# Swan labelling of
# Fuel

**Proposal for Version 1.0 • XX month 200X — XX month 200X**

**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.

For further information, please visit the respective Web sites:


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This document is a translation of an original in norwegian. In case of dispute, the original document should be taken as authoritative.

## Svan labelling of Fuel

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# What is a Swan-labelled fuel?

In a life cycle perspective, a Swan-labelled fuel generates lower emissions of green-house gases. Moreover, compared with conventional fossil fuels, a Swan-labelled fuel does not give rise to an increased danger of cancer or increased energy consumption.

The quality of the fuel is safeguarded in that it is required to fulfil acknowledged fuel standards. In a Swan-labelled fuel, the raw materials are traceable – i.e. the applicant must document where the raw material originates from. In addition, in the case of some raw materials, there is a requirement that a specified proportion of certified raw materials must be used in order to safeguard sustainable cultivation.

# Why choose the Swan label?

- The licenceholder is permitted to use the trademark-protected Swan label in marketing the fuel. The Swan label enjoys credibility and is widely known in the Nordic countries.
- The health and environment requirement of the Swan label provide the individual producer with guidance on how to contribute to the development of a sustainable society.
- The Swan label is a cost-effective and simple means of communicating the environmental work and environmental commitment of the producer to customers and suppliers.
- Environmental issues are complex, and understanding specific issues can take time. The Swan label scheme can be viewed as a guide in this work.
- The Swan label encompasses not only environmental requirements but also quality requirements because environment and quality often go hand-in-hand. This means that a Swan licence can also be viewed as a mark of quality.

# What fuels are eligible for a Swan label?

Fuels based on more than 50% renewable raw materials are eligible for a Swan label. In this context, renewable raw materials mean biological materials that are reproduced in nature within a time frame of 100 years. The biodegradable fraction of products, waste and waste materials from agriculture and fisheries (both vegetable and animal), sustainable forestry and similar industries and the biologically degradable fractions of industrial waste and municipal waste are also defined as renewable.

Animal oils from threatened species on the IUCN’s Red List of Threatened Species are not viewed as a renewable resource. In the case of animal waste fractions, only materials classifiable in Categories 2 and 3 of the Animal By-product Regulation (EC 1774/2002) may be used as raw materials in the production of a Swan-labelled fuel.

# How to apply

Each requirement is labelled with the letter R (for Requirement) and a number. In order for a licence to be granted, all requirements must be fulfilled.

### Symbols used in the text

Each requirement is accompanied by a description of how the requirement must be documented. Various icons are used in the text to make this work easier. These icons are:

✉ Submit

☺ The requirement will be checked on site

### Application

Applications must be submitted to Nordic Ecolabelling in the country in which the fuel will be sold, see the address list on page 2. Applications comprise an application form and documentation evidencing fulfilment of the requirements (specified in the requirements).
Further information and help with applications is available on the websites of the various countries.

### Sales in other Nordic countries

Registering the licence in other Nordic countries allows the Swan label to be used on a larger market. To do so, the following must be submitted to Nordic Ecolabelling:

- Application form for registering the ecolabelled product.
- Documentation evidencing fulfilment of national regulations.

Registration is free of charge, but annual fees are payable in accordance with the rules in force in the individual Nordic countries.

### On-site checks

Before a licence is granted, Nordic Ecolabelling will conduct an on-site inspection to ensure that the requirements are fulfilled. During the inspection, the figures on which calculations are based, the original of submitted documents, measurement protocols, purchasing statistics etc. confirming fulfilment of the requirements must be available for examination.

### Costs

An application fee is payable in connection with licence applications. An annual fee is also payable based on the sales of the Swan-labelled fuel.

### Questions

In the event of questions, please contact Nordic Ecolabelling, see the address list on page 2.

# 1 Environmental requirements

### R1 Description of the business

A description of the applicant's business must be submitted. The description must include geographical location, the products produced, the customers of the business and a description of the technology used in the process of converting raw materials to fuel. Nordic Ecolabelling may also request other information that may be of relevance to the application.

✉ The producer's own description of the business and the process technology used.

### R2 Ingoing components in the production of the fuel

The producer must account for all raw materials, chemical additives and process chemicals used in the production of the fuel for which a Swan label is sought.

If the fuel for which a Swan label is sought is a blend of several fuel qualities (e.g. biodiesel from rapeseed and biodiesel from animal fat) an account must be provided of all ingoing components of all qualities.

*If the applicant is reprocessor/distributor of a finished fuel, this part must be documented by the producer of the fuel.*

*If the fuel for which a Swan label is sought also contains a fossil fuel fraction, information on raw materials, chemical additives and process chemicals used in the production of the fossil fraction must not be reported.*

*Definitions of raw materials, chemical additives and process chemicals can be found in the glossary at the end of the criteria document .*

✉ Complete formula of the product for which the Swan label is sought as well as product safety data sheets on all chemical additives and process chemicals.

✉ Form A in Appendix 6 can be used for documenting quantities of ingoing raw materials and process chemicals.

### R3 Energy consumed during the production of the fuel

The producer of the fuel must provide details of the energy sources used in the production of the fuel.

*If the applicant is reprocessor/distributor of a finished fuel, this part must be documented by the producer of the fuel.*

✉ Form B in Appendix 6 can be used for documenting energy consumption in the production of the fuel.

### R4 Products and by-products

The producer must specify the products and by-products formed in the process. Documentation must also be provided of the purchasers of any by-products and the use to which they are put.

*If the applicant is reprocessor/distributor of a finished fuel, this part must be documented by the producer of the fuel*

*If the fuel for which a Swan label is sought also contains a fossil fuel fraction, information on raw materials, chemical additives and process chemicals used in the production of the fossil fraction must not be reported.*

*A definition of by-products provided in the glossary at the end of the criteria document.*

✉ Form A in Appendix 6 can be used for documenting product and by-products.

✉ Invoicing base showing quantities and purchases of the by-products.

### R5 Specification of transport of raw materials/semi-manufactures

The producer must specify transport distances and transport means used in shipping raw materials/semi-manufactures. If transport is divided into several stages, all must be described. The same applies if the fuel for which the Swan label is sought consists of multiple components.

*In the case of transport relating to the distribution of the Swan-labelled fuel, reference values must be used. The applicant need accordingly not document this transport stage. In this context, the distribution of fuel means the final transport stage within the boundaries of the country in which the fuel is to be sold.*

*If the fuel for which a Swan label is sought also contains a fossil fuel fraction, information on transportation of the fossil fraction must not be reported*

✉ Declaration from the applicant in which transport distances and transport means are specified. Form C in Appendix 6 may be used for documenting transport distances and transport stages.

### R6 Emissions of greenhouse gases

In a life cycle perspective, emissions of greenhouse gases must not exceed 120g $CO_2$ equivalents per kilometre driven using values taken from NEDC 2002 and the calculation model described in JEC Well to Wheel – see Appendix 1. Emissions of the greenhouse gases $CO_2$, $CH_4$ and $N_2O$ from raw material production, production of the fuel, transport, distribution and the driving phase must be included in the calculations.

