



**Swan labelling of  
Solid biofuel boilers  
Version 2.0**

**xx December 2006 — 31 December 2009**



**Nordic Ecolabelling**

In November 1989, the Nordic Council of Ministers adopted a measure to implement an official voluntary ecolabelling scheme, the Swan. The organizations/companies listed below administer the Swan ecolabelling schemes on assignment from their national governments.

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

## Swan labelling of solid biofuel boilers

060/2., 23 August 2006

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- 2 Declaration on recycling systems for products and packaging
- 3 Declaration on plastic boiler components
- 4 Declaration on surface treatment
- 5 Declaration on packaging
- 6 Marketing of Swan-labelled solid biofuel boilers

## **What is a Swan-labelled solid biofuel boiler?**

A Swan-labelled boiler is fired on solid biofuel, that is wood or pellets made of wood. In some cases, an alternative biofuel may be used.

The fuel can be fed manually or automatically. Wood is generally fed manually while pellets are fed automatically.

A boiler uses water to distribute heat around a building. It is not designed to emit heat directly into a room. The size of the boiler is dependent on the heat and hot water requirement of the house. A wood-fired boiler is generally run periodically since the hot water is stored in a hot-water tank. Pellets boilers do not generally have hot-water tanks and are thus also fired at low loads.

The flue gas emissions produced by the boiler and the efficiency are tested. The supplier must also provide clear user information as to how to operate and maintain the boiler for optimum performance.

The emission of particles, carbon monoxide and hydrocarbons from a Swan-labelled boiler are low compared to other boilers on the market. Swan-labelled boilers are highly efficient and are made of environmentally suitable materials. The manufacturer must also ensure that the instruction manual contains sufficient information.

## **Why choose the Swan label?**

- The manufacturer and/or reseller may use the Swan trademark. The Swan label is a very well-known and well-reputed trademark in the Nordic region.
- The Swan label is a cost-effective and simple way to communicate that a boiler is among the best on the market from an environmental viewpoint, that it has been tested by an independent laboratory and which manufacturers are successively adapting boilers for a sustainable society.
- Swan labelling enables manufacturers to reach a growing number of professional and private consumers who wish to reduce their impact on the environment by using boilers that produce the lowest emission levels and general environmental impact.
- Environmental issues are complex and it is difficult to compare the various parameters. For a long time, municipalities and other users have sought an aid that provides credible evaluations. The Swan leads the way.

## What can carry the Swan label?

A boiler is classified as a primary heat source when **one** boiler provides the majority of heat, including hot water, in one building.

The product group comprises combined solid biofuel boilers/burners with an output of up to 300 kW. Solid biofuel refers to split logs, briquettes, pellets and chips as defined by EN 303-5. Straw is also a solid biofuel. The fuel can be fed manually or automatically.

A solarcell may be included in the heating system. If a solarcell is included in the heating system, a boiler with a complementary possibility to heat with electricity, may also be Swan-labelled.

Normally separate burners cannot be awarded the Swan label. However, if a burner is tested together with a defined boiler, the burner may be Swan-labelled if it is sold together with the defined boiler.



Single-room heat sources such as stoves, slow heat release fireplaces and open fireplaces are covered by a separate criteria document.

## How to apply

A manufacturer or reseller may apply for a licence using the designated application form. If a reseller applies for a licence, the manufacturer must also sign the application.

All requirements must be fulfilled. The requirements are marked in this document with the letter R and consecutive numbers. Icons indicate for each requirement how the applicant shall demonstrate that the requirement is fulfilled. An electronic checklist will also be published on the Internet ([www.svanen.nu](http://www.svanen.nu)) to facilitate the application procedure.

These icons are:

-  Enclose documentation.
-  Requirement checked on site.

### Application

The application shall be sent to Nordic Ecolabelling in the country in which the biofuel boiler is sold. See page two for addresses. The documents required for application are an application form and documentation demonstrating fulfilment of the requirements (specified in the criteria).

Further information and assistance can be obtained during application. Visit the Web site of the national ecolabelling body for more information.

## **Sales in other Nordic countries**

Registering a licence in another Nordic country allows the Swan label to be used on a larger market. The following must be submitted to Nordic Ecolabelling:

- Form for sales in the country in question.
- The applicable sections of the installation manual and operating and maintenance instruction translated into the national language.

Registration is free of charge but an annual fee shall be paid in accordance with the national regulations.

