. Energy consumed in extracting raw materials is not included.

In the case of panel production, the energy accounts must be based on data from the point at which raw material processing commences (ingoing conveyor belt in the production line) up to and including the finished product, but before any surface treatment. Energy consumption for surface treatment is not included.

Purchased electricity means electricity acquired from an outside supplier. Electricity produced by the manufacturer is included in the fuel consumption. Fuel consumption includes both purchased fuel and fuel deriving from production waste.

If a surplus of energy is produced and the surplus is sold in the form of electricity, steam or heat, the quantity sold is subtracted from energy consumption.

Consumption of energy from sources other than electrical energy. Consumption is calculated on the basis of the quantity of each energy carrier and the theoretical energy content of each energy carrier (see the table in Form 4).

If electricity is produced internally, the manufacturer may choose between the following methods for calculating fuel consumption for electricity production:

- Actual consumption of fuel calculated for the year
- Consumption of internally produced electricity multiplied by 1.25.
- The background to the energy requirement

Attention is focused on the factor that manufacturers are most readily able to influence themselves: end consumption of energy.

The decision to treat electricity separately from other forms of energy was taken because electricity is a special case. It is the only form of energy that can be transferred over long distances without great losses. It is "high quality" energy that should as far as possible be used only for purposes for which other forms of energy are not suitable. In view of the high growth in electricity consumption and the low potential for further development of renewable energy sources, priority has been given to reducing electricity consumption in all Nordic countries. Moreover, in Sweden electricity generation will be reduced significantly with the phasing out of nuclear power stations.

When it comes to producing low temperature thermal energy, the use of heat pumps is more efficient than direct electrical heating. It is therefore important that strict requirements be imposed with regard to the consumption of electrical energy for direct heating purposes. The level of the requirements has been set in such a way that there is the scope for using electrical energy for electrical motors and the like that can be operated only with the aid of electrical energy. There is much evidence that there is considerable scope for reducing the electricity consumed in sub-processes in the process industry, for example by pumps. However, at the present we do not have sufficient information in this area to set stricter requirements.

A further reason for distinguishing the consumption of electrical energy from the consumption of other types of energy is that it is difficult to compare the environmental impact of external electricity production with internal energy production. The main problem lies in determining which efficiency factor should be used for externally produced electricity. For example: the electricity used by a manufacturer could in one year derive 100% from hydro power whereas in another year electricity may derive 60% from hydro power, 30% from nuclear power and 20% from coal power. Electricity production based on hydro power in particular may vary from year to year, depending on the amount of rainfall in a given year.

If the manufacturer produces electricity that is supplied to the grid, an allowance may be made for this production.

Energy from other sources refers mainly to purchased raw materials. This parameter is calculated on the basis of the energy content of the energy raw materials. This represents an incentive to convert energy raw materials efficiently (e.g. combustion) and to use the converted energy efficiently.

“Proportion of recycled material” was included in the matrix in order to provide an incentive to recycle building waste and other types of waste and to give manufacturers maximum flexibility. This requirement has now been replaced with the requirement that non-renewable raw materials must contain at least 30% reclaimed materials (see Chapter 1.1.2).

In the next revision, all requirements will be made significantly more strict in order to offer an incentive to reduce energy consumption and to switch to energy from renewable sources.

### **Functional units**

- For all panels excluding sound-absorbent panels (kilo as functional unit)  
The panels perform many functions, including load-bearing, "covering" or sound-insulation. Depending on which function is considered to be the most important, the functional unit may be based on volume, weight or surface area. Generally speaking, surface area ( $m^2$ ) appears to be the dimension/unit that is best suited as a functional unit. This is the unit on which the price of the product is based and in which the end user specifies quantities. Within the same area of use,  $m^2$  as a functional unit is the most sensible measure. However, the product group includes products of a variety of thicknesses and with a range of functional properties, suitable for various areas of use. If  $m^2$  is chosen as a functional unit, then a 4 mm chipboard panel for use in furniture, for example, will easily fulfil the requirements, whereas 33 mm chipboard panels for use in flooring is unlikely to fulfil the requirements. This is not consistent with the idea that a Swan labelled alternative should be available in all product categories.

