



**Ecolabelling
of
Closed Toilet Systems**

**Criteria document
9 April 1997 - 8 July 2005**

Version 2.4

This is a translation of the criteria document in Norwegian. In any case of dispute, the original document should be taken as authoritative

Joint Nordic ecolabelling

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

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

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

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

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

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

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Nordic Ecolabelling of Closed Toilet Systems

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1 Summary

Closed toilet systems are toilets that are not required to be connected to a drainage system or systems for retrieving faeces and urine.

The product group encompasses closed toilet systems that require an electrical power supply and also those that do not require such a supply. The end product should be utilizable as a means of soil improvement.

It is principally toilet systems based on processes of biodegradation that will satisfy the requirements. Urine separating closets are not yet included in the product group.

General requirements:

Products for which ECO labelling is being sought must comply with all relevant provisions in national regulations.

Specific requirements:

Materials: The criteria contain requirements as regards additives to plastics and the manufacture of insulation materials.

Design and durability: The design and durability of the toilets must be tested. The toilet must have a five years warranty.

Capacity: The toilet must have a capacity of at least 4 p.e.

Energy effect Power supply must not exceed 320 W.

Additives: Use of the toilet must not necessitate the use of chemicals harmful to health or the environment.

Discharge of liquids: Uncontrolled discharges of liquid from the toilet are not permitted. Surplus liquid must be channelled to the internal or an external container, or satisfy the requirements specified for end products.

The end product: Degraded waste from the toilet must satisfy the requirements laid down for dry solids content, thermotolerant coliform bacteria, pH, C/N ratio, odour, consistency and N-content.

Qualities in use: Functioning of the toilet systems must be tested for in accordance with specified test methods.

Instructions for use: Requirements are laid down for the contents of instructions for use, assembly and installation instructions and marketing material.

Testing and control

Closed toilet systems for which an ecolabel is sought must be tested in terms of design/durability and function. In testing functionality manufacturers who have sold over 50 units which have been in operation for over 2 years may choose between a field test or a laboratory test. All others must undergo a laboratory test.

2 Delimitation/definition of the product group

The product group encompasses closed toilet systems that require an electrical power supply and also those that do not require such a supply. Closed toilet systems are toilets that are not required to be connected to a drainage system or systems for retrieving faeces and urine. The end product should be utilizable as a means of soil improvement.

Closed toilet systems must include common or separate containers for the reception of urine and faeces. If the waste is to be composted externally, external compost containers must also be included in the system. Composting externally means that the compost/waste can be transported from an internal container to an external compostbin for final composting.

Toilets requiring a supply of water as a means of transporting urine and faeces (water toilets) are not included in this product group. It is principally toilet systems based on processes of biodegradation that will satisfy the requirements.

In earlier versions of the criteria urine separating closets were included in the product group. Urine separating closets have been withdrawn from the product group in this version of the criteria. New knowledge and experience in the use of urine separating closets has shown that previous requirements were not sufficient to secure efficient operation and low environmental impact.

The ecolabel may be applied for by either the manufacturer or the importer.

3 Markets, materials and components in closed toilet systems

There are no statistics detailing the sales of closed toilet systems in the Nordic countries. At an estimate 6-7,000 biological toilets (toilets without discharges of liquids, based solely on biodegradation) are sold in the Nordic countries. This figure can be increased to 15-20,000 if a broader definition is applied (toilets largely utilizing biodegradation).

Closed toilets are generally used where there is no sewage system available, usually in holiday homes or all year-round homes in sparsely populated areas.

Closed toilets may in principle encompass all types of toilets that do not utilize water as a means of transporting urine and faeces. This might for example include biological toilets (composting toilets), toilets utilizing external composting, drying toilets, packaging toilets, chemical toilets and combustion toilets. These toilets operate in accordance with different principles and the environmental impact may vary considerably from type to type. Environmental criteria (i.e.

section 5.1 to 5.9 in the criteria document) exclude toilet types that are unacceptable from an environmental viewpoint.

Some toilets, for example combustion and drying toilets, require an electrical power supply in order to function. Others, such as the biological toilets, function both with or without a supply of energy. Toilets with heating elements and fans, however, may have greater capacity - in some cases considerably greater capacity - than non-electrical equipment.

Plastics and metals are the dominant materials used in closed toilet systems.

1. The containers may comprise the following materials:
 - Glass fibre reinforced polyester
 - Polyethylene
 - Acrylonitrile/butadiene/styrene plastic
 - Stainless steel
2. The bowl and the seat are made of porcelain, plastic or wood.
3. Fans, motors, heating elements etc. are made of miscellaneous metals and plastics.
4. External containers are made of plastic or wood.

Toilet systems have a long useful life. Their materials and design must therefore comply with strict quality requirements. The materials must resist corrosion and be able to withstand external strains during transportation, installation and use. Leaks may result in considerable impact on the environment, a danger of contamination and annoy the user. The toilet bowl must also be easy to keep clean, i.e. its surface must be even and scratch-resistant, and its design must be such that contact contagion is avoided.

4 Environmental impact and the ecological qualities of the products

Unlike traditional water toilets which are designed to receive and remove waste materials, a number of functions may be ascribed to closed toilet systems:

- receiving faeces and urine and possibly food waste
- storing the waste until emptying at a later point in time
- reducing odour while the toilet is in use
- stabilizing the waste so that emptying and further processing may take place under conditions that are aesthetically, hygienically and environmentally acceptable
- sanitizing the waste by breaking down organisms that may cause disease
- preserving the value of the waste as an agent of soil improvement
- preventing pollution by for example stopping discharges into the earth and water and limiting discharges into the air.

Although the choice of materials and the consumption of energy and resources will have an effect on the environmental impact of closed toilet systems, the primary environmental effect of the toilets is related to their use and the processing of waste materials.

The environmental impact of the materials is largely related to the production and processing of plastics. The environmental impact of plastics will also vary depending on the additives used in the plastic. The requirements made on materials coincide with the requirements contained in other criteria documents in the environmental labelling scheme.

Closed toilet systems discharge far lower quantities of nutritional salts and organic materials than normal water toilets. Nevertheless, closed toilet systems may have an environmental impact. This impact will largely be related to the emptying of the toilets and the disposal of the waste materials. Hygiene problems may for example arise when infectious materials in the form of liquids or poorly composted solids are discharged into the ground, or handled unhygienically. Unpleasant odour and insects may also be a problem. During transportation there will also be a risk of leaks. Some types of toilets require chemicals to be added in order to prevent contagion and unpleasant odour. This may have an impact on the eco system. A toilet that is not functioning or that has a leak may also involve a considerable impact on the environment and be unhygienic. It is therefore considered important that the design and functionality of the toilets are tested in accordance with a specified test method.