Greenhouse gases must be calculated on the basis of the model described in Appendix 2. For areas of the production chain on which the applicant does not have specific data, reference data from JEC Well to Wheel may be used – a selection is provided in Appendix 1. Rules on the use of reference values can be found in Appendix 3. In the case of the production of the fuel itself, the applicant must use production specific data.

*If the fuel for which a Swan label is sought is a blend of several fuel components, emissions of climate gas must be calculated as a weighted total of each ingoing component.*

*Climate gas emissions associated with the production and use of any chemical additives must not be included in the calculations. Definitions of additives are provided in the glossary at the end of the criteria document.*

*A complete list of reference data is available from http://iec.jrc.cec.eu.int/.*

✉ The applicant must calculate emissions of greenhouse gases using the model described in Appendix 2. This must be submitted to Nordic Ecolabelling in the form of an Excel spreadsheet. Total emissions of climate gas for the product must be presented in a table summarising the contributions made by the individual process stages (see Figure 1 in Appendix 1).

✉ Documentation confirming product specific data must be submitted to Nordic Ecolabelling. This might, for example, take the form of documentation used in connection with reporting to the authorities. Any data acquired by the producer from other areas of the production chain will be assessed as received by Nordic Ecolabelling.

## R7 Energy consumption during the life cycle as a whole

### Alternative 1:

Energy consumption in a life cycle perspective must not exceed the energy consumption associated with the fossil fuel alternative per 100 km driven using values taken from NEDC 2002 and the calculation model described in JEC Well to Wheel – see Appendix 1. Energy consumption relating to raw material production, production of the fuel, transport, distribution and the driving phase must be included in the calculations.

The following table shows energy consumption associated with various fossil fuels. Biodiesel must be compared with diesel, ethanol with petrol, biogas with gas, hydrogen with natural gas and DME with diesel.

**Table 1: Table showing the energy consumption associated with the production and use of fossil fuel alternatives. Data taken from JEC Well to Wheel 2007.**

| Fuel alternative | MJ/100 km |
|---|---|
| Petrol | 255 |
| Diesel | 212 |
| Natural gas - CNG | 250 |

Greenhouse gases must be calculated on the basis of the model described in Appendix 2. For those areas of the production chain on which the applicant does not have specific data, reference data taken from JEC Well to Wheel may be used – a selection is provided in Appendix 1. Rules on the use of reference values are provided in Appendix 3. In the case of the production of the fuel itself, the applicant must use production-specific data.

*If the fuel for which a Swan label is sought is a blend of several fuel components, the energy consumption must be calculated as a weighted total for each ingoing component.*

*Energy consumption associated with the production and use of any chemical additives must not be included in the calculations. A definition of chemical additives is provided in the glossary at the end of the criteria document.*

*A complete list of reference data is available on http://iec.jrc.cec.eu.int/.*

✉ The applicant must calculate energy consumption on the basis of the model described in Appendix 2. This must be submitted to Nordic Ecolabelling in the form of an Excel spreadsheet. The total energy consumption of the product must be presented in a table summarising the contributions made by the individual process stages (see Figure 1 in Appendix 1.

✉ Documentation confirming the production specific data must be submitted to Nordic Ecolabelling. This may, for example, take the form of documentation used in connection with reporting to the authorities. Any data acquired by the producer from other areas of the production chain will be assessed as received by Nordic Ecolabelling.

**Alternative 2:**

Consumption of energy in a life cycle perspective must not exceed the energy consumption associated with the production of fossil fuel – i.e. 255 MJ/100 km with values taken from NEDC 2002 and JEC Well to Wheel – see Appendix 1. Energy consumption associated with raw material production, production of the fuel, transport, distribution and the driving phase must be included in the calculations.

Greenhouse gases must be calculated on the basis of the model described in Appendix 2. For areas of the production chain on which the applicant does not have specific data, reference data taken from JEC Well to Wheel may be used – a selection is provided in Appendix 1. Rules on the use of reference values are provided in Appendix 3. In the case of the production of the fuel itself, the applicant must use production-specific data.

*If the fuel for which a Swan label is sought is a blend of several fuel components, the energy consumption must be calculated as a weighted total for each ingoing component.*

*Energy consumption associated with the production and use of any chemical additives must not be included in the calculations. A definition of chemical additives is provided in the a glossary at the end of the criteria document.*

*A complete list of reference data is available on http://iec.jrc.cec.eu.int/.*

✉ The applicant must calculate energy consumption on the basis of the model described in Appendix 2. This must be submitted to Nordic Ecolabelling in the form of an Excel spreadsheet. The total energy consumption of the product must be presented in a table summarising the contributions made by the individual process stages (see Figure 1 in Appendix 1.

✉ Documentation confirming the production specific data must be submitted to Nordic Ecolabelling. This may, for example, take the form of documentation used in connection with reporting to the authorities. Any data acquired by the producer from other areas of the production chain will be assessed as received by Nordic Ecolabelling.

## R8 The traceability of vegetable raw material

The licenceholder must ensure that all vegetable raw materials are traceable. The licenceholder must ensure that the raw material does not originate in areas in which biodiversity or values worthy of protection for social reasons are under threat. If it transpires that raw materials originating in areas in which biodiversity or values worthy of protection for social reasons are under threat are used, Nordic Ecolabelling may revoke the licence.

✉ The applicant must state supplier data (name and owner of the forest/crop), the Latin name of the plant and its geographical origin (country, state and region/province/municipality and the address of the forest/crop) of the raw material used in the production of the fuel. If applicant is a processor of a fuel, this requirement must be documented by the producer of the biofuel. Nordic Ecolabelling reserves the right to require further documentation in the event of uncertainty about whether the raw material originates in areas in which biodiversity or values worthy of protection for social reasons are under threat. Form D in Appendix 6 must be used for documenting the origins of the raw material.

### R9 Traceability of animal raw materials

The licenceholder must ensure that all animal raw materials are traceable. The licenceholder must ensure that animal raw materials do not derive from species listed on the IUCN's Red List of Threathened Species or that the raw material is categorised under Category 1 in the By-product Regulation (EC 1774/2002). If it transpires that raw materials deriving from threatened animal species or Category 1 materials have been used, Nordic Ecolabelling may revoke the licence.

✉ Form E of Appendix 6 can be used for accounting for the origins of raw materials.

### R10 $CO_2$ -balance in the production of biomass

The production of biomass must be conducted in such a way that it does not result in a negative $CO_2$-balance.

