

# PRODUCT-CATEGORY RULES (PCR)

For preparing an environmental declaration  
(EPD) for Product Group

*Windows and doors*

The validity of this document is extended until April 2012 (5 years)

**NPCR 014**

April 2007

## Content

1	General information .....	3
2	Terms and definitions .....	4
3	Company/organization and product group .....	5
3.1	Description of company/organization .....	5
3.2	Definition of product group.....	5
3.3	Description of product.....	5
4	Requirements for the underlying LCA .....	5
4.1	Scope .....	5
4.2	Functional and declared unit .....	6
4.3	System boundaries.....	6
4.3.1	Product stage .....	7
4.3.2	Construction stage .....	7
4.3.3	Use stage .....	7
4.3.4	End of life stage.....	7
4.4	Description of data .....	7
4.5	Cut-off rules .....	8
4.6	Data Quality requirements .....	8
4.6.1	Allocation rules .....	8
4.6.2	Transportation .....	9
4.6.3	Data collection.....	9
4.6.4	Units .....	9
5	Impact categories .....	9
5.1	Calculation rules.....	9
5.2	Characterization factors.....	10
6	Source of data of the underlying LCA report .....	10
7	Additional information .....	11
7.1	Chemicals (voluntary).....	11
7.1.1	Health risk impact (voluntary) .....	11
7.2	Indoor environment impact .....	11
8	Period of validity of the document .....	12
9	Content of the environmental declaration (EPD) .....	12
9.1	General information to be declared.....	12
9.2	Parameters to be declared.....	13
10	References.....	14
Appendix 1	Project documentation/report .....	15
Appendix 2	Health risk impact .....	16
Appendix 3	Indoor environment impact .....	17

## 1 General information

These product category rules (PCR) are intended for companies that are in the process of validating an Environmental Product Declaration (EPD) to cover all environmental aspects for the declaration of windows and doors. The PCR will be valid for windows and doors according to the standards shown in 3.2.

The PCR complies with the ISO standards, ISO 21930: 2007, Building construction - Sustainability in building construction – Environmental declaration of building products [1] and the requirements of ISO 14025: 2006, Environmental labelling and declarations – Type III environmental declarations – Principles and procedures [2] and the provisions in ISO 14044: 2006, Environmental management — Life cycle assessment — Requirements and guidelines [3].

The PCR is based on life cycle assessment (LCA) study of windows carried out for Norwegian manufacturers of windows [4] and the work carried out by European Aluminium Association on PCR Aluminium Building Products, 2007 [5].

The EPD will present data that has been aggregated over the life cycle stages “Product stage”, “Construction stage”, “Use stage” and “End of life stage” or relevant portions of it. Any EPD following these PCR may also be based on information modules that only partially cover all of the stages of the product’s Life Cycle. However while the EPD is intended to be used for comparison based on the product’s application in a building, comparison of the EPD without consideration of the use stage in the context of a building is not valid.

Program operator:  
The Norwegian EPD Foundation  
Postboks 5250, Majorstuen  
0303 Oslo

The PCR has been prepared by the members of the PCR WG and SINTEF Byggforsk.

### Members of the PCR WG (windows and doors):

Trond Nybråten	Natre Gjøvik AS
Edin Pirija	Natre Gruppen AS
Gudmund Osmundsen	Lyssand Treindustri AS
Steinar Holum	NorDan AS
Ivar H. Hansen	Norske Trevarefabrikkers Landsforbund

Consultant:  
Sverre Fossdal                      SINTEF Byggforsk

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 2.1

#### **declared unit**

quantity of a building product for use as a reference unit in an **EPD** (2.7), based on **LCA** (2.4), for the expression of environmental information needed in **information modules** (2.3)

Example: Mass (kg), Volume (m<sup>3</sup>)  
[ISO 21930]

### 2.2

#### **functional unit**

quantified performance of a product system for a building product for use as a reference unit in an **EPD** (2.7) based on **LCA** (2.4)

[ISO 21930]

### 2.3

#### **information module**

compilation of data to be used as a basis for a **Type III environmental declaration** (2.7), covering a unit process or a combination of unit processes that are part of the life cycle of a product

[ISO 21930]

### 2.4

#### **life cycle assessment (LCA)**

compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle

[ISO 14040]

### 2.5

#### **product category**

group of building products that can fulfill equivalent functions

[ISO 21930]

### 2.6

#### **reference service life**

service life of a building product that is known or expected under particular set, i.e., a reference set, of in-use conditions and that may form the basis of estimating the service life under other in-use conditions

NOTE The reference service life is applied in the functional unit

[Adapted from ISO 21930]

### 2.7

#### **Type III environmental declaration, Environmental product declaration, EPD**

environmental declaration providing quantified environmental data using predetermined parameters and, where relevant, additional environmental information [ISO 21930]

## **3 Company/organization and product group**

### **3.1 Description of company/organization**

The name of the company/organization as well as the place(s) of production shall be provided. General information about the company/organization can be included in the EPD i.e. the existence of quality systems or environmental management system according to ISO 14001: 2004 or EMAS or any other environmental management system in place [6], [7].