The work on the criteria has been approached from the perspective of the products lifecycle. The end product from the toilets may represent a valuable resource as a fertilizer and soil improvement agent and its nutrients should be exploited and returned to nature. To take advantage of this potential and to prevent the waste materials from imposing a strain on the environment it is important for the end product to satisfy sanitary requirements and to be of a consistency that makes it easy and practical to handle. The criteria are designed to as far as possible close the cycle, and to minimize the need for transportation of the end product.

The objective of ecolabelling closed toilet systems is to label products which have the lowest possible impact on the environment and which allow the waste material to be returned to the natural cycle.

The objectives for ecolabelling closed toilet systems

- * To minimize waste discharges while the product is in use and to facilitate the return of the end product to the natural cycle.

5 Criteria for the ecolabelling of closed toilet systems

The criteria are divided into two categories, both of which must be fulfilled.

- Requirements as to the toilet's materials, design and functionality
- Requirements as to the end product

5.1 Materials

Plastics must not contain additives based on lead, cadmium, mercury, tin and their compounds, chlorinated/brominated paraffins, brominated diphenyl ethers, or phthalates.

The production of insulation materials must not involve gases classified in any Nordic country as dangerous to the ozone layer.

5.2 Design and durability

The design and durability of the toilets must be tested for tightness, impact resistance, rigidity, flammability and strength of materials, wear and construction in accordance with the testing closed toilet systems described in the enclosure (Part 1, Section 4).

The toilet systems must be issued with five year warranty. The warranty requirement will not apply to parts exposed to heavy wear. Such parts must be defined in the instructions for use and must be available throughout the warranty period. Parts that are exposed to wear must be easy to replace.

The manufacturer must guarantee that materials and design are able to with stand temperatures of between -30°C and +40°C and that the contents of the containers freeze. This information must be stated clearly on the warranty.

5.3 Capacity

The total capacity for toilets is specified for one year's use and must be at least 4.0 p.e. (population equivalent).

If the toilet system utilizes external composting, the volume capacity of external compost containers must be sufficient for one year's use.

The capacity is defined as the lower of the capacity limits calculated for either solids or liquid. Applicants must define the capacity for which the toilet system is to be tested.

5.4 Energy consumption

Power supply must not exceed 320 W.

5.5 Non-permitted additives

Use of the toilet must not require the addition of:

- chemical substances or chemical products classified as a health risk (highly toxic, toxic, hazardous to health, corrosive, allergenic, carcinogenic, harmful to the reproductive system, genetically harmful), harmful to the environment, flammable, highly flammable in accordance with regulations in Denmark, Finland, Iceland, Norway or Sweden with exception of products classified as irritant (Xi) or in accordance with the Swedish "Läs varningsteksten".

- chemical substances classified as harmful to the environment in accordance with regulations in force in Denmark, Finland, Iceland, Norway, Sweden or in accordance with the EU's Directive 67/548 (with amendments and corrections).

5.6 Discharge of liquid

If there is a risk of uncontrolled seepage, the toilet must be equipped with an appropriate fluid level indicator and draining facility. Controlled drainage of fluid into an external fluid container is permitted.

Surplus fluid must be channelled to an internal compost container or to an external compost container. The rechannelling of surplus fluid to the internal compost container must proceed without manual operations.

The manufacturer must provide a description of the way in which surplus fluid is to be handled. The description must be included in the instructions for use and must also be utilized in function testing of the toilet.

5.7 The end product

The end product must be tested and must fulfil the requirements for its contents of dry solids, thermotolerant coliform bacteria (TCB), pH, odour, consistency and N-content in accordance with the Method testing closed toilet systems described in the enclosure (Part 2, Section 6).

5.8 Qualities

The functionality of the toilet systems must be tested in accordance with the Method testing closed toilet systems described in the enclosure.

Alternatively, if documentation can be furnished of sales of at least 50 units which have been in operation for at least 2 years, the manufacturer may instead choose to perform a field test in accordance with the Method testing closed toilet systems, see enclosure (Part 2, Section 5.3 and 5.4)

The maintenance and emptying required must be such that they can be performed by most users. These procedures must not entail the soiling of people or the environment.

5.9 Instructions for assembly, installation and use

Instructions for use in the language of the country in question must be enclosed with the toilet system. The following instructions must be compiled: Instructions for assembly, instructions for installation and instructions for correct use and operation.

The instructions must specify that the requirements as to materials and function have been satisfied, subject to the condition that the instructions for assembly, use and maintenance are followed.

National languages must be used in the instructions. Related languages may be used in exceptional cases, provided that expressions etc. that might be difficult to understand are not used.

5.9.1 Assembly

Illustrated instructions for assembly and installation must be included with the toilet. The assembly instructions must contain a list of all parts and a breakdown of those parts that experience has shown are exposed to wear. The instructions must show how the individual parts of the toilet are to be put together and what tools are necessary for assembly.

5.9.2 Installation

The installation instructions must show how it is intended that the toilet including the ventilation system and any devices for emergency discharges of liquid should be installed in buildings. The ventilation must be over the roof ridge or in a way that satisfies the requirement to working conditions and that do not lead to odour problems

The ventilation system must ensure that air is not drawn up from the toilet system into the room in which the toilet is placed. The ventilation system must be described and arrows must be used to illustrate the airflow.

The space required around the toilet for maintenance and repairs must be indicated, as must any requirements as regards ventilation, heating and, if appropriate, emergency drainage in the room in which the toilet is to be installed. If the toilet requires insulation the instructions must specify the type and quantity of insulation required in various types of installation.

The instructions must specify which areas of the installation work that must be performed by an authorized technician.

5.9.3 Instructions for use

The instructions for use must contain the following information: Type designation, manufacturer, importer/supplier, type number/year, area of use, capacity and energy consumption, ecolabel, warranty and fulfilment of requirements.

The instructions for use must contain a description of the principles governing the operation of the toilet and the preconditions required for satisfactory operations as regards composting, the addition and quality of pellets (e.g bark), remains of food recommended composting time, procedures for processing excess liquid, care, regular maintenance, use of tools if appropriate and emptying. Details must also be given as to how the end product is to be processed and used.

The instructions for use must contain a guide to trouble-shooting.