## **Inspection at the factory**

During the application process, Nordic Ecolabelling performs an inspection at the factory to ensure adherence to the requirements. For this inspection, records supporting the application such as calculations, original copies of submitted certificates, test records, purchase statistics, and similar documents that demonstrate fulfilment of the requirements must be made available for examination. This inspection also covers the relevant sections of the quality assurance process or documented procedures.

## **Costs**

An application fee is charged to companies applying for a licence. There is an additional annual fee based on the revenues produced by the Swan-labelled boiler.

## **Enquiries**

Please contact Nordic Ecolabelling if you have any queries or require further information. See page two for addresses.

# **1. Manufacture**

## **1.1 Environmental and quality control in production**

To ensure that Swan requirements are fulfilled, the following procedures must be implemented. If the manufacturer's environmental management system is certified to ISO 14001 or EMAS, where the following procedures (R1-R6) are applied, it is sufficient for the accredited certification body to certify that the requirements are implemented.

### **R1 Swan licence person**

The company shall appoint a person responsible for ensuring the fulfilment of Swan requirements, and a contact person for communications with Nordic Ecolabelling.



A chart of the company's organizational structure detailing who is responsible.

**R2 Boiler quality**

The manufacturer is responsible for that the production quality of the Swan-labelled boiler is maintained throughout the validity period of the licence.

- Procedures for collating and, where necessary, dealing with claims and complaints regarding the quality of the Swan-labelled boiler.

**R3 Planned changes**

Planned changes to areas controlled by Swan requirements must be reported in writing to Nordic Ecolabelling and the licensee (if other than the manufacturer).

- Procedures detailing how planned changes are handled.

**R4 Unplanned nonconformities**

Unplanned nonconformities in production of the Swan-labelled boiler that may affect an aspect of quality regulated by the criteria document must be reported in writing to the licensee, if other than the manufacturer, and recorded.

- Procedures detailing how unplanned nonconformities are handled.

**R5 Traceability**

The manufacturer must have a system for the tracing of the Swan-labelled boilers in production.

- Procedures detailing how traceability is operated.

**R6 Information from suppliers**

Documentation from suppliers with regard to the requirements in the criteria (R11-R16).

- Requirement checked on site.

## **1.2 Documentation held by the licensee**

The licensee must keep certain documents during the licence period. The licensee must be able to present these documents during the application process and follow-up inspections.

**R7 Documents to be held by the manufacturer**

Copy of the entire application.

Facts/supporting data for the documents submitted during the application procedure.

Results from inspections of the production of the ecolabelled product.

Reclamations and complaints.

- Checked on site.

## **1.3 General regulatory requirements**

### **R8 Regulatory requirements during production**

The manufacturer of the Swan-labelled boiler must fulfil the regulations in force regarding external and internal environments and safety that apply to production in that area and country.

Declaration from the manufacturer, see Appendix 1.

### **R9 Regulatory requirements concerning the boiler in use**

The boiler shall comply with any complementary regulation concerning for example security.

Declaration from the producer.

### **R10 Take-back system**

Applicable national regulations, legislation and/or agreements within the sector regarding the recycling systems for products and packaging shall be met in the Nordic countries in which the Swan-labelled boiler is marketed.

Declaration from the applicant regarding adherence to existing recycling/take-back agreements. See Appendix 2.

## **1.4 Product design**

### **1.4.1 Material requirements**

#### **R11 Labelling**

Plastic components weighing more than 50 g must be marked according to ISO 11469.

Electrical cables are not subject to this requirement.

Declaration from the manufacturer of the heat source, see Appendix 3.

#### **R12 Content of surface treatments**

Surface treatments must not contain pigments based on lead, cadmium, chromium, mercury or their compounds. The treatment may not contain more than 5 % w/w of organic solvents.

Declaration from the manufacturer of the heat source, see Appendix 4.

#### **R13 Packaging**

Packaging must not contain chlorine-based plastics. The plastics used must have technical data sheets.

Declaration from the applicant, see Appendix 5.

## **1.4.2 Supplementary heating system components**

### **R14 Hot-water tank**

Manual feed boilers must have a hot-water tank.

The heat accumulation system must be able to collect the heat produced by a fully stocked firebox. This means that the accumulation tank must be 18 times the volume of the firebox.



Information that manual feed boilers must be installed with a hot-water tank. The instruction manual must include information about the size of the hot-water tank.