*A negative $CO_2$-balance entails that bound carbon is released in such a way that net emissions of greenhouse gases from the production area of the biomass are greater than the the quantity of carbon bound up in the biomass in a time frame of 10 years. The $CO_2$-balance may be calculated using, for example, "Carbon payback time" – the method described in Department of Transport, UK:2007: Carbon and Sustainability Reporting Within the Renewable Transport Fuel Obligation (page 81 – 83).*

*If the cultivation of biomass takes place in areas in which the same raw material has been cultivated since November 2005, a declaration from the producer to this effect will be sufficient.*

✉ Report/calculation showing that the production of biomass has not resulted in a negative $CO_2$-balance. The result of the calculations must be verified by a competent independent third party.

✉ Declaration by the raw material producer on the date on which raw material production was established.

### R11 Certified raw materials

20% of all wood raw materials (including sawdust and chippings from sawmill operations), palm oil, soybean oil and sugar cane used in the production of a Swan-labelled fuel must be certified in accordance with a standard and certification system specified in Appendix 5. The requirement limit must be fulfilled separately by each raw material, but exemptions from the requirement are granted in the case of raw materials present in the fuel in quantities of less than 5%. Certification must be performed by an independent third party.

*Example: The raw materials in a biodiesel product are 60% palm oil and 40% rapeseed oil. 20% of the palm oil must accordingly be certified in accordance with a standard and a certification system approved by Nordic Ecolabelling. The rapeseed, like the palm oil, must fulfil R9 and R11.*

✉ Overview of the proportion (%) of certified raw materials used in the fuel on an annual basis. If the applicant is solely a processor of a fuel, this requirement must be documented by the producer of the biofuel.

✉ Copy of a certificate signed by an approved certification body (in accordance with Appendix 4).

## R12 Carcinogenic substances in exhaust fumes

The risk of cancer must not increase when fossil fuels are replaced with a Swan-labelled fuel.

The concentration in exhaust fumes of all the substances listed in the table below must be measured at a laboratory that fulfils the requirements applicable to test laboratories provided in Appendix 5. Cancer risk is assessed by multiplying the concentration of the individual substance with the specified risk factor. The total reached must not exceed the equivalent total calculated for the fossil fuel alternatives for engines using the same combustion technology.

| Substances | Risk factors |
|---|---|
| particles | 7 x 10-5 |
| benzene | 8 x 10-5 |
| formaldehyde | 10 x 10-5 |
| acetaldehyde | 0.2 x 10-5 |
| ethene | 5 x 10-5 |
| propene | 1 x 10-5 |
| 1,3-butadiene | 30 x 10-5 |
| PAH 2 (incl. benzopyrene) | 2 800 x 10-5 |

*The risk of cancer must always be calculated on the basis of the finished fuel product including all additives.*

*If the laboratory is already in possession of measurement results for fossil fuel alternatives, these may be used for a basis for the assessment. If so, the measurement results for the fuel for which a Swan label is sought must be acquired using the same method and using an engine with the equivalent combustion technology.*

*If the applicant can obtain test results for equivalent fuels showing that the cancer hazard is less than in the case of fossil fuels, this may be used to document fulfilment of the requirement.*

✉ Test reports from accredited party laboratories.

## R13 Emissions of substances that are harmful to health

Swan-labelled fuels may be used only in car models that the car manufacturer has approved for use with the type of fuel in question.

The licenceholder must ensure that the following label is affixed to the fuel pumps in question:

“Check that your vehicle can be refuelled with XXX (insert “biodiesel”, “bioethanol” or the equivalent).

☺ On-site inspection.

✉ Documentation of fulfilment of the applicable Euronorm for at least one car model that has been tested with the biofuel in question or equivalent fuel.

### R14 Quality requirements

A Swan-labelled fuel must fulfil one of the following standards:

A. EN 590 - Automotive fuels. Diesel. Requirements and test methods alternative EN 14214 - Automotive fuels. Fatty acid methyl esters (FAME) for diesel engines. Requirements and test methods, SS 155435 - Dieselbränsle av miljöklass 1 och 2 för snabbgående dieselmotorer, ASTM D975 - Standard Specification for Diesel Fuel Oils eller DIN 51 606.

B. EN 288 - Automotive fuels. Unleaded petrol. Requirements and test methods alternativt SS 155480 - Motorbränslen – Etanol E85 – Krav och provningsmetoder, ASTM D 5798 - Standard Specification for Fuel Ethanol for Automotive Spark- Ignition Engine.

C. SS 155438 - Motorbränslen - Biogas som bränsle till snabbgående ottomotorer.

✉ Valid certificate or written guarantee from the fuel supplier containing a specification in accordance with the requirements and test methods/methods of analysis in the standard in question.

# 2 Quality requirements and the requirements of the authorities

In order to ensure that the Swan requirements are fulfilled throughout the licence period, the following procedures must be in place.

If the producer/importer/supplier has a certified environmental management system in accordance with ISO 14 001 or EMAS, in which the following procedures are implemented, it will be sufficient for the accredited auditor to document implementation of the requirements.

### R15 Statutes and regulations

The licenceholder must ensure that the applicable provisions on safety, working environment, environmental legislation and plant-specific conditions/licences are adhered to at all production sites for the Swan-labelled product.

**Nordic Ecolabelling may revoke the licence if this requirement is not fulfilled.**

✉ Duly completed and signed Form d) in Appendix 5.

### R16 Responsibility for the Swan label

One person in the company must be allocated responsibility for fulfilment of the Swan label requirements and one person must be allocated responsibility for contact with Nordic Ecolabelling.

✉ Organisational structure showing responsibility for the above.

### R17 Documentation

The licenceholder must be able to present a copy f the application and the basis for calculation and data (including test reports, documents from subcontractors and the like) for the documentation submitted in connection with the application.

☺ On-site inspection.

### R18 The quality of the fuel

The licenceholder must guarantee that the quality of the Swan-labelled fuel will not deteriorate during the period of validity of the licence.

✉ Description of the applicant's systems for checking the Swan-labelled fuel.

✉ Procedures for summarising and, where necessary, reporting on complaints received concerning the quality of the Swan-labelled fuel.

### R19 Planned changes

Planned changes affecting the Swan requirements must be reported in writing to Nordic Ecolabelling.

✉ Procedures showing how planned changes are handled.

### R20 Unforeseen deviations

Unforeseen deviations that impact on the Swan requirements must be reported in writing to Nordic Ecolabelling and recorded in a journal.

✉ Procedures showing how unforeseen deviations are handled.

### R21 Traceability

The licenceholder must safeguard the traceability of the Swan-labelled fuel in the production process in order to ensure that the Swan-labelled product is not mixed with products that are not Swan-labelled.

✉ Descriptions/procedures of fulfilment of the requirement.

### R22 Marketing

Marketing of the Swan-labelled fuel shall be in accordance with "Rules on Nordic Ecolabelling".

✉ Duly completed Form g) in Appendix 6.

### R23 Annual reporting

Each year by 31 March, the applicant must complete a form which, inter alia, provides an account of the use of raw materials and energy and sales of by-products during the preceding year. In the event of changes in relation to the calculation data used at the time of application, a new Excel spreadsheet must submitted to Nordic Ecolabelling showing that the requirements relating to emissions of greenhouse gases and energy consumption continue to be adhered to.