The instructions for use must specify what maintenance will be required.

The instructions for use must also specify the number of times the internal container must be emptied per year at maximum capacity and the weight of the

container at time of emptying if the container has to be moved to carry out the emptying procedure.

5.10 Marketing material

Marketing material must provide details of the capacity of and space required for the toilet system, a description of the principles governing the operations of the toilet and the preconditions for satisfactory operations as regards composting, if appropriate the addition of pellets and food waste, the required maintenance, emptying and processing and use of the end product.

Requirements concerning dimensioning of containers must be specified if the toilet systems are to be used in a cold climate. Marketing material must provide details on the number of times the internal containers must be emptied in the course of a year at maximum capacity, and the weight of the container at time of emptying if the container has to be moved to carry out the emptying procedure.

Costs relating to any addition of pellets and energy consumption per annum and at maximum capacity are to be calculated and stated in the marketing material.

6. Other requirements as regards ecolabelled products

6.1 Requirements by the authorities as regards safety, the working environment and the outside environment

The holder of an ecolabelling licence is responsible for ensuring that ecolabelled products and the production of such products fulfil all prevailing provisions concerning the working environment, as well as legislation and concessions, in the respective countries of manufacture.

Manufacturers or importers of ecolabelled products must ensure that national provisions, legislation and licences prevailing recycling schemes for products and packaging must be fulfilled in the Nordic countries where the products are on sale.

6.2 Eco and quality assurance

Using documented procedures and instruction manufacturers holding ecolabelling licences themselves or through vendors/importers must:

- Ensure that the requirements in the ecolabelling criteria are fulfilled.
- Secure the level of quality of ecolabelled products included in the licence so that they continue to comply with submitted information.
- Provide an account of the way in which the Eco assurance is structured to guarantee that the requirements in the ecolabelling criteria and environmental legislation are fulfilled.
- Ensure that the internal control procedures are coordinated by a contact person.

6.3 Marketing

The licence applicant shall provide an account of:

- The distribution of responsibility within the marketing function as regards the principles of ecolabelling and the conditions contained in "Regulations for Nordic Ecolabelling".

7. Analyses and control

Sampling must be performed in a competent manner. The laboratory/test institution must be impartial and competent. The unprocessed data must be available for verification by the ecolabelling organization.

The laboratory performing the analysis must fulfil the general requirements contained in standard EN 45001, ISO-IEC guide 25 or is an official GLP approved laboratory. The applicant will be liable for cost in connection with documentation and analysis. Logbooks shall be available for control from the ecolabelling organization

The product for which an licence has been granted may be checked by impartial test institutions. Responsibility for submitting products for control rests with the ecolabelling body. Controls may take the form of a random sample at the retail trade stage. The control will apply to a single closet randomly selected by an impartial body. If the product does not fulfil the requirement a further two randomly selected closets will be tested. If both these closets fail to fulfil the requirements the ecolabelling licence may be revoked. If so, the licence holder will bear the cost of testing. These costs will be borne by the ecolabelling body if the products fulfil all requirements.

Testing shall proceed in accordance with Section 7.1. The test institution must inform the manufacturer of the progress of the test and notify the manufacturer if it is probable that the closet will not pass the test.

7.1 Test method

7.1.2 Testing of durability and function.

Testing to verify that the requirements contained in sections 5.2 - 5.8 have been fulfilled must be performed in accordance with the Method testing closed toilet systems described in the enclosure.

The manufacturer must also state the air extraction (m³/hour) required in the building regulations.

7.1.3 Testing of substances in chemical products

If use of the toilet requires chemical additives the applicant must submit documentation on all ingoing substances of the product in accordance with the following test methods.

Biodegradability, aerobic

Biodegradability should be determined in accordance with test method 301 (A - F), in OECD guidelines for testing of chemicals, (ISBN 92-64-1222144) or other equivalent methods.

Bioaccumulation

If a substance solubility in n-octanol is at least 1000 times greater than in water ($\log P_{ow} > 3$) the substance will be considered as potentially bioaccumulative, unless otherwise demonstrated (OECD test method 107 or 117). The bioaccumulation of a substance of this type can be tested on fish in accordance with OECD test method 305 A-E. If the biological concentration factor (BCF) is 100 or more, the substance will be deemed to be bioaccumulative.

Ecotoxicity

For ecotoxicity test method no 201, 202 and 203 in the OECD guidelines for testing of chemicals or other equivalent methods should be used.

Scientific references from the literature may be used to demonstrate that the ingoing components of a product fulfil the requirements that have been imposed.

8 Application

The application for an ecolabelling licence must be completed in accordance with "Regulations for Nordic Ecolabelling of Products" on the requisite form. All information revealed in the application will be treated confidentially. The following documentation must be submitted together with the application:

- i The trade mark/trade name and type designation of the product.
- ii Annual financial turnover in the Nordic countries for which a licence is sought.

The number of units sold per year in the various Nordic countries

- iii The production technology utilized in manufacturing

A technical description of the product, including specification of the materials used in the product (Section 5.1 and appendix 1 and 2), its capacity (Section 5.3), energy consumption (Section 5.4), any additives used (Section 5.5) and discharges of liquids (Section 5.6).

The production technology used in the production and the processing of waste water and gaseous discharges into air.

- iv The manufacturer must provide a list of production chemicals utilized, and their quantities, giving trade names and suppliers. All production chemicals must be specified with unambiguous designation of their content (e.g. CAS-numbers) and quantities from the chemical supplier
- v Complete testreport in accordance with section 7.1.1. The test report shall state that the requirements in accordance with section 5.2 - 5.8 are fulfilled. All primary measurement data must be enclosed with the test report and it

must also contain a description of the test, showing that the test institution has completed the required tests.