### **R15 Solar collector**

If the heating system includes a solar collector, this must be type approved according to EN 12 975.



Declaration from the solar collector manufacturer.

### **R16 Fuel pellet storage**

The manufacturer of a pellets boiler shall inform the customer of how storage facilities for the recommended fuel should be designed to ensure that the quality of the fuel is not impacted when the fuel pellets are emptied into the customer's storage hopper.



Information must be provided in the instruction manual.

## **2. Operation of the Swan-labelled boiler**

The boiler must be tested for flue gas emissions. The results of these tests must be submitted to Nordic Ecolabelling.

The test laboratory shall produce a comprehensive test report that contains information on the following.

1. Selected test method.
2. Results from all tests.
3. A clear description of the boiler.
4. Confirmation that the test has been performed in accordance with the method specified, except where stated otherwise.
5. Specification of the test fuel.
6. That the laboratory fulfils the specified requirements.
7. An evaluation of whether the boiler fulfils the requirements in the criteria.

Products for testing are chosen randomly from the factory's warehouse or from the open market. The following material must be submitted to the testing body together with the product:

- Drawings including dimensions.
- Description of materials.
- Installation manual.
- Operating and maintenance instructions.
- Photograph of the product.
- Proposed labelling solution.

Variations of the same boiler may be assessed on the basis of results from an earlier measurement of a product of the same variant. The difference between the boilers must not affect the results of the testing itself. The assessment must be made by a laboratory that fulfils the requirements stipulated in Section 2.1.

Such an evaluation must place emphasis on the boiler's environmental and safety characteristics.

Design factors that strongly influence these properties:

- Dimension and volume of the combustion chamber.
- Air valves and air channels.
- Gas flues.
- Radiation protection and convection system.

The applicant is liable for the cost of testing.

## 2.1 Choosing a laboratory

For flue gas tests, the applicant may choose any laboratory that fulfils the general requirements of EN ISO/IEC 17 025 or which has official GLP status. The laboratory must be accredited for testing to a valid EN standard.

An alternative laboratory may be acceptable if the laboratory has applied for accreditation according to the valid EN method but has not yet been granted approval. The laboratory must be able to show that it is independent and qualified.

If the country of origin lacks an accredited laboratory, a competent, independent laboratory shall be chosen. Such a laboratory shall fulfil the requirements of EN/ISO/IEC 170 25 or have official GLP status.

## 2.2 Limit values

### R17 Air emissions

The limit values specified in Table 1 must not be exceeded.

Particle emissions are only tested at nominal load.

The limit values for OGC (organic carbon), CO (carbon mono oxide) and NO<sub>x</sub> (nitrogen oxides) are tested under the following conditions:

- 1) Nominal load for manual feed boilers equipped with a hot-water tank.
- 2) Nominal load and low load for automatic feed boilers. An average is calculated from the results of the three low loads. The various loads are defined in Section 2.3.

The requirements are applicable to manual and automatic feed boilers as well.

Table 1: Limit values for air emissions.

Boiler heat output	$x \leq 100 \text{ kW}$	$100 < x \leq 300 \text{ kW}$
OGC (mg/m <sup>3</sup> dry gas at 10% O <sub>2</sub> )	25*/70**	25*/50**
CO (mg/m <sup>3</sup> dry gas at 10% O <sub>2</sub> )	400* / 1 500**	400* / 1 000 **
NO <sub>x</sub> (mg/m <sup>3</sup> dry gas at 10% O <sub>2</sub> )	340	340
Particles (mg/m <sup>3</sup> dry gas at 10% O <sub>2</sub> )	40*/70**	40*/70**

\*automatic feed boiler

\*\* manual feed boiler

Comprehensive test report with laboratory certification that the boiler meets the requirements.

### R18 Efficiency

Boiler efficiency,  $\eta_k$ , must exceed:

Manual feed boiler:  $\eta_k = 73 + 6 \log Q_N$

where  $Q_N$  is the nominal output of the boiler.

Automatic feed boiler:  $\eta_k = 75 + 6 \log Q_N$ , nominal load

and  $\eta_x \geq 86 \%$  low loads

$\eta_x = (\eta_{20} + \eta_{40} + \eta_{60}) / 3$

where  $\eta_{20}$ ,  $\eta_{40}$ ,  $\eta_{60}$  stand for the measured efficiency at 20, 40 and 60% load.

- ☒ Comprehensive test report with laboratory certification that the boiler meets the requirements.