# Marketing

The Swan label is a trademark that is familiar and respected in the Nordic countries. The Swan-labelled/service may be marketed using the Swan label for as long as the licence remains in force.

The label must be positioned in such a way that no doubt exists about the meaning of the label and that makes it clear that the fuel is ecolabelled.

Further information on marketing can be found in the “Rules on Nordic Ecolabelling of 12 December 2001 or subsequent versions.

# The design of the Swan label

The design of the Swan label is as follows:


XXX XXX

Dansk: Brændstoff

Svensk: Drivmedel

Finsk: Ajoneuvon polttoaine

Norsk: Drivstoff

Islandsk:

Engelsk: Fuel

Each licence has a unique licence number for use in combination with the label.

Further information on the design of the label can be found in Rules on Nordic Ecolabelling” 12 December 2001, or subsequent versions.

# Follow-up inspections

Nordic Ecolabelling may check to ensure that the fuel continues to fulfil the Swan label requirements after a licence has been granted. This may take the form of, for example, on-site inspections or random sampling.

Random samples may also be taken at points of sale and analysed by an impartial laboratory. If this process reveals that the requirements are not fulfilled, Nordic Ecolabelling will require the licenceholder to pay the costs of analysis.

# How long will the licence remain in force?

Nordisk Miljømerking fastsatte kriteriene for XX den DAG MÅNED ÅR og de gjelder til og med DAG MÅNED ÅR.

Miljømerkingslisensen gjelder så lenge kriteriene oppfylles og så lenge kriteriene er gyldige. Kriteriene kan forlenges eller justeres, i slike tilfeller forlenges lisensen automatisk og lisensinnehaveren meddeles dette.

Senest 1 år før utløpsdato, skal det meddeles hvilke kriterier som deretter skal gjelde. Lisensinnehaveren tilbys da muligheten for å fornye lisensen.

# New criteria

A key element in the first revision of the criteria will be to review the requirements imposed on raw materials. As part of this work, a report will be presented on certification schemes for various raw materials.

Requirements may also be imposed on the additives used in fuels.

# Definitions and explanations of terms

**Waste:** All materials and all items encompassed by Appendix 1 to EU Directive 75/442/EEC that the proprietor must, wishes or is under an obligation to dispose of.

**Biofuel:** Liquid or gaseous fuel for transport uses produced from biomass (see the definition of biomass below).

**Biomass:** The biologically degradable portion of vegetable and animal substances.

**By-product:** A product formed in the production of something else.

**Fuel components:** E85 is an example of a product that consists of two fuel components: the fossil component which makes up 15%, and the biobased component, which makes up 85%.

**Fossil fuels:** Fuels produced from fossil raw materials such as oil, natural gas and coal. A fuel may also consist of a number of bio-based fractions, e.g. biodiesel from rapeseed, blended with biodiesel from animal fat.

**Functional unit:** Definition of the function/performance of a product, irrespective of the way in which this function is fulfilled. In connection with life cycle analyses (see the explanation below) where several apparently “similar” products are compared, it is important that the functional unit should take account of efficiency, durability and, where applicable, other quality parameters.

**GHG:** Abbreviation of greenhouse gases (see definition below).

**Greenhouse gases:** Atmospheric gases that let through radiation from the sun but capture heat radiated from the earth. Man-made emissions of greenhouse gases increase the concentration in the atmosphere to level that exceed the natural balance. Several gases contribute to this increase, including $CO_2$, $CH_4$ and $N_2O$.

**LCA:** Abbreviation of Life Cycle Analysis. A Life Cycle Analysis is a systematic charting and assessment of the impacts on health, environment and resources throughout the life cycle of a product or product system, from the raw material extraction stage to the final waste processing stage.

**NEDC 2002:** Abbreviation of New European Driving Cycle. NEDC provides data on the fuel consumption of an average European car with an average European driving pattern.

**Process chemicals:** Chemicals used in the process to ensure that the process works.

**Reference values:** Standard values for parts of the life cycle of the fuel taken from Well to Wheel JEC 2007. These may be used for any parts of the life cycle of fuels if applicants have difficulties in presenting specific data of their own.

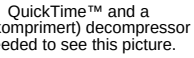
**Raw material:** Raw materials are materials that are not processed in any way. For the purposes of the ecolabelling of fuels, a raw material is defined as the ingoing component where the energy that is transferred in the process conversion to fuel is stored.

**Chemical additive:** Chemicals added to the fuel in small quantities in order to change the freezing point/melting point, obtain value or other physical properties of the product.

# Appendix 1 Reference data

This appendix outlines some of the key data used in the calculations in JEC Well to Wheel 2007 – for a complete list, see http://ies.jrc.cec.eu.int/wtw.html – Well to Tank, Appendix 1 and 2 . These reference data may be used by the applicant for any areas of the product chain on which product specific data is not available – e.g. the production of raw materials. See Appendix 3 for the rules governing the use of reference values.

The figure below divides up the life cycle of a fuel into 8 process stages. The figure is not applicable to all types of fuel, there may, for example, be variations in the number of stages leading up to the finished fuel product. Nevertheless, the figure provides a general overview of the production of a fuel and the stages that must be included for the purposes of calculating total energy consumption and emissions of greenhouse gases. The reference values provided below refer to a specific process stage.




### Process stage 1: The production of a selection of renewable raw materials:

Reference is made to Chapter 9 of Appendix 1 to the JEC Report for a complete overview.

| | MJx/MJ raw material | g $CO_2$.equiv./MJ raw material |
|---|---|---|
| Wood farming and chipping | 0.0371 | 5.02 |
| Sugar beet farming | 0.0842 | 11.01 |
| Wheat farming | 0.1306 | 18.24 |
| Sugarcane farming (Brazil) | 0.211 | 5.13 |
| Rapeseed farming | 0.1776 | 30.6 |
| Sunflower seed farming | 0.1220 | 18.02 |

### Process 2: Truck transportation of biomass

Reference is made to Chapter 11 of Appendix 1 to the JEC Report for a complete overview.

| | MJx/MJ raw material | g $CO_2$ equiv./MJ raw material |
|---|---|---|
| Rapeseed road transport | 0.0024 | 0.18 |
| Sugar beet transport | 0.0147 | 1.11 |
| Sunflower seed road transport | 0.0024 | 0.18 |
| Wheat grain road transport | 0.0039 | 0.30 |
| Wheat straw road transport | 0.0039 | 0.29 |
| Sugar cane road transport | 0.0042 | 0.32 |
| Wood chips road transport, 50 km | 0.0045 | 0.34 |

### Process 3 and 5: Energy consumption in the production of biofuel:

Reference is made to Chapter 2 of Appendix 1 to the JEC Report for a complete overview.