- If use of the toilet requires chemical additives (section 5.5) complete documentation of chemical additives in accordance with Section 7.1.2.
 - Complete receipt where all relevant substances are specified with cas-no (if available)
 - Test result for all components in the product, i.e. data sheets for ingoing components. The datasheet must contain ecotoxicity data - testmethod and test result concerning biodegradability, bioaccumulation and toxicity.
 - Statement from suppliers of plastic and insulation materials guaranteeing that the requirements in Section 5.1 have been fulfilled. Appendix 1 and 2.
 - Instructions for assembly, installation and use, marketing material, and warranty, cf. Sections 5.2, 5.9 and 5.10.
- vi Description of quality and eco assurance containing:
- organisation, contact person and other persons responsible stating their areas of responsibility
 - monitoring procedures
 - journal recording
 - procedures for handling deviations from the ecolabelling requirements and procedures for informing the contact person
 - procedures for reporting changes in production that have an effect on assessment pursuant to the ecolabelling requirements and procedures for informing the contact person
 - the contact person's procedures for reporting to the ecolabelling organisation.
- vii Marketing
- A description of the marketing shall contain:
- Declaration that the persons marketing the ecolabelled products within our company are familiar with "Regulations for Nordic Ecolabelling of Products". (Appendix 3)
 - Description of the distribution of responsibility with regard to the marketing of ecolabelled products

After a licence has been granted to a product, the licensee needs an acceptance from the ecolabelling organization before any changes can be carried out that may have an effect on factors regulated in this criteria document (ie changes in raw materials, chemical components, production methods or treatment methods).

9 The design of the ecolabel

The ecolabel and the allocated ID number (shown as 000-000) shall have the following design:



The environmental label shall be displayed on the product and on the packaging.

10 The validity of the criteria document

This criteria document was adopted by the Nordic Ecolabelling Board on 9 April 1997 and is valid until 8 April 2005.

On 4 March 1999, the Nordic Ecolabelling Board decided to prolong the criteria document with 3 months, until 8 July 2000, version 2.1.

On 14 June 1999, the Nordic Ecolabelling Board adopted some alterations in the criteria document and to prolong the criteria document with 2 years, until 8 July 2002, version 2.2.

On 6 June 2001, the Nordic Ecolabelling Board decided to prolong the criteria document with 2 years, until 8 July 2004, version 2.3.

On 19 March 2003, the Nordic Ecolabelling Board decided to prolong the criteria document with 1 year, until 8 July 2005, version 2.4. The Nordic Ecolabelling Board is required, at least 12 months prior to this date, to give notice of which criteria will apply thereafter.

11 Future criteria

The criteria may during the period of validity or at the next revision be extended with criteria for urine separating closets.

Information on environmental harmful compounds in plastic materials

Type of plastic
Manufacturer

Contains plastic/additives based on

Lead or lead compounds	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Cadmium or cadmium compounds	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Mercury or mercury compounds	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Tin or tin compounds	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Chlorinated/brominated paraffins	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Brominated diphenyl ethers	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Phtalates	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know

Manufacturers signature

.....
Date

.....
Name of Company

.....
Contact person

.....
Telephone

Information on environmental harmful compounds in insulation materials

Type of insulation materials
Manufacturer

Did the production of insulation material involve the use of gases classified in the regulations or directives of any Nordic country as harmful to the ozone layer in the stratosphere?

Yes

No

Don't know

Manufacturers signature

.....
Date

.....
Name of Company

.....
Contact person

.....
Telephone

Appendix 3

The marketing of the ecolabelled products for which a licence is sought

We hereby confirm that we are aware of the rules governing the rules of the Nordic ecolabel as described in " Regulations for Nordic Ecolabelling of Products ".

We hereby undertake that the marketing of the product will comply with these regulations.

We also confirm that we are familiar with the criteria for the ecolabelling of Closed toilets systems

We undertake to ensure that the persons marketing the ecolabelled products within our company receive information on the criteria governing the ecolabelling of Closed toilets systems and "Regulations for Nordic Ecolabelling of Products".

.....
Place/date	Name of company
.....
Contact	Telephone
.....
Person responsible for marketing	Telephone

A new confirmation must be submitted to the ecolabelling organization in the event of changes in the personnel.

Testmethod for

Closed Toilet Systems

14 June 1999

Nordic Ecolabelling

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Appendix 1: Map over climatic zones in the Nordic countries

Appendix 2: Interview form for field test

1. Introduction

Closed toilet systems for which an ecolabel is sought must be tested in terms of design/durability and function. For testing operation/function manufacturers who have sold over 50 units, which have been in operation for over two years, may choose between a field test or a laboratory test. All others must undergo laboratory testing.

Testing materials and construction

Design and durability must be tested in a laboratory. This includes testing whether the containers is tight, whether it is able to withstand impact (which is important during, for example, transportation), and whether the mixing mechanism and other mechanical devices are able to withstand wear. All toilets must undergo this test. Nevertheless an exception has been made for toilets which have previously been approved in accordance with the Nordic quality norms for biological toilets (where JORDFORSK functioned as the test/consultative body) or by the National Sanitation Foundation (N.S.F.) in the United States. Nevertheless these must undergo testing of deformation of the toilet pan. This is a new test requirement

The function test

The function test is a test of whether the toilet systems can be expected to function in practice. The laboratory test is designed for toilets both with and without a power supply.

At the request of The Norwegian Foundation for Environmental Labelling JORDFORSK has compiled a test for biological toilets.

With effect from 1995 onwards, the Nordic ecolabelling system functions as the official quality norm for closed toilet systems.

2. General preconditions for testing

2.1 Location and assembly

This section encompasses the laboratory testing of materials and construction and the laboratory testing of function.

The test premises must not be open to unauthorized third parties.

The toilets (main units) must be assembled in accordance with their assembly instructions. The test body may require the applicant to assemble the toilet. All parts of the toilet that have a bearing on its functioning must be assembled by the applicant or in accordance with written instructions accompanying the test object.

The toilet must be installed in climatic chamber at the laboratory. The ventilation duct of the toilet must be connected to the laboratory's ventilation system by means of a vertical duct (min. 1 metre). Extracted air must be measured and adapted to the documented volume of extracted air. The documentation requirement applies to equipment intended for mains voltage (220/230 V), solar cells (12/24 V), solar collectors and other mechanical components.

On toilets with natural extraction the quantity of air extracted through the extraction pipe will be standardized at $10 \pm 3 \text{ m}^3$ per hour. The air quantity must be cross-checked after the start of the test by means of a hotwire anemometer at at least six measurement points.

2.2 Technical equipment required in the laboratory

The test laboratory must be capable of generating humidity of up to 60% RH and cooling/heating to 8° and 20° C \pm 2° C respectively. Precise dosage pumps or corresponding devices (urinators) must be used for channelling artificial urine to the toilets. The urinator must have an accuracy of at least \pm 2 ml per dose.