## **2.3 Test methods**

Testing encompasses:

- 1) Examination of product drawings, description of materials, installation manual, and operating and maintenance instructions. Materials, according to R10 and R11.
- 2) Declaration that the product fulfils R16 and R17.
- 3) Full test reports.

Boilers must be tested fully equipped.

Boilers shall be tested according to EN 303-5 at nominal load. Nominal load is defined by the manufacturer.

Low load testing shall comply with EN 303-5 but at 20, 40 and 60% of the nominal load.

## **3. Customer information**

### **3.1 Instructions**

#### **R19 Installation manual**

The installation manual shall contain technical data about the boiler.

The manufacturer shall notify that a hot-water tank must be installed with a manual feed boiler.

Information on the required size of water tank shall be included (R13).

The manufacturer/reseller must recommend qualified fitters in the installation manual, marketing material or in some other way. The installation manual must clearly state the importance of installation being performed by a qualified technician as instructed.

The installation instructions shall cover:

Necessary volume of air for combustion.

Distance from combustible materials.

Space required for operation, maintenance and chimney sweeping.

Type of gas flue to which the boiler can be connected with regard to flue gas temperature, height and area.

Instructions for the design of fuel storage (R15).

Other necessary installation information according to EN 303-5 must be included.

Information on the heat contribution that the heating system can provide (R21).

- ☒ Copy of the instruction manual.

**R20 Operating and maintenance instructions**

The manufacturer must ensure that the customer is supplied with operating and maintenance instructions. These shall include:

The type of fuel used during testing.

A description of how various fuels affect output and emissions.

The recommendation that Swan-labelled pellets should be used and that a list of licensees can be found on the Swan Website.

Recommendations as to the grade, size and moisture content of wood fuel.

Handling and storage recommendations for the biofuel.

Lighting instructions.

Stocking instructions.

Cleaning instructions and checks.

Copy of the operating and maintenance instructions.

## **3.2 Marketing**

The Swan label is a very well-known and well-reputed trademark in the Nordic region. Swan-labelled boilers may be marketed using the Swan label so long as the associated licence is valid.

The label must be positioned so that there is no doubt as to what the label refers and so that it is clear that the boiler is ecolabelled.

More information on marketing can be found in "Regulations for Nordic Ecolabelling" of 12 December 2001 or later version.

## **3.3 General information**

**R21 Instructions**

The manufacturer must inform the reseller of the importance of furnishing the customer with the installation manual and operating and maintenance instructions.

Information must be provided in the instruction manual.

**R22 Heat coverage**

The customer must be notified of the heat contribution that the heating system can provide.

Information must be provided in the instruction manual.

## 4. Manufacturer's requirements on resellers and fitters

### R23 Qualification requirements

The manufacturer must supply training material designed for fitting technicians. The material shall emphasise the importance of following safety, working environment and environmental legislation as well as any conditions particular to the site, and information on the use of the Swan-labelled product.

Training material.

### R24 Design and sizing of the heating system

If the heating system has a supplementary solar collector, the system must be correctly designed and sized.

Information must be provided in the instruction manual.

## Design of the Swan label

Design of the Swan label:



Licence number

Each licence has a unique six-digit licence number that must be displayed beside the label.

More information on the design of the label can be found in "Regulations for Nordic Ecolabelling" of 12 December 2001 or later version.

## Follow-up inspections

Follow-up inspections to ensure observance of the requirements may be performed. Manufacturing and/or the boiler may be inspected on instruction from Nordic Ecolabelling.

The licence may be revoked if it is evident that the boiler does not meet the requirements.

On request, one boiler shall be selected at random from new production under the supervision of an independent party, and shall be dispatched without delay to the original test laboratory. If this boiler does not fulfil emission requirements within a 10% tolerance range, the procedure is repeated on a second boiler chosen at random. If this unit does not fulfil emission requirements, the licensee is given three months in which to make the necessary changes and send two new boilers for testing. If this requirement is not met, the licence shall be withdrawn until new testing has been carried out in accordance with 2.3.

Nordic Ecolabelling is liable for the cost of the follow-up inspection if one of the first two boilers tested is approved. If not, the licensee is liable for the costs.

## **How long is a licence valid?**

This first version of this criteria document was approved by the Nordic Ecolabelling Board on 14 December 2000 and remained valid until 14 December 2003.