The various energy sources must be multiplied by the following factors in order to determine MJ of primary energy per MJ output.

| | MJx/MJ output |
|---|---|
| Electricity (EU-mix) | 2,835 |
| NG for steam at 90% eff. | 1.13 |

### Process 6: Credit awarded for the production of by-products:

| | MJx/MJ fuel | g $CO_2$ equiv./MJ fuel |
|---|---|---|
| Biproduct from ethanol production substitutes soya as animal feed | -0.3074 | -10.17 |
| Biproduct from ethanol production substitutes electricity in the production | -0.4197 | -25.14 |
| Biproduct from biodiesel production substitutes a chemical | -0.0152 | -3.53 |
| Biproduct from biodiesel production substitutes wheat grain | 0.0378 | 1,79 |

### Process 7: Distribution of finished fuel:

Reference is made to Chapter 19 of Appendix 1 to the JEC Report for a complete overview.

| | MJx / MJ fuel | g $CO_2$ equiv. / MJ fuel |
|---|---|---|
| Ethanol distribution (blended) | 0,0298 | 1,74 |
| Biodiesel distribution (blended) | 0,026 | 1,46 |

### Process 1 – 7: Well to Tank data for a selection of fossil fuels:

| | MJx/MJ fuel | g $CO_2$ equiv./MJ fuel |
|---|---|---|
| Diesel | 0.160 | 14.20 |
| Gasoline | 0.140 | 12.5 |
| CNG | 0.12 | 8.40 |

### Process 8: Energy consumption and greenhouse gas emissions associated with various types of car system

| | MJ/100 km | g $CO_2$ equiv./km |
|---|---|---|
| PISI Gasoline | 223. | 168 |
| PISI Ethanol (neat) | 223.5 | 161.3 |
| PISI CNG bifuel | 226.9 | 132.2 |
| PISI CNG dedicated | 222.8 | 129.9 |
| DICI Diesel | 183.1 | 137.9 |
| DICI Biodiesel | 183.1 | 142.9 |
| DICI DME | 183.1 | 126.6 |
| DICI FT-diesel | 183.1 | 132.9 |

### Process 8: Credit awarded for combustion of various biobased fuels

Reference is made to Appendix 2 to the JEC Report for a complete overview.

| | MJx/MJ fuel | g $CO_2$ equiv./MJ fuel |
|---|---|---|
| Biodiesel | - | -75.4 |
| Ethanol | - | -71.4 |
| Biogas | - | -75.5 |

# Appendix 2 Calculation model

This appendix shows two examples of calculations of greenhouse gas emissions and energy consumption. The applicant must use an equivalent method and present data in the same way in the documentation submitted for R6 and R7. The applicant must make clear which reference data are taken from JEC Well to Wheel and, if applicable, which are taken from other sources (see Appendix 3 for the rules governing the use of reference values).

The data used in the examples are taken from JEC Well to Wheel 2007. The processes refer to those parts of the life cycle that are described in Figure 1 in Appendix 1. Total greenhouse gas emissions and energy consumption can be divided between the phase leading up to the point at which the fuel is ready for filling in the tank of the car (Well to Tank) and the use phase (Tank to Wheel). The Well to Tank data encompass all process stages except process 8. Here, environmental impacts are stated per MJ of fuel. The Tank to Wheel data specify environmental impacts according to distance driven - 100 km for energy consumption and 1 km for greenhouse gas emissions.

MJx refers to the quantity of primary energy.

## Calculation of greenhouse gas emissions and energy consumption for sugar cane ethanol:

The product for which a Swan label is sought is 100% ethanol from Brazilian sugar cane. There is little chance that ethanol originating in Brazil will not contain a small percentage portion of fossil petrol. However, for the sake of simplicity, this is viewed as a pure ethanol product. The ethanol is produced in Brazil and shipped to Europe by tanker.

Process 1: Cultivation of sugar cane

Process 2: Transport of sugar cane from plantation to ethanol plant.

Processes 3 and 4: Not applicable since there is no intermediate stage in the production of ethanol.

Process 5: Production of ethanol.

Process 6: Crediting for by-products, which in this case is heat from the ethanol production process. In this example, for practical reason this is included in process stage 5.

Process 7: Transport and distribution of ethanol.

Process 8: Use of ethanol as fuel in cars.

### Process 1: Raw material production

It should be noted that JEC Well to Tank, Appendix 1 gives energy in MJ of primary energy per MJ output of the individual process. This means that the figures for raw material production are stated as MJ of primary energy per MJ of sugar cane and not per MJ of ethanol.

A combination of data from JEC Well to Tank Appendix 1 and Appendix 2 is used. The following table is taken from Appendix 1:

| Farming process | MJx / MJ sugarcane | g $CO_2$ equiv. / MJ sugarcane |
|---|---|---|
| CaO fertilizer | 0.002 | 0.12 |
| $K_2O$ fertilizer | 0.0019 | 0.12 |
| $P_2O_5$ fertilizer | 0.0012 | 0.08 |
| N fertilizer | 0.0083 | 1.02 |
| Pesticides | 0.0014 | 0.09 |
| Seeding material | 0 | 0 |
| Diesel | 0.0062 | 0.46 |
| Net emissions from field | 0 | 3.24 |
| Total | 0.0211 | 5.13 |

Appendix 1 states that 2.7720 MJ of sugar cane is required to produce 1 MJ of ethanol. By multiplying energy consumption and greenhouse gas emissions by 2.7720 MJ we obtain data stated on the basis of MJ of ethanol. This gives us **0.06 MJ** of primary energy per MJ ethanol and **13.09 g $CO_2$ equivalents** per MJ of ethanol.

### Process 2: Transport of raw materials

Tankers are used to transport the raw material to the ethanol factory. Appendix 2 states the primary energy consumption for shipping sugar cane in Brazil per MJ of ethanol as **0.01 MJ**, whereas greenhouse gas emissions are stated to be **0.85 g $CO_2$ equivalents** per MJ of ethanol.

### Process 5 and 6: Production of fuel – NB: Applicants must provide their own process data for this part of the process

The following table is taken from Appendix 1:

| Conversion process | MJx / MJ ethanol | g $CO_2$ equiv. / MJ ethanol |
|---|---|---|
| Sugarcane | 1.7720 | 0 |
| Credit for surplus heat | -0.1450 | -10,94 |
| $H_2SO_4$ | 0.0019 | 0.09 |
| CaO | 0.0021 | 0.46 |
| Cyclohexane | 0.0003 | 0.01 |
| Total | 1.6313 | -10.37 |

The energy content of the raw material must not be included (the reason for this is discussed in the background document) as a result of which the figures for energy consumption and greenhouse gas emissions are **-0.141 MJ** primary energy per MJ of ethanol and **-10.,37 g $CO_2$ equivalents** per MJ of ethanol, respectively. In other words, the production process provides surplus energy for which credit is given in the calculations.