In addition to general laboratory equipment the test laboratory must be equipped with the following equipment for testing materials and function:

- * Pedestal (adjustable/water)
- * Wattmeter/clock
- * Impact weight with rig (45)
- * Torque wrench
- * Electrical start relay
- * A scale with an accuracy of \pm 0.1 g
- * Instruments for measuring air quantity/speed, e.g. hotwire anemometer
- * Humidifier
- * 2 electronic humidity gauge, at least one with data saving facilities
- * Urinator, e.g. with magnetic valve or magnetic clamp
- * Pump and prefilter for urine container
- * Urine container
- * Waste water sacks for surplus liquid (volume at least 10 litres)
- * Drying cabinet (105° C) with extractor
- * Annealing furnace (550° C)
- * Sampling equipment for thermotolerant coliform bacteria
- * Fire extinguishing equipment and other protective equipment

The laboratory must have the facilities to chill stored slurry materials to 4° C \pm 2° C. The same cooling requirements apply to compost samples awaiting subsequent chemical/microbiological analyses.

2.3 Technical equipment required in the field

All results measured in the field must be recorded in a journal.

The following equipment is required for tests in the field:

- * Map (1:50.000)
- * Flashlight
- * Folding ruler
- * Sampling equipment (sterile equipment) for thermotolerant coliform bacteria, pH, conductivity
- * Equipment for cooling compost samples
- * Interview forms
- * Protective equipment

PART I MATERIALS AND CONSTRUCTION

3. Testing materials and design

This test applies to all types of closed toilet systems, with and without electrical power supplies.

3.1 Testing tightness

The toilet must be examined for leaks by means of internal filling or external spraying of water. The test is to be performed before and after the function test.

3.2 Testing impact resistance

The impact resistance of the container and any external containers must be tested at $20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ with blows from a pendulum weighing 3 kilos with an arm of 75 cm and an angle of 45° . If function is also tested in the laboratory, the impact resistance must be tested before and after function testing. The bob on the pendulum must be made of steel and spherical with a diameter of 10-12 cm.

3.3 Testing flammability

To test the toilet bowl and container for flammability a naked flame (e.g. a burning match) must be held against what are deemed to be the most flammable parts, e.g. the joint seals in the compost container. The flame must be kept alight and at rest horizontally for at least 10 seconds.

3.4 Testing of deformation

The toilet pan must be subjected to a static load of 150 kg. The load must be evenly distributed over the whole toilet pan. Porcelain toilet bowls need not undergo this test.

3.5 Testing mixing mechanism and other mechanical devices

The toilet shall be empty and cleaned after the function test and then be inspected visually for material damage and damage caused by wear.

4 Requirements as regards materials and construction

4.1 The design of the toilet

The toilet must have no sharp edges or projections that might cause injury to users or repair personnel. The diameter on the pipe between the toilet bowl and the container for decomposing waste must not exceed 20 cm. The waste outlet pipe may have a greater diameter, but if so the toilet bowl must be tapered so that the opening between the toilet bowl and the waste outlet pipe is equal to or less than 20 cm in diameter.

If the toilet is equipped with mechanical moving parts and/or electrical/electronic equipment, these must not be capable of causing injury to the user. Warning of faults in the electrical system must be given by means of lights or some other form of signal.

The toilet must be equipped with physical barriers to prevent the ingress of insects and rodents e.g. in the form of grids over air vents etc. The safety of the toilet for use by children must also be assessed.

4.2 Required degree of tightness

The assembled toilet must not have any leaks. If leaks are discovered before the function test, the test must be abandoned immediately.

4.3 Impact resistance

After the impact test the materials in the container and external container must not display cracks that penetrate all the way through the material.

4.4 Acceptable deformation

After loading the toilet pan must not exhibit deformation that is > 1 cm.

4.5 Flammability

The materials in the bowl and container must not ignite when exposed to a naked flame (e.g. a match) over the course of 10 seconds.

4.6 Quality and durability of materials

The materials in the bowl and container and any external container must exhibit no visible damage after function testing.

4.7 Mechanical components

Motors with drive gears must normally have a torque that is 50% higher than the torque required to rotate the agitator. The agitator, transmissions, drive gear, motor etc. must not display visible damage after wear testing has been concluded.

The toilet must be emptied and cleaned after function testing and inspected visually for material damage and wear.

4.8 Drainage

Liquid must normally not be drained from the toilet. The toilet must be equipped with an emergency overflow and draining facility. If there is a danger of uncontrolled seepage, the toilet must be equipped with an appropriate fluid level indicator.

4.9 Electrical components

Manufacturers must document that their toilets satisfy the requirements laid down by the authorities as regards electrical components (see also Section 6 in the criteria document).

4.10 Ventilation of the toilet

Fans and insect nets/grids etc. must be examined for blocking by dust, toilet paper and the like. Grids in fans must be replaceable. Conspicuous noise and vibrations from fans or other mechanical devices must be evaluated and, if appropriate, commented upon.

4.11 Inspection facility

The compost container must provide an inspection facility in the form of e.g. a hatch. If special tools are required for emptying or cleaning, these must be supplied with the toilet.

4.12 Assessments

For the toilet to be approved all requirements with regard to materials and construction must be fulfilled.

PART II FUNCTION

5 Function testing

The function test is designed for use on toilets both with and without an electrical power connection. Test methods have been developed for testing in a laboratory and testing in the field. Unless otherwise specified the toilet system must be tested in accordance with the manufacturer's instructions for use.

5.1 Preconditions for function testing in a laboratory

5.1.1 Duration of test

The test comprises of one period during which loading/filling of compost raw material takes place (the filling period), and a period of composting (the composting period) during which time the toilet must not be loaded with compost raw materials. The test may last between 8 and 48 weeks in accordance with the instructions of the manufacturer.

The filling period must last for a minimum of 8 weeks, but may, if requested by the manufacturer, be extended to up to 22 weeks. The duration of the composting period is 0 - 52 weeks after completion of the filling period. The composting period is determined by the manufacturer.

5.1.2 Test climate

The temperature and relative humidity (RH) of the air in the laboratory must be as follows throughout the entire test period:

Loading period	18° C ± 2° C	50-60% RH
Composting period	9° C ± 2° C	50-60% RH

The temperature and RH in the room must be measured every other hour and logged. The requirements to temperature and relative humidity concern 24-hours mean value. That ten 24-hours mean values during a test period are not within the set limits are accepted, but then the week mean value must be within the limits.

Energy (through heating cables and fan) may be supplied during the entire test period in accordance with the instructions of the manufacturer.