### **3.2 Definition of product group**

The product group “windows and doors” comprises all kind of windows and doors prepared for trade made of different materials like; wood, steel, aluminium, plastic, glass etc.

- Main technical data and properties of windows and doors according to NS-EN 14351-1: 2006 [8] and EN 14600: 2005 [9];

### **3.3 Description of product**

The description of the product shall enable the user to identify the product unambiguously. It should include:

- Product identification by name (including e.g. production code) and a simple visual representation of the windows and doors for which the EPD is developed;
- Flow diagram of main production processes according to the scope of the declaration;
- Materials and substances to be declared: Material contents of the finished product, including packaging shall be declared in terms of the main components. Substances classified as hazardous according to national and international regulations (e.g. EU directive 67/548/EWG, CLP (Classification, Labelling and Packaging of substances and mixtures)) shall be stated. Product specific data that is confidential, because of competitive business environment, intellectual property rights or similar legal restrictions need not to be declared to the public. Requirement according to the REACH regulation concerning chemicals shall apply;

## **4 Requirements for the underlying LCA**

### **4.1 Scope**

The intended application of this PCR is to give guidelines for carrying out environmental product declaration for windows and doors and to pinpoint the underlying requirements of the LCA. The user of this PCR will be manufacturers of windows and doors and other interested parties.

This PCR is valid for windows and doors, according to the standards shown in chapter 3.2, and on other information, for incorporation in a building or other construction work. (i.e. building materials, products, components or building elements).

## 4.2 Functional and declared unit

This PCR is valid for all windows and doors according to the standards shown under chapter 1, which are focused on windows and doors that are manufactured or processed for incorporation in a building or other construction work.

The functional unit of a product provides the quantitative normalisation, for comparing products of equivalent function. For declarations covering the complete life cycle, a functional unit is defined.

For declarations not covering the complete life cycle, e.g. leaving out the use stage and/or the end of life stage, a declared unit is defined. Information provided using a declared unit shall not be used for comparison.

The functional unit (cradle to grave) is:

***1 window or door with an essential parameter (e.g. u-value, fire classification, noise reduction) and a reference service life of 30 years***  
(packaging included).

The declared unit (cradle to gate) is:

***1 produced window or door with an essential parameter (u-value, fire classification, noise reduction)***

## 4.3 System boundaries

The life cycle stages for the installed windows and doors are shown in figure 1.

The manufacturing and the installation processes shall be declared separately from both the use/maintenance processes (building stage) and from the demolition processes (end of life stage). The building stage and the end of life stage shall both be based on typical scenarios for the products. The scenarios shall be described in detail.

Any other transportation data than identified in §4.3.1 – 4.3.4 shall be indicated. If transport information is included in other stages than indicated, or if no transportation information exists and assumptions are made, this should be noted.

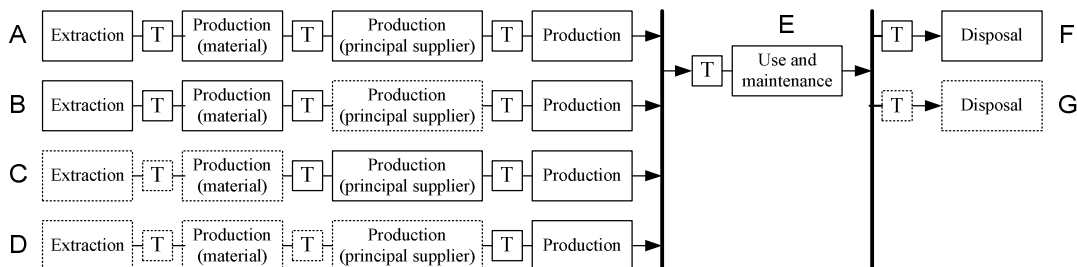


Figure 1 System boundaries and life cycle stages of windows and doors (T = transport).