### Process 7: Transport and distribution

According to Appendix 2, transporting ethanol by tanker from Brazil to Europe (assuming a distance of 5,500 nautical miles) involves energy consumption and greenhouse gas emissions of 0.08 MJ primary energy per MJ of ethanol and 0.99 g $CO_2$ equivalents per MJ of ethanol, respectively. According to Appendix 2, distribution involves energy consumption and greenhouse gas emissions of 0.01 MJ primary energy per MJ of ethanol and 5.82 g $CO_2$ equivalents per MJ of ethanol, respectively. Data on distribution within the national borders of the country in which the fuel is sold must always be taken from JEC Well to Tank Appendix 2. In total, process 6 involves primary energy consumption of **0.09 MJ** per MJ of energy and **6.81 g $CO_2$ equivalents** per MJ of ethanol.

### Process 8: The use of the fuel in cars

According to data taken from NEDC 2002, an average European car (designed to run on ethanol) with an average driving pattern, needs **223.5 MJ** to cover a distance of 100 km. This creates greenhouse gas emissions of 161.3 g $CO_2$ equivalents. According to Appendix 2, 71.4 g $CO_2$ equivalents per MJ of ethanol can be subtracted from this as a credit for the combustion of renewable energy sources. This credit is based on the assumption that all emissions of $CO_2$ and $CH_4$ in the car exhaust will return to the carbon cycle and will in turn be available for absorption in the photosynthesis of plants. On the other hand, when fossil fuels are combusted, large quantities of carbon that have been out of the natural cycle for millions of years are channelled to the carbon cycle. Emissions of $N_2O$ cannot be credited to the fuel.

### Process 1 – 8: Total emissions in the entire production chain

Comparison table for processes 1 – 7:

| | MJx/MJ ethanol | g $CO_2$ equiv./MJ ethanol |
|---|---|---|
| Process 1: Raw material production | 0.06 | 13.09 |
| Process 2: Transport of raw materials | 0.01 | 0.85 |
| Processes 5 an 6: Production of fuel | -0.141 | -10.37 |
| Process 7: Transport and distribution of fuel | 0.09 | 6.81 |
| Credit awarded for combusting renewable energy sources | | -71.4 |
| **Total Well to Tank** | **0.019** | **-61.0** |

The figures in the table above are per MJ of ethanol. The following formulae are used to determine emissions of greenhouse gases and energy consumption for the entire life cycle:

*MJx/100 km* = (*MJ/100km* * Total WtT) + *MJ/100 km*

*g $CO_2$ equiv./km* = ((*MJ/100 km* / 100 km) *Total WtT) + *g $CO_2$ equiv./km*

We know that the car requires 223.5 MJ in order to cover a distance of 100 km. This gives us a total primary energy consumption of:

(223.5 *MJ ethanol /100 km* * 0.019 *MJx/MJ ethanol*) + 223.5 *MJ/100 km* =

**227.5 *MJx/100 km***

Emissions of greenhouse gases during the entire life cycle are:

((223.5 *MJ ethanol/100 km* / 100 km) * - 61.0 *g $CO_2$ equivalents/MJ ethanol* ) + 161.3 *g $CO_2$ equivalents/km* = **25 *g $CO_2$ equivalents/km***

This entails that this product meets the requirements applicable to both emissions of greenhouse gases and energy consumption (R7 and R8). In order to fulfil the Swan criteria for fuel, other requirements must also be fulfilled.

## Calculation of greenhouse gas emissions and energy consumption for RME

The product for which a Swan label is sought is a blended product comprising 80% biodiesel and 20% fossil diesel (energy percentage – for the sake of simplicity). The rapeseed is average European rapeseed, and production of RME takes place within a radius of 50 km and the rapeseed is transported by tanker to the RME plant. For the sake of simplicity, the RME plant conducts all tasks from the pressing of rapeseed oil to the esterification of the refined oil. The biproduct of the production process is glycerine, which is used in the cosmetics industry or for similar purposes. The RME is then transported to Norway in a tanker to a diesel depot and blended with the fossil fraction before distribution to tanking stations.

Process 1: Cultivation of rapeseed

Process 2: Transport of rapeseed from the plantation to the RME plant

Processes 3 and 4: Not applicable since the RME plant encompasses all stages in the production of RME from rapeseed.

Process 5: Production of RME

Process 6: Credit for the by-products, which in this case is rapeseed cake and glycerine (used as chemical). For practical reasons, credit for by-products is given in process 5 above.

Process 7: Transport and distribution of RME, including blending of fossil diesel.

Process 8: Use of RME/diesel as a fuel in a car

### Process1: Raw material production

It should be noted that JEC Well to Tank, Appendix 1 gives energy in MJ of primary energy per MJ output of the individual process. This means that the figures for raw material production are stated as MJ of primary energy per MJ of rapeseed and not per MJ of RME.

A combination of data from JEC Well to Tank Appendix 1 and Appendix 2 is used. The following table is taken from Appendix 1:

| Farming process | MJx / MJ rapeseed | g $CO_2$ equiv. / MJ rapeseed |
|---|---|---|
| CaO fertilizer | 0.0005 | 0.03 |
| $K_2O$ fertilizer | 0.0041 | 0.24 |
| $P_2O_5$ fertilizer | 0.0115 | 0.75 |
| N fertilizer | 0.1001 | 12.35 |
| Pesticides | 0.0047 | 0.30 |
| Seeding material | 0.0006 | 0.02 |
| Diesel | 0.0480 | 3.62 |
| Net emissions from field | 0 | 12.91 |
| Drying (electricity, EU mix) | 0.008 | 0.36 |
| Total | 0.1776 | 30,6 |

According to Appendix 1, 1.712 MJ rapeseed is required in order to product 1 MJ of RME (The figure is found by multiplying the energy in the ingoing raw material in the three tables under process stages 5 and 6 with each other, i.e. 1.6326 * 1.0417 * 1.0065). By multiplying energy consumption and greenhouse gas emissions by 1.712 MJ we get the data stated on the basis of MJ RME. This gives us **0.30 MJ** of primary energy per MJ of RME and **51.92 g $CO_2$ equivalents** per MJ of RME.

### Process 2: Transport of raw materials

Tankers are used to transport raw materials to the RME factory. Appendix 2 gives the primary energy consumption per MJ of RME as **0.02 MJ**, whereas climate gas emissions are **0.30 g $CO_2$ equivalents** per MJ of RME.