5.1.3 Raw materials in compost

This manual defines the waste from a single person over a 24- hour period as one population equivalent (p.e.) corresponding to:

Defecation	200 g
Urine	1275 g
Toilet paper	25 g
TOTAL	1500 grams

The compost raw materials must be dosed with an accuracy of ± 3%. Pellets and any food waste must be added to the toilet in accordance with the instructions for use. The manufacturer must specify the quantity of pellets to be added, in terms of weight or volume and how frequently pellets need to be added. The same applies to food waste. The quantity of food waste (measured as wet weight) must not exceed the sludge quantity or 200 grams per p.e. As raw material for food waste a mixture of potatoes (80%), bread (15%) and feed concentrate (5%) complying with the following requirements must be used:

Food waste	Gram/p.e	Dry matter requirements	Other requirements
Potatos	160	20-22	Food potato quality
Bread	30	63-69	Brown bread, nonsweet bread
Feed concentrate	10	23-29	18% raw protein and an energy content of 11 MJ/Kilo
Total	200 gram		

Potatoes must be cut into pieces corresponding to "pommes frites" before being added. The bread must be chopped (e.g. in a compost mill) so that it crumbles. If the feed concentrate is pelleted, it must be ground up into a meal. Before filling mix all ingredients thoroughly. Food waste can be processed and kept in tightly closed plastic bags and be frozen. The food waste must be de-iced before use. (If applicable, see criteria and test manual for the ecolabelling of compost bins issued by Nordic ecolabelling.)

5.1.4 Raw material loading

Table showing loading during 8 - 22 weeks filling period. Grams of waste per population equivalent. For example the figures in the table must be multiplied by four when testing toilets with a capacity of four persons.

Time/week	Weekdays							Total	Remarks
	Mon	Tue	Wed	Thur	Fri	Sat	Sun		
1	1500	1500	1500	1500	1500	1500	1500	10500	
2	3000	1500	1500	1500	1500	1500	1500	12000	
3	3000	1500	1500	1500	1500	1500	1500	12000	
4	3000	4050	1500	1500	1500	1500	1500	14550	3 x urine
5	3000	1500	1500	1500	1500	1500	1500	12000	
6	3000	1500	1500	1500	1500	1500	1500	12000	
7	3000	1500	1500	1500	1500	1500	1500	12000	
8	3000	3000	1500	1500	1500	1500	1500	13500	2 x normal
								98,55	kg
9	3000	1500	1500	1500	1500	1500	1500	12000	
10	3000	1500	1500	1500	1500	1500	1500	12000	
11	3000	3000	3000	1500	1500	1500	1500	15000	2 x normal
12	3000	1500	1500	1500	1500	1500	1500	12000	
13	3000	1500	1500	1500	1500	1500	1500	12000	
14	3000	1500	1500	1500	1500	1500	1500	12000	
15	3000	4050	1500	1500	1500	1500	1500	14550	3 x urine
16	3000	1500	1500	1500	1500	1500	1500	12000	
17									"holiday"
18									"holiday"
19	3000	1500	1500	1500	1500	1500	1500	12000	
20	3000	1500	1500	1500	1500	1500	1500	12000	
21	3000	1500	1500	1500	1500	1500	1500	12000	
22	3000	1500	1500	1500	1500	1500	1500	12000	
								248,1	kg

5.1.5 Testing external containers

External compost containers must be loaded in accordance with the instructions for use. External containers must be tested in terms of capacity and end product in a corresponding way as for the main toilet.

5.2 Performance of the test

5.2.1 Composition and processing of raw materials

The choice of raw materials must take into account the composting process and the working environment.

Slurry

For reasons of hygiene and practicality fresh human faeces is not used. Dehydrated raw, fresh sewage slurry is used as a substitute material. The slurry must have an acidity of between 6 and 7.5. The slurry may be treated with aluminium-based sedimenting chemicals. Dry solid measurements must be performed on slurry that is introduced into the toilet. Three representative samples of dry solids must be taken from each batch of slurry used and the average of these measurement results will then be used. If the type of pellets used is changed during the course of the test, three new DS measurements must be taken of the new type of pellet. The dry solid must be measured using samples of at least 100 grams. The permitted dry solids content is 18-25%.

Slurry older than eight days must not be used. The slurry must be stored in a cooling chamber (see requirements for technical equipment). One population equivalent of slurry corresponds to 200 g wet weight/day.

When added the slurry shall contain $5 \cdot 10^4$ TKB /g TS. Three representative samples must be taken to measure thermotolerant coliform bacteria in the final batch of slurry. The average of the measurement results will be utilized. Thermotolerant coliform bacteria are defined in accordance with Norwegian Standard 4714 and Table 2 in NS 4790, Part 1, with 10 test portions each of 1 gram. If the slurry do not contain the recommended quantity of TKB the hygienization must be inspected by using 3 nylonbags with slurry added the set quantity of TKB. When slurry is added the last time, the bags shall be mixed into the garbage 5-10cm under the surface. The bag shall stay in the compost. The content of TKB in the bag shall be analysed when emptying the compost.

Urine

The daily quantity of urine produced by a person will vary depending on diet, activity, health, gender etc. Some uncertainty therefore attaches to the exact amount. The load on the toilets (i.e. the definition of one p.e.) is based on the same quantities as used previously and for which experiential figures are therefore available.

Artificial urine must be used. One litre of artificial urine comprises:

Urea	23,26 gram
Phosphorus	3,10 gram
Salt (sodium chloride)	12,40 gram
TOTAL	38,76 gram/litre

Water (Spring water quality) 1000 gram

The mixture used for testing might for example consist of 300 litres water to which is added 6978 grams of urea, 3721 grams of salt (NaCl) and 930 grams of phosphorus (KH₂P0₄). The mixture is dissolved in warm tap water, e.g. 10 litres. The warm mixture is then added without delay to the urine/liquid stock and mixed with water to achieve the correct mixture.

Toilet paper

The toilet paper used must be of ordinary retail quality without decoration. It may comprise of either virgin fibre or recycled fibre. The paper quantity required is 25 grams per person per day.

5.2.2 Procedure for filling

All materials introduced into and removed from the toilets must be quantified and recorded in a journal. If the instructions for use require the use of pellets as a starter, these must be moistened with water until they achieve the texture of a squeezed out sponge. Pellets for ordinary use must not be moistened unless such a procedure is described in the instructions for use.

When filling the components sludge, paper and if applicable pellets and food waste must be divided into three portions which are then introduced into the toilet in alternate layers. The toilet paper rolls are divided up (e.g. sawn across) and the paper is added (by hand) in thin layers. Moisten the paper carefully with water so that approximately three-quarters of the paper quantity is wet.