If the EPD does not cover the entire life cycle (Cradle to grave, shown as AEF in Figure 1) this shall be clearly stated on the front page of the EPD.

As an example; for materials like AEF and BEF the entire life cycle is covered while C and D only cover the production. Omissions of any material flows that may have a relevant contribution to the selected impact categories of the products shall be justified.

The system boundaries encompass the following processes:

#### **4.3.1 Product stage**

- production of raw materials
- transport of raw materials
- manufacturing of windows and doors
- transport of raw materials from extraction to manufacturer
- transport of recycled/used materials to manufacturer
- packaging

#### **4.3.2 Construction stage**

- transport of building products from manufacturer to stockist and/or direct to building site
- typical installation on the building site

#### **4.3.3 Use stage**

The use stage is treated as scenarios:

- the reference service life of windows and doors is defined to be 30 years. The number of replacements of windows and doors shall be declared accordingly to the building's reference service life.
- maintenance of windows and doors that will be required to reach the expected reference service life [10]. Maintenance/replacements are to be modelled according to manufacturers' guidelines.
- releases to ground, surface water and air during the use of the windows and doors shall be declared in accordance with national standards and practice.

#### **4.3.4 End of life stage**

The end of life stage is treated as scenario:

- dismantling/demolition
- transport from building site to recycling/reuse/land fill
- recycling/reuse/land fill/energy recovering

### **4.4 Description of data**

The use of specific or average background data shall be documented. As a rule the following distribution will be applied:

- Production of raw materials (specific and/or average background)
- Manufacturing of the product (specific)
- The mix of electricity used should be the official one in the country where main energy consuming processes take place, if site-specific data cannot be obtained. The mix of electricity (calculation procedure) shall be documented.
- Hazardous waste shall be specified according to relevant regulation (e.g. EU Directives 91/689/EEC and 75/442/EEC (specific and/or average background))

## 4.5 Cut-off rules

Any processes or activities that altogether do not contribute to more than 2 % of the total mass and 1 % of the total energy use may be omitted from the inventory analysis. However, omissions of any material flows that may have a relevant contribution to the selected impact categories of the products underlying the EPD shall be justified, if applicable by a sensitivity analysis.

A list of hazardous and toxic materials and substances shall be included in the inventory and the cut-off rules do not apply (relevant regulations).

## 4.6 Data Quality requirements

### 4.6.1 Allocation rules

In a production process where more than one type of product is generated, it may be necessary to allocate the environmental impacts (inputs and outputs) from the process to the different products in order to get product-based inventory data.

In principle allocation rules should reflect the goal of the production process. For production of windows and doors the primary allocation rule is that allocation shall be carried out according to mass.

Raw material energy shall be allocated to material resources (kg), while process energy shall be allocated to energy resources (MJ).

When the product's original function is lost, it can be processed further in a waste management system, e.g. it can be recycled and/or reused and energy recovered.

The recycling processes shall be treated as closed loop recycling, as long as no changes occur in the inherent properties of the recycled material. In such cases, the need for allocation is avoided since the use of secondary material displaces the use of virgin (primary) materials. Recycled materials that are used in the fabrication of the product shall have no environmental impact on the new product.

The environmental impacts from recycling are allocated to the product they come from according to mass.

When allocation is used, the economic reality and other relevant aspects shall be considered to determine if other allocation criteria would be more appropriate or lead to deviating results. A sensitivity analysis should be initiated if a deviation of > 20% is foreseen.

Different data sets shall be documented and reported, if different allocation options are relevant.



#### 4.6.2 Transportation

Allocation connected to transport shall be based on weight.

#### 4.6.3 Data collection

The data shall be representative according to temporal, geographical and technological requirements.

- **Temporal:** The obtained information from the manufacturing process should be annual approximate values and updated, i.e. from the previous 12-month period. Average background data should not be older than 10 years.
- **Geographical:** The geographic region of the production sites included in the calculation of representative data shall be documented.
- **Technological:** Data should represent technology in use.

#### 4.6.4 Units

The following units shall be used:

- SI units
- Preferred power and energy units:
  - kW (MW) for power
  - kWh (MJ) for electric energy

## 5 Impact categories

The EPD shall report the contribution from the product to the impact categories listed in table 1.