### Process 5 and 6: Production of fuel – NB: Applicants must provide their own process data for this part of the process

The following figures are taken from Appendix 1:

| Rapeseed to raw oil | MJx / MJ raw oil | g $CO_2$ equiv. / MJ raw oil |
|---|---|---|
| Rapeseed | 0.6326 | 0 |
| Electricity | 0.238 | 1.07 |
| NG for steam at 90% eff. | 0.50 | 2.99 |
| n-hexane | 0.0036 | 0,27 |
| Credit for rapeseed cake | -0.1155 | -1.89 |
| Total | 0.5945 | 2.44 |

| Raw oil to refined oil | MJx / MJ refined oil | g $CO_2$ equiv. / MJ refined oil |
|---|---|---|
| Crude plant oil | 0.0417 | 0 |
| Electricity | 0.0017 | 0.08 |
| NG for steam at 90% eff. | 0.0103 | 0.2 |
| Total | 0.0537 | 0.70 |

| Refined oil to RME | MJx / MJ RME | g $CO_2$ equiv. / MJ RME |
|---|---|---|
| Refined oil | 0.0065 | 0 |
| Electricity | 0.0082 | 0.37 |
| Methanol | 0.0969 | 5.81 |
| NG for steam at 90% eff. | 0.0464 | 2.78 |
| Various other chemicals | 0.103 | 0.14 |
| Credit for glycerine as a chemical | -0.0591 | -6.16 |
| Glycerine purification | 0.0439 | 2.63 |
| Total | 0.1531 | 5.56 |

In the tables above, environmental impacts are stated according to MJ of product and they must therefore be converted so that all are stated as MJx/MJ RME. The following is required in order to produce 1 MJ of RME:

1.0417 MJ raw oil/MJ refined oil * 1.0065 MJ refined oil /MJ RME =

1.048 MJ raw oil/ MJ RME

We also know that we need 1.0065 MJ of refined oil/MJ of RME. This gives us the following table and the total environmental impacts associated with the production of RME from rapeseed:

| **Rapeseed to RME** | **MJx / MJ RME** | **g $CO_2$ equiv. / MJ RME** |
|---|---|---|
| Rapeseed to raw oil | 0.624 | 2.56 |
| Raw oil to refined oil | 0.055 | 0.704 |
| Refined oil to RME | 0.1531 | 5,56 |
| **Total** | **0.84** | **8.82** |

The energy content of the raw material is not included (the reason for this is given in the background document) and accordingly the figures for energy consumption and greenhouse gas emissions are **0.128 MJ** of primary energy per MJ of RME and **8.82 g $CO_2$ equivalents** per MJ of RME, respectively.

### Process 7: Transport and distribution

According to Appendix 2, transport of RME to the diesel depot (assuming a distance of 150 km), the blending of diesel, tanker to filling station and filling station contribute environmental impacts equivalent to **0.02 MJ** of primary energy and **1.26 g $CO_2$ equivalents** per MJ of fuel produced.

### Process 8: The use of the fuel in cars

According to data taken from NEDC 2002, an average European car (designed to run on biofuel) with an average driving pattern, needs 183.1**223.5 MJ** to cover a distance of 100 km.If this car operates on 100% biodiesel, the greenhouse gas emissions during the driving phase will be 143.9 g $CO_2$ equivalent/km, whereas the equivalent figure for 100% pure fossil diesel is 137.9 g of $CO_2$ equivalents/km. By weighting in proportion to the blending ratio, we get a greenhouse gas emission of **142.k7 g $CO_2$ equivalents/km**. According to Appendix 2, 74.4 g $CO_2$ equivalents per MJ of RME can be subtracted from this as a credit for the combustion of renewable energy sources. This credit is based on the assumption that all emissions of $CO_2$ and $CH_4$ in the car exhaust will return to the carbon cycle and will in turn be available for absorption in the photosynthesis of plants. On the other hand, when fossil fuels are combusted, large quantities of carbon that have been out of the natural cycle for millions of years are channelled to the carbon cycle. Emissions of $N_2O$ cannot be credited to the fuel.

**Processes 1 – 8: Total emissions for the production chain as a whole**

Comparison table for processes 1 – 6 for RME production:

| **Well to Tank** | **MJx/MJ RME** | **g $CO_2$ equiv./MJ RME** |
|---|---|---|
| Process 1: Raw material production | 0.30 | 51.92 |
| Process 2: Transport of raw materials | 0.02 | 0.30 |
| Processes 5 and 6: Production of fuel | 0.128 | 8,82 |
| Process 7: Transport and distribution of fuel | 0.02 | 1.6 |
| Credit for combustion of renewable energy source | | -75.4 |
| **Total** | **0,468** | **-13.1** |

According to Appendix 1, the environmental impacts associated with diesel production is 0.160 MJ of primary energy and 14.3 g $CO_2$ equivalents per MJ of diesel produced.

By weighting the environmental impacts of fossil diesel and of RME, we get the following values for the finished fuel:

(0.468 * 0,8) *MJx/MJ product* + (0.160 * 0,2) *MJx/MJ product* =

0.406 *MJx/MJ product*

(-13.1 * 0.,8) *g $CO_2$ equiv./MJ product* + (14.3 * 0.2) *g $CO_2$ equiv./MJ product* =

- 7.62 *g $CO_2$ equiv./MJ product*

For the life cycle as a whole (WtW) the environmental impacts are:

*MJx/100 km* = (*MJ/100km* * Total WtT) + *MJ/100 km*

*g $CO_2$ equiv./km* = ((*MJ/100 km* / 100 km) *Total WtT) + *g $CO_2$ equiv./km*

We know that the car needs 183.1 MJ to cover a distance of 100 km. This makes for a total primary energy consumption of:

(183.1 *MJ product/100 km* * 0.406 *MJx/MJ product*) + 183.1 *MJ/100 km* =

**257.4 *MJx/100 km***

Emissions of greenhouse gases for the life cycle as a whole are:

((183.1 *MJ product/100 km* / 100 km) * - 7.62 *g $CO_2$ equivalents/MJ product* ) + 142.7 *g $CO_2$ equivalents/km* = **128.7 *g $CO_2$ equivalents/km***

This entails that this product fulfils neither the requirements as to emissions of greenhouse gases nor those applicable to energy consumption (R7 and R8).

## Appendix 3 Rules governing the use of reference values

Please see JEC Well to Wheel 2007 or later versions for a complete list of reference values - http://iec.jrc.cec.eu.int/. Applicants must themselves determine any data not provided in this report. Applicants must ensure that data that they obtain themselves is in accordance with the calculation model described in JEC Well to Wheel.

Parts of the production chain for which reference values must be used:

- Data for transport/distribution of finished product.
- Data on energy consumption relating to distance driven of 100 km taken from NEDC 2002.
- Data for credit for combusting renewable energy sources.

Parts of the production chain for which reference values may be used:

- Production of any fossil fraction
- Production of raw materials/semi-manufactures
- Transport of raw materials/semi-manufactures to the applicant's production site
- Credit for production of by-products
- Emissions of greenhouse gases and primary energy consumption associated with various energy sources

Parts of production for which reference values must not be used:

- Applicant's own parts of the production chain

Life cycle analyses showing greenhouse gas emissions and energy consumption related to the product for which a Swan label is sought may be used if a competent and independent third party certifies that the calculation methods applied are in accordance with JEC Well to Wheel.

# Appendix 4 Guidelines for the certification of biomass

Certified biomass in ecolabelled products must be certified by a third party in accordance with a valid standard for biomass production that fulfils the requirements applicable to standards and certification systems. The following requirements apply to standards, certification systems and certification bodies acceptable to Nordic Ecolabelling.