The criteria were amended 21 March 2001. The requirement on the manufacturer to certify fulfilment of the regulations in each country of use was dropped. Instead, the requirements on training material regarding these issues have been tightened. The criteria are published as version 1.1.

These criteria were revised on 12 December 2001. The validity of the document was extended 12 months. Particle emissions are only tested at nominal output since the European test method does not allow for low load testing. More experience enables the use of a dilution tunnel during testing. Further, the possibility to use other test methods for 12 months is introduced, provided that an accredited laboratory certifies that the product fulfils the requirements. The criteria are published as version 1.2.

The Nordic Ecolabelling Board decided on 14 December 2003 to extend the validity of the criteria two years to 14 December 2006. The criteria are published as version 1.3.

The Nordic Ecolabelling Board decided on 19 October 2004 to change the requirements regarding plastics. Electrical and electronic components are exempted from the requirement. Version 1.4 is published.

The Nordic Ecolabelling Board decided on 13 December 2005 to reduce the material requirements and extend the validity period two years. Version 1.5 is published and is valid until 31 December 2007.

An ecolabel licence is valid providing the criteria are fulfilled and until the criteria expire. The validity period of the criteria may be extended or adjusted, in which case the licence is automatically extended and the licensee informed.

Revised criteria shall be published at least one year prior to the expiry of the present criteria. The licensee is then offered the opportunity to renew their licence.

## **New criteria**

The following test methods will be evaluated in future criteria. The intention is to investigate whether the lighting phase should be included in testing.

Current technology will also be assessed, in particular to determine whether technical advances mean that manual feed boilers without a hot-water tank fulfil the requirements. If such is the case, it should also be possible to ecolabel such boilers.

An evaluation of whether test laboratories should be engaged in round-robin testing.

An evaluation of whether the pellet grade used for testing of emissions should be defined.

An evaluation of whether service life requirements on catalytic converters should be introduced in those cases a catalytic converter is used.

An evaluation if requirements of an average annual efficiency shall be included.

## Appendix 1

### Declaration of fulfilment of manufacturing regulations

We hereby certify that production fulfils regulations in force regarding safety, work environment, environmental legislation, plant-specific conditions and concessions in the country in which the boiler is manufactured.

Details of local regulatory authorities:

.....

_____	_____
Date	Boiler manufacturer
_____	_____
Principal	Phone

## Appendix 2

### Declaration on recycling systems for products and packaging

We hereby certify that national regulations, legislation and/or agreements within the industry regarding the recycling systems for products and packaging are met in the Nordic countries in which the product is marketed.

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Date	Company name/manufacturer/importer
Principal	Phone

## Appendix 3

### Declaration on plastic boiler components

We hereby certify that all plastic components weighing more than 50 g are labelled in accordance with ISO 11 469 or equivalent standard.

Boiler manufacturer:

.....

Type designation of boiler:

.....

---

Date

Boiler manufacturer

---

Principal

Phone

## Appendix 4

### Declaration on surface treatment

We hereby certify that the boiler's surface treatment does not contain pigment or additives based on lead, cadmium, chromium, mercury or their compounds nor more than 5% (w/w) organic solvents.

Boiler manufacturer: \_\_\_\_\_

Type designation of boiler: \_\_\_\_\_

\_\_\_\_\_  
Date

\_\_\_\_\_  
Boiler manufacturer

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Phone

## **Appendix 5**

### **Declaration on packaging**

We hereby certify that plastic product packaging does not contain chlorine-based plastics.

---

Date

Boiler manufacturer

---

Principal

Phone

## Appendix 6

### Marketing of Swan-labelled solid biofuel boilers

We hereby certify that we are well acquainted with the regulations governing the use of the Nordic Swan ecolabel, as detailed in "Regulations for Nordic Ecolabelling" 12 December 2001 or later versions. We agree to follow these regulations when marketing the Swan-labelled boilers.

Further, we confirm that we are familiar with the criteria document regarding the Swan labelling of Solid Biofuel Boilers.

We undertake to advise those individuals within the company involved in marketing the Swan-labelled biofuel pellets of the criteria for the Swan labelling of Solid Biofuel Boilers and "Regulations for Nordic Ecolabelling" 12 December 2001 or later versions.

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Date and place

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Company

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Signature, contact person

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Clarification of name

---

Phone

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Signature, marketing director

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Clarification of name

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Phone

In case of a change in personnel, a new declaration must be submitted to Nordic Ecolabelling