Table 1 *Environmental impact categories*

Impact category	Unit
Climate change (GWP)	[kg CO <sub>2</sub> equiv]
Destruction of atmospheric ozone (ODP)	[kg CFC 11 equiv]
Acidification (AP)	[kg SO <sub>2</sub> equiv]
Eutrophication (NP)	[kg PO <sub>4</sub> equiv]
Photochemical Ozone Creation (POCP)	[kg C <sub>2</sub> H <sub>4</sub> equiv]

### 5.1 Calculation rules

The amount of material used as input of windows and doors (functional unit) shall include related accessories and auxiliary materials (screws, prefabricated mountings). Omission of accessories and auxiliary materials shall be justified. Calculation shall follow the requirement given in NS-EN-ISO 14044: 2006

## 5.2 Characterization factors

The factors employed to calculate the selected environmental impacts shall be taken from the following sources, table 2:

Table 2 Characterization factors

Impact category	Unit /declared unit	Source
Climate change (GWP)	[kg CO <sub>2</sub> equiv]	Latest version of IPCC
Destruction of atmospheric ozone (ODP)	[kg CFC 11 equiv]	Latest version of WHO
Acidification (AP)	[kg SO <sub>2</sub> equiv]	CML 2001
Eutrophication (NP)	[kg PO <sub>4</sub> equiv]	CML 2001
Photochemical Ozone Creation (POCP)	[kg C <sub>2</sub> H <sub>4</sub> equiv]	CML 2001

## 6 Source of data of the underlying LCA report

The calculation procedures for the contribution to the impact categories shall follow the instructions in the ISO 14040-standards, and the results shall be clearly documented in the LCA-technical report, or report on other environmental background information.

The following source, table 3, for generic data shall be used for the European market.

Table 3 Databases (example)

Material	Database
Steel	IISI (International Iron and Steel Institute) <a href="http://worldsteel.org">http://worldsteel.org</a>
Copper	ICA (International Copper Association)
Electricity	ECO-PROFILES of the European plastics industry Methodology Plastics Europe (Association of Plastics Manufacturers) <a href="http://www.plasticseurope.org/">http://www.plasticseurope.org/</a>
Aluminium	EAA (European Aluminium Association) <a href="http://www.eaa.org/">http://www.eaa.org/</a>
Plastics	Plastics Europe (Association of Plastics Manufacturers Europe) <a href="http://www.plasticseurope.org/">http://www.plasticseurope.org/</a>
Chemicals	Plastics Europe (Association of Plastics Manufacturers Europe) <a href="http://www.plasticseurope.org/">http://www.plasticseurope.org/</a>

All data has to be specified and it shall include the database and year of publication (reference). Sources of data for transport models (including transport form, distances and quantities to be transported) and thermal energy production shall be documented.

## **7 Additional information**

Relevant information, such as specific manufacturing processes, beneficial from the environmental point of view can be described. Technical data that is needed to model the building stage e.g. load requirements etc. A description of toxicity effects, occurring in the use of the product, e.g. in processes such as leaching, shall be given.

The specified rules in the previous sections secures that all relevant environmental impact information will be documented in the EPD report.

### **7.1 Chemicals (voluntary)**

Other information that can be represented in the EPD is specification of materials and substances that can adversely affect the environment, human health and the indoor environment in all stages of the life cycle.

A detailed list of the product's substances (chemicals used in manufacture), including identification number and hazard class, can be included in the product content declaration. The content of substances shall be declared in weight %. In those cases where information of content could affect patent or business secrets, a qualitative list of chemicals and their expected impacts will be sufficient.

#### **7.1.1 Health risk impact (voluntary)**

The health risk impacts can be calculated according to the rules developed in the project "Environmental Product Declaration (EPD) as a tool for documentation/information on chemicals and toxicity in the value chains of products – a pre-study for EPD-Norway". The calculation methods for calculating the health risk impact and environmental impact are described in Appendix 2 and the results are classified in 6 classes.

Since the working environment is not included in ISO 21930: 2007 "Environmental declaration of building products", the working environment will not be included in the EPD for building materials. Such calculation may be carried out in the company's Environmental Management System. The working environment is normally a subject for national legislation.

### **7.2 Indoor environment impact**

Impact on the indoor environment (inneklima) may be classified according to the M1 method. The calculation method for calculating indoor environmental impact is described in Appendix 3.

## 8 Period of validity of the document

The validity of this document is extended until April 2012 (3 years).

## 9 Content of the environmental declaration (EPD)

All Type III environmental declarations for this product category shall follow the format shown in close 9.1 and include the parameters identified in clause 9.2.