### Standards:

1. The standard must balance economic, ecological and social interests and comply with the UN's Rio document: Agenda 21 and the Forestry Principles and respect international conventions and agreements.
2. The standard must contain absolute requirements and promote and work towards sustainable production of biomass. The standard must ensure that production does not lead to a negative carbon balance.
3. The standard must be generally available. The standard must be defeloped in an open process in which economic ecological and social interests have been invited to participate.

### Certification systems:

The certification system must be transparent, enjoy broad and national or international credibility and be capable of verifying that the requirements of the standard (see above) have been fulfilled.

### Certification bodies:

The certification body must be impartial, credible and capable of verifying that the requirements of the standard have been fulfilled, be able to communicate the result and ensure the efficient implementation of the standard.

### Documentation:

- Copy of the standard, name, address and telephone number of the organisation that formulated the standard and the final report of the certification body.
- References must be provided to persons representing parties and interest groupings invited to participate in the development of the standard.
- The ecolabelling organisation has the right to require further documentation in order to assess whether the requirements applicable to the standard and the certification system have been met.

## Appendix 5 Requirements applicable to test / analysis laboratory

Sampling must be conducted in a qualified manner. The test/analysis laboratory must be impartial and competent. Raw data must be available for verification by the ecolabelling organisation during the period of validity of the licence.

The test/analysis laboratory must fulfil the general requirements provided for in the standard EN 45001/DS/EN/ISO/IEC 17025 or have official GLP approval. The applicant is responsible for the cost of documentation and analysis.

The producer's test/analysis laboratory may be approved for the perform of analyses and tests if the authorities monitor the procedures used for sampling and analysis or if the producer has a quality system encompassing sampling and analysis and certified to ISO9001 or ISO9002.

# Appendix 6 Form A Documentation of ingoing and outgoing material flows (R2 og R4)

In the following, the applicant must provide an account of the materials (raw materials, chemical additives and process chemicals) used in the production of the fuel (the conversion of raw materials to fuel) and the products that are formed (including bioproducts). If the applicant is a processor/distributor of the finished fuel, this form must be completed and signed by the producer of the fuel. Energy consumption must be accounted for in Form B.

Documentation of ingoing and outgoing material flows:

- Completed tables for ingoing raw materials, chemical additives, process chemicals and produced products.
- Complete formula for the fuel for which a Swan label is applied.
- Basis for invoicing or equivalent documentation confirming the stated figures.

All quantities stated in the tables below must refer to the following unit for the product tonnes/MJ/$m^3$):_____

**Raw materials:**

| Raw material | Supplier | Quantity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**Process chemicals:**

| Chemical | Supplier | Quantity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**Chemical additives:**

| Chemical | Supplier | Quantity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**Products:**

| Products and by-products | Purchaser / recipient | Quantity |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

_____ _____

Place and date Company

_____ _____

Contact person Telephone number

## Appendix 6 Form B Documentation of energy consumption in the production of the fuel (R3)

In the following, the applicant must account for the energy sources and quantities of energy used in production of the fuel (conversion from raw material to fuel). If the applicant is a processor/distributor of the finished fuel, this form must be completed and signed by the producer of the fuel.

For documenting energy consumption in the production of the fuel:

- Completed table showing the energy sources used in the production and the energy requirements met by the various sources of energy.
- Basis for invoicing or equivalent documentation confirming the stated figures.

All quantities stated in the tables below must refer to the following unit for the product tonnes/MJ/$m^3$):_____

| Energy source | Energy consumption (MJ/kg/$m^3$) |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

_____ _____

Date and place Company

_____ _____

Contact person Telephone No.

## Appendix 6 Form C Documentation of transport of raw materials/semi-manufactures (R5)

In the following, the applicant must account for all the transport stages in the production of the chain – except the distribution of the finished fuel (the final transport stage). This form may be completed by the applicant irrespective of whether the applicant is the producer of the fuel or the processor/distributor.

For documenting transport of raw materials and products:

- Completed table showing the forms of transport used for shipping raw materials/semi-manufactures and the transport distances involved.

| Product | From | To | Means of transport |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

_____ _____

Date and place Company

## Appendix 6 Form D Documentation of vegetable raw materials (R8 and R11)

The form must be completed by the producer/supplier of the raw materials.

Producer/supplier: _____

Product: _____

For documenting vegetable raw materials:

- Supplier data (name and owner of forest/crop), Latin name of plant and geographical origin (country, state and region/municipality/province and address of forest/crop) – applies to R8.

For documenting wood raw materials, palm oil, sugar cane and soy, in particular:

- Copy of certificate for biomass certification – applies to R11.
- Proportion (%) of certified biomass in the product – applies to R11.

If several products are purchased from the same supplier, the following table may be used:

| Supplier or | Product | Geographical origin | Standard for certification | Proportion (%) certified in biomass products |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Signature of supplier

_____ _____

Date Company

_____ _____

Contact person Telephone No.

## Appendix 6 Form E Documentation of animal raw materials (R9)

The form must be completed by the producer/supplier of the raw materials.

Producer/supplier: _____

Product: _____

For documenting animal raw materials:

- Data on supplier (name and owner of the product) and origin of the product (source of material and geographical origin) – applies to R9.

If several products are purchased from the same supplier, the following table may be used:

| Supplier | Product | Origin |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |

Does the product consist only of second and third category materials in accordance with the Animal By-product Regulations (EC 1774/2002)? _Yes _No

Does the raw material contain organic materials from species listed on the IUCN's Red List of Threatened Species?. _Yes _No

Signature of supplier:

_____ _____

Date Company

_____ _____

Contact person Telephone No.

## Appendix 6 Form F Declaration that the requirements of the authorities have been fulfilled (R15)

It is hereby certified that the applicant fulfils all the applicable provisions governing safety, working environment, environmental legislation and that plant-specific conditions/licences are adhered to at all sites at which the Swan-labelled product is produced.

Information on the local regulatory authority responsible for following up the applicant's production: _____

_____ _____

Date and place Company

_____ _____

Contact person Telephone No.

## Appendix 6 Form G Certification of fulfilment of the marketing requirements (R22)

We hereby certify that we are familiar with the rules governing the use of the Nordic Ecolabel, the Swan, as provided for in “Rules on Nordic Ecolabelling” and we undertake to market the Swan-labelled fuel in accordance with these rules.

We also confirm that we are familiar with the contents of the criteria for the Swan labelling of fuel.

We hereby undertake that the personnel at our company responsible for marketing the Swan-labelled fuel will be informed about the criteria governing the Swan-labelling of fuel and “Rules on Nordic Ecolabelling”.

| | |
|---|---|
| Place/date | Company |
| Contact person | Telephone No. |
| Marketing manager | Telephone |

In the event of changes in personnel, a new certification must be submitted to the ecolabelling organisation.