Water that is added to the toilets must be of spring water quality. Under normal circumstances no other liquids but artificial urine and water may be added to the toilet. Artificial urine is dosed by means of a urinator/pump through the toilet seat once every hour over a course of 16 hours. For the sake of the nitrogen content of the liquid and for practical reasons the liquid should be introduced to the toilet at virtually the same temperature as prevails in the test premises.

When the toilet is emptied any external (outside) compost containers will be loaded with the removed mass in accordance with the instructions for use.

5.2.3 Capacity

The applicant will provide a written definition of the capacity to which the toilet is to be tested. The capacity of the toilet will be set as equal to the lower of the capacity limits for either solids or liquids. The test institution will assess the capacity of the toilet and any external compost containers based on the filling period (on the basis of inter alia the evaporation capacity of the toilet), and the composting period (on the basis of inter alia the reduction in mass).

5.2.4

Measurements of surplus fluid

The quantity of surplus fluid drained off into the external fluid container must be measured when the filling period has been completed. This is used as the basis for calculating fluid quantity and the frequency of transfer to internal or external compost containers.

5.3 Preconditions for testing function in field tests

The precondition for the performance of a field test is that the toilet model in question has been sold to and installed by a minimum of 50 customers/users two years prior to the commencement of the test (for example in the case of type xx due for testing in 1995, 50 units must have been sold by 1993 at the latest). The toilets must be of the same type as those for which a licence is sought.

5.3.1 Period of use prior to evaluation

The toilet to be examined must have been in regular use for at least two years prior to evaluation, in other words at least 3 weeks continuous use during the summer or winter, as well as regular use during weekends in the spring and late summer/early autumn or winter.

5.3.2 Load

The load on the toilet must correspond to the maximum number of persons for which the toilet is marketed and used in accordance with the instructions of use issued by the manufacturer (e.g. as regards the addition of pellets).

5.3.3 Test climate

The toilets must be tested in two separate climatic zones. Climatic zones will be selected in accordance with the classification of the Nordic Council of Ministers (NU:B 1977:34, see Enclosure 1) which corresponds to:

- a) D3 - Cold Climate
- b) CT2 and/or D1 and/or D2 - Mild Climate

This requirement will not apply in the case of toilets with compost bin designed exclusively for installation in a heated room (> 15°C).

5.3.4 Location and assembly

The toilet must be assembled in accordance with the instructions for use. Assembly and location must be documented by means of photographs and/or drawings marked with dimensions that are simple to comprehend.

5.3.5 Raw materials for compost

If large quantities of food waste are used (more than half, i.e. > 200 g/pe), a different test item must be selected.

5.3.6 External container

If the instructions for use specify the use of an external container, the samples must be taken from this container.

5.4 Implementation of the field test

A competent and independent test institution must be responsible for implementation of the field test (see Section 7.2 of the criteria document). The test institution may elect to utilize local subcontractors for sampling, interviews and analyses of the end product. The test institution will have the responsibility for evaluating whether or not the toilet fulfils the criteria for ecolabelling.

5.4.1 Number of test items

A minimum of five toilets must be tested (i.e. three in the mild climatic zone and two in the cold climatic zone). If no definitive conclusions can be drawn after five toilets have been examined, the test institution, in consultation with the applicant, may decide that up to two further items may be tested in the climatic zone in which the criteria were not fulfilled. Accordingly, the maximum number of test items in each climatic zone will be five in the mild climatic zone and four in the cold climatic zone, making for a total of nine.

If it is still not possible to draw conclusions from the field examination, the toilet must be tested in a laboratory (see Sections 5.1 and 5.2).

5.4.2 Choice of test items

The applicant will submit proposals for 50 test items representing both climatic zones. The distribution should preferably be 50% in each zone. Potential test hosts must not be connected to the applicant in any way that might engender partiality. For example there must be no relationship of dependency of a financial or social nature (e.g. a family relationship).

The test institution is responsible for deciding which items are to be tested. The applicant must not be informed in advance of which items have been selected.

5.4.3 Interviews

The test institution is responsible for ensuring that an interview is conducted with the test hosts in accordance with the enclosed interview form (enclosure 2). The objective is to chart significant operating conditions, times of use, daily operations, problems etc. Interview must not be performed by the applicant.

The test institution will utilize the interview in an overall evaluation of the toilet system.

5.5 Sample taking and analyses of the end product

This section applies both to laboratory testing and to field testing.

Samples of the mass are taken at the emptying hatch at the time of emptying when the toilet or, if appropriate external compost container requires emptying, or upon conclusion of the test.

Five samples of 200 grams each are to be taken. These are mixed into a mass sample which is then homogenized. Samples are taken from the common sample and analyzed to ascertain the dry solids content and volatile solids, TCB, pH, C/N ratio and Kjeldahl Nitrogen.

5.5.1 Dry solids and volatile solids

Three samples of 100 grams each are extracted from the common sample and analyzed to ascertain the dry solids content and volatile solids in accordance with NS 4764. The average of the parallels is stated.

5.5.2 Thermo-tolerant coliform bacteria

The presence of TCB is ascertained in accordance with NS 4714. The chosen technique is described in NS 4790, Part 1 Table 2, "10 parallels with volume V each". The analysis is performed as follows:

10 test portions weighing 1 gram \pm 0.1 gram each, are taken from the common sample. Each test portion is transferred to a tube at normal strength-bouillon consistency, and is treated as described in NS 4714. 9 out of 10 positive tubes results in an MPN index of 2.3 TCB/gram (and means that the required TCB/gram has not been fulfilled). The MPN index specified in Table 2 is recorded as the result of the analysis.

5.5.3 pH

Three parallel samples which are analyzed for pH are taken from the common sample. 1-2 g fresh sample is weighed in a beaker. 100 ml of distilled water is then added. The mixture is stirred/homogenized with a glass rod. Allow the slurry to sediment for 1 hour at room temperature. The sample is then measured with a pH-meter with a combination electrode while the sample is at rest.

5.5.4 Kjeldahl Nitrogen

Three parallel samples from the common sample are analyzed for Kjeldahl Nitrogen. If necessary, several parallel samples may be analyzed. The average of the parallels is recorded.

5.5.5 Odour

Smell in the toilet room (laboratory/test chamber) must be assessed and commented on if appropriate. Any smell of compost when the toilet is emptied and when external compost holders are emptied must be evaluated. Odour may be characterized subjectively as:

- 1 A smell of soil
- 2 Sharp smell of ammonia (smell of urine)
- 3 Decomposition (sulphide)
- 4 Acidic

5.5.6 Consistency

The consistency of the samples is evaluated on a scale from 1 (soft) to 5 (very firm).