The product group encompasses products with a wide variety of densities, from 80 to 1,000 kg/ $m^3$ . However, the density of most of the products lies in the range 650-750 kg/ $m^3$  (gypsum plasterboard, chipboard and MDF). If kilos are chosen as a functional unit, then "dense", heavy materials will be favoured, whereas if  $m^2$  is chosen as a functional unit, then light, porous products will be favoured. However, it is often found that the choice of panel is based on other properties than environmental properties, for example fire retardant properties, mechanical properties, price etc. Accordingly it is important that the requirements be formulated in such a way that ecolabelled alternatives be available in all categories of panel. The conclusion must be that the use of kilo as a functional unit provides the best solution in this regard. Moreover, weight provides a very high correlation with resource consumption and a moderately high correlation with functionality.

- Sound-absorbent panels ( $m^3$  as functional unit)  
It has been decided that separate requirements should be imposed as to sound-absorbent panels. Panels of this type are made of extremely light and porous materials. This is necessary in order for them to be able to fulfil their function. These panels are not able to fulfil other functions, and panels made of the other materials discussed here do not have sound-absorbent properties (perforated acoustic panels made of plaster must be used in conjunction with sound-absorbent panels, e.g. mineral wool). It has been decided that cubic metres should be used as the functional unit for such panels. Density and thickness will vary depending on the area of use, and accordingly using  $m^2$  as a functional unit would not be practical. Volume has been chosen as a functional unit because it provides a measure of the quantity of a panel, and moreover the sound-damping effect is proportional to the volume of the panel.

## **1.4 Requirements as to emissions**

### **1.4.1 Requirements as to emissions to air**

The requirements relating to emissions of CO<sub>2</sub> and SO<sub>2</sub> have been changed for all panels except sound-absorbent panels. The requirements have been changed from emissions of CO<sub>2</sub> < 0.6 kg per kilo of panel to CO<sub>2</sub> < 0.5 kg per kilo panel and emissions of SO<sub>2</sub> < 0.5 g per kilo of panel to SO<sub>2</sub> < 0.4 g per kilo of panel. The reason for this is that the requirements in

the current criteria have proved to be too strict for sound-absorbent panels, whereas other types of panels can be adapted to the new levels.

#### Background to the emission requirements

The purpose of the requirements is to encourage the transition from non-renewable to renewable energy sources. The level of the CO<sub>2</sub> requirement has been set in such a way that the company cannot exclusively base consumption of energy from other sources on energy sources with higher CO<sub>2</sub> emissions than natural gas. The level of the SO<sub>2</sub> requirement has been set in such a way that the company cannot solely base consumption of energy from other sources on energy sources that on average contain more than 0.1% by weight of S.

#### **1.4.2 Requirements as to emissions to water**

This requirement has not been changed. The background to the requirement is that manufacturers must limit their emissions of organic material.

#### **1.4.3 Requirements as to emissions of dust**

This requirement has not been changed. The background to the requirement is that emissions of dust and soot into the atmosphere represent the main local environmental problem created by manufacturers in large parts of the industry. The problem is greatest for those companies that utilize non-renewable raw materials. In many cases wood dust represents a considerable energy resource, the use of which offers financial benefits to the company. In many countries the authorities impose the requirement that emissions of dust into the atmosphere must be less than a specified quantity. In other countries no such requirements are in force.

### **1.5 Specific requirements as to the product**

#### **1.5.1 Requirements as to formaldehyde**

This requirement has not been changed. The background to the requirement is that formaldehyde use is limited because it is harmful to health and may cause health problems for people involved in the production process and for users of the product.

#### **1.5.2 Requirements as to radioactive substances**

This requirement has not been changed. The background to the requirement is that radioactive substances may cause health problems for people involved in the production process and for users of the products.

## **2. Other requirements as to ecolabelled products**

Minor changes have been made to the other requirements relating to the product, including requirements as to waste processing and recycling systems, requirements as to packaging, performance properties, instructions for use, the requirements of the authorities relating to safety, working conditions and the external environment, eco and quality assurance and marketing.

One change that will have consequences for some manufacturers is that the requirement relating to recycling systems, which formerly encompassed only national legislation on recycling schemes for products and packaging now also encompass industry agreements such as Materialretur in Norway.