### 9.1 General information to be declared

The following general information shall be declared:

- the name and address of the manufacturer(s);
- product identification by name (including e.g. production code) and a simple visual representation of the building product to which the EPD is developed;
- the description of the product's use and the functional or declared unit of the product to which the data relates;
- the description of the application (installation) of the windows and doors;
- a general specification for the composition of the products shall be given;
- name of the programme and the programme operator's address and, if relevant the logo and website;
- the PCR identification;
- the date the declaration was issued and period of validity;
- additional environmental information;
- a statement of whether the declaration is complete or modular; (ISO 21930: 2007);
- a statement that environmental declarations from different programmes (ISO 14025: 2006) may not be comparable;
- a statement that this declaration represents an average performance, in such cases where an EPD declares an average performance for a number of products. In addition the standard deviation of the products' performance with respect to the average is stated;
- the site(s), manufacturer or group of manufacturers or those representing them for whom the results of the LCA are representative;
- information on where explanatory material may be obtained;
- in addition to the above, table 3 shall be completed and reproduced in the Type III environmental declaration;

Table 3 *Demonstration of verification*

PCR review, was conducted by: < name and organization of the chair, and information on how to contact the chair through the programme operator >
Independent verification of the declaration and data, according to ISO 21930: <input type="checkbox"/> internal <input type="checkbox"/> external
(Where appropriate <sup>a</sup> ) Third party verifier: <name of the third party verifier>

a Optional for business to business communication, mandatory for business to consumer communication.

- a diagram of the life cycle stages included in the LCA subdivided into product stage, building stage and end of life stage, and system boundaries. The stages may be further subdivided, see ISO 21030: 2007 Fig 1;
- a description of the nature of the processes and ancillary materials that are required for installing the building product in the building works and their replacement and maintenance according to the cut-off criteria in the PCR see chapter 4.5.

## 9.2 Parameters to be declared

Use of material and energy resources:

- depletion of non-renewable material resources
- use of renewable material resources

depletion of non-renewable primary energy differentiated into:

- Fossil oil
- Natural gas
- Coal
- Uranium

use of renewable primary energy differentiated into:

- Hydropower
- Wind power/Solar power
- Biomass

use of potable water

Impact category indicator results for:

- Climate change (greenhouse gases). Emission of greenhouse gases (expressed as the sum of global warming potential, GWP in kg CO<sub>2</sub> - equivalents, 100 years).
- Depletion of the stratospheric ozone layer. Emission of ozone-depleting gases (expressed as the sum of ozone-depleting potential, ODP in kg CFC 11-equivalents, 20 years).
- Acidification of land and water sources. Emission of acidifying gases (expressed as the sum of acidifying potential, AP in kg SO<sub>2</sub> - equivalents).
- Eutrophication. Emission of substances contributing to eutrophication potential, (expressed as the sum of nutrition potential, NP in kg PO<sub>4</sub> -equivalents).
- Formation of tropospheric ozone (photochemical oxidants). Emission of gases that contribute to the creation of ground-level ozone (expressed as the sum of ozone-creating potential, POPC, in kg C<sub>2</sub>H<sub>4</sub>-equivalents).

Waste to disposal

- Non hazardous waste (kg).
- Hazardous waste (kg), if applicable, according to EU directive 91/689/EEC (see also regulation of June 1, 2004 no. 930 of recycling and treatment of waste with amendment by the Ministry of the Environment 2. May 2005 (Avfallsforskriften)).

## 10 References

This PCR is based on the following studies:

1. ISO 21930: 2007 Sustainability in building construction - Environmental declaration of building products
2. ISO 14025: 2006 Environmental labels and declarations –Type III environmental declarations – Principles and procedures
3. ISO 14044: 2006 Environmental management - Life cycle assessment - Requirements and guidelines
4. Energi- og miljøregnskap for bygg. Prosjektrapport 173. Byggforsk. 1995.
5. PCR Aluminum Building Products. Product Category Rules to be submitted to the advisory Board for final approval. EAA, Brussels. 2007
6. ISO 14001: 2004 Environmental management systems –Requirements with guidance for use
7. EMAS – The Eco-Management and Audit Scheme
8. EN 14351-1: 2006 Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics.
9. EN 14600: 2005 Doorsets and openable windows with fire resisting and/or smoke control characteristics - Requirements and classification.
10. ISO 15686-8: 2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life

**Approved 03.04.2009, valid until 03.04.2012**  
**Norwegian EPD Foundation, PCR Review Panel**

Thor Endre  
For  
Panel chairman

## Appendix 1 Project documentation/report

Project documentation shall include information, which can be made available to verifier in order to demonstrate that the requirements of ISO 21930: 2007 “Environmental declaration of building products” have been met:

- the input and output environmental data of the unit processes that are used for the LCA calculations;
- the documentation (measurements, calculations, estimates, sources, correspondence, traceable references to origin, etc) that provides the basis from which the process data for the LCA is formulated;

This includes documentation on:

- the specification used to create the manufacturer's products;
- energy consumption figures;
- emission data to air, water and soil;
- waste production;
- data that demonstrates that the information is complete. In specific cases, reference can be made to, for instance, standards or quality regulations;
- referenced literature and databases from which data have been extracted;
- documentation that demonstrates that the products can fulfil the desired function(s) and performance;
- documentation that demonstrates that the chosen processes and scenarios in the flow chart satisfy the requirements set in ISO 21930: 2007;
- documentation that substantiates the chosen life cycle of the products;
- the documentation and substantiation of the percentages or figures used for the calculations in the waste scenario;
- documentation and substantiation of the percentages and figures (number of cycles, prices, etc.) used for the calculations in the allocation procedure;
- information showing how averages of different reporting locations have been calculated in order to obtain generic data;
- documentation used to substantiate any qualitative information in the additional environmental information;
- procedures used to carry out the data collection (questionnaires, instructions, informative material, confidentiality agreements, etc.);
- the characterization factors, normalisation factors and weighting factors used;
- the criteria and substantiation used to determine the system limits and the selection of input and output flows;
- documentation used to substantiate the other choices and assumptions

## Appendix 2 Health risk impact

Table 4 Classification of health impact

Class	Impact	Hazard statement	Weight (g)/FU
Class 1	CMR substances	R 40, 45, 46, 49, 60, 61, 62, 63	
Class 2	Chemicals that are very toxic, CME substance group 3 May sensitise by inhalation. Danger of very serious irreversible effects or damage breast-feeding children	R 26, 27, 28, 39, 42, 64	
Class 3	Chemicals that are toxic, may sensitise by skin contact, very corrosive, danger of serious damage to health by prolonged exposure	R 23, 24, 25, 35, 48, 68,	
Class 4	Harmful, corrosive, danger of cumulative effects. May cause lung damage if swallowed, vapour may cause drowsiness and dizziness.	R 20, 21, 22, 33, 34, 41, 65, 67	
Class 5	Irritants	R 36, 37, 38, 66	
Class 6	No classified due to health effects		

Table 5 Calculation of environmental impact

Class	Impact	Hazard statement	Weight (g)/FU
Class 1	PBT/vPvB		
Class 2	Very toxic and may cause long term adverse effects	R 50/53	
Class 3	Toxic and may cause long term adverse effects	R 51/52	
Class 4	Harmful and may cause long term adverse effects	R 52/53	
Class 5	Toxic or may cause long term adverse effects	R 50, R51, R 52, R53, R 54, R55, R 56, R57, R 58, R59	
Class 6	No classified due to environmental effects		



## Appendix 3 Indoor environment impact

### M1 – Emission classification of building materials

This scheme is well established in the Finnish market. It was published for the first time in 1995 by the Finnish Society for Indoor Air Quality (FISIAQ) under the title "Classification of Indoor Climate, Construction and Finishing Materials". The first products were labelled in 1996. In May 2000, the name was changed into "Emission classification of building materials" and at the present the scheme forms a part of a larger system with the aim of obtaining good indoor climate quality for the whole of the buildings – in this scheme, good indoor climate quality is defined by means of S1 to S3 values in the "Indoor Climate 2000 classification" [22]. Currently, the scheme is operated by The Building Information Foundation (RTS) which has close contact with the building industry – this has made the scheme accepted and given it great propagation in the Finnish market. The materials are labelled M1, M2, and M3 in which M1 represents materials of low emission and M3 represents the highest emissions. The scheme is well documented; all information is available at [www.rts.fi](http://www.rts.fi). Here you will also find a list of all materials that are labelled M1.

For materials in the M1 group, the following requirements apply:

Test requirement after 28 days	
TVOC	< 200 µg/m <sup>2</sup> h
Carcinogenic compounds	Cat. 1 < 5 µg/m <sup>2</sup> h
Sensory effect	Dissatisfaction concerning odour < 15 % in climpaq test
Formaldehyde	< 50 µg/m <sup>2</sup> h
Ammonia	< 30 µg/m <sup>2</sup> h
Casein	Not permitted

**Table 1:** Assessment requirements for M1 classification in Emission classification of building materials