- 1 Soft. Does not cohere.
- 2 Very brittle. Crumbles under very light pressure, but the mass coheres when pressed together again.
- 3 Brittle. Crumbles easily under light to moderate pressure between thumb and forefinger, but the mass coheres when pressed together again.
- 4 Firm. Crumbles under moderate pressure between thumb and forefinger, but resistance to crumbling is clearly noticeable.

5. Very firm. Crumbles under heavy pressure, but it is barely possible to crumbles into pieces between the thumb and forefinger.

(This classification is based on "Guidelines for description of soil profiles" by T.E. Sveistrup, page 53, of offprint of "Jord og Myr" No. 2, 1984)

6 Requirements as to function

6.1 Capacity

The total capacity is specified for one year's use and must be at least 4.0 p.e. The volume of the toilet and any external containers must be sufficient for the capacity defined pursuant to the test.

6.2 End products

The requirements apply to the time of emptying and may also apply to end product from outside containers.

6.2.1 Dry solids and volatile solids

The average dry solids content in end product in three parallel samples from the common sample product must be higher than 25% at the time of emptying.

6.2.2 Thermotolerant coliform bacteria

In three parallel samples from the common sample the average TCB content in the solid matter (indoor or external containers) and in the urine fraction, if any, must be less than two bacteria per gram wet weight/or ml at the time of emptying or at the conclusion of the test.

6.2.3 pH

In 3 parallel samples from the common sample the average pH value in the end product (solids) must be between 6 and 8 at the time of emptying or at the conclusion of the test.

6.2.4 Nitrogen content

The content of Kjeldahl Nitrogen in three parallel samples must total at least 1% in the solid matter. State the content of Kjeldahl Nitrogen in the urine fraction.

6.2.5 Odour

The compost odour when the toilet is emptied and when outside compost bins are emptied must be evaluated subjectively. Marked smell characteristics pursuant to Sections 2, 3 and 4 (see Section 5.2.5) will count against the test item. The compost should smell of "moist soil" and must not smell of ammonia.

6.2.6 Consistency

When used in practice the human source material must not be easily recognizable as such from its form, colour or consistency.

The quality of the compost must be such that it is practical to handle. The consistency of the samples must be 1-4 based on a scale from 1 (soft) to 5 (very firm).

6.3 Assessments

To satisfy the function requirements the toilet system must fulfil the requirements as to capacity, dry solids content (in the solid matter) and thermotolerant coliform bacteria in the end product. To be approved the toilet must fulfil each of these requirements.

Deviations from the requirements as regards the content of nitrogen, pH, odour and consistency are not individually sufficient for the toilet to fail the test. To achieve approval, the toilet must fulfil at least 3 of the requirements.

To pass the field test 4 out of 5 toilets must fulfil the requirements.

7 Requirements as to instructions for use

The applicant must submit written instructions for use, assembly and installation to the test laboratory. The instructions must be complete and more or less ready for printing.

The criteria governing written information accompanying the toilet will as a general rule be strict. Temporary instructions for use may be deemed acceptable provided that the applicant compiles complete instructions by the end of the test period. The instructions must be submitted to the test institution for evaluation before an assessment can be given.

7.1 Instructions for use

The instructions for use must cover the following subjects:

- * Type designation
- * Manufacturer/importer and supplier
- * Type number and year
- * Ecolabelling, including warranty and confirmation of fulfilment of requirement
- * Capacity and energy consumption

- * The principle on which the toilet functions
- * The principle for composting
- * The significance and use of pellets, food waste and composting substances
- * Recommended composting time
- * Day-to-day care, e.g. covering of compost and use of fan/heating element
- * Maintenance, e.g. replacing filters etc., hosing down heating elements/bottom of toilet

- * Emptying, with particular emphasis on hygienic emptying procedures
- * Use of tools
- * Use of compost and liquids, if any
- * Special preconditions/comments on the toilet

Trouble-shooting

- * Overview of the main types of incorrect installation
- * Overview of the main types of faults that occur in the ventilation system and the method of repair
- * Overview of the main types of problems affecting fluid capacity/excess fluid and methods of repair
- * Overview of the main types of problems with compost quality and methods for repair
- * Overview of the main types of problems with unpleasant odour indoors and outdoors and methods for rectifying such problems

7.2 Assembly instructions

The assembly instructions must show how the toilet (including the ventilation system) is to be put together. The assembly instructions must discuss the following subjects:

- * Complete list of contents of package
- * Overview of replaceable parts that experience has shown will have to be replaced before the warranty expires
- * Overview of the tools necessary for assembly
- * Overview of the method by which the individual parts are to be assembled

7.3 Installation instructions

The installation instructions must show how the toilet (including the ventilation system) is intended to be installed in buildings. The ventilation must be over the roof ridge or in a way that satisfies the requirement to working conditions and that do not lead to odour problems. The installation instructions must discuss the following subjects:

- * Area required around the toilet for use, maintenance and repairs
- * Requirements as to ventilation, heating and if appropriate outlets in the toilet room
- * Required insulation of compost container/tanks and ventilation ducts etc.
- * Skilled craftsmen required, e.g. electrician

8 Documentation and conclusion

Written documentation of the test results must be provided in the form of a brief report. This must specify whether the test item has satisfied the requirements made as regards function testing. If the requirements could be satisfied by means of small changes to the test item, a note to this effect must be given. The report is to be sent to the principal.

Enclosure 1

Map over climatic zones in the Nordic countries

Available at the Nordic secretariates

Appendix 2

Interview Form for Field Test

A brief interview must be conducted with the host family by the test institution (not the applicant) with a view to ensuring the representativity of the test and to clarify significant operational conditions, deviations etc. such as times of use, daily operations, any problems encountered etc.

1 Identification

Date: (day/month/year)

Owners name	Address	Telephone	Fax	Comments
Applicant's company name				
Interviewer's name				

Location

Country	Iceland	Norway	Sweden	Finland	Denmark
County:					
Municipality:					
House/cabin No. Site.					
Map (M=1:50-100 000).					
Height above sea level.					

2 Installation

What type of toilet has been installed?

Manufacturer:

.....

Model:

.....

With power connection (220/230 volt). The toilet has a heating element.

Without power connection, including 12/24 volt.

The toilet is installed in: Dwellinghouse Holiday home/cabin

When was the toilet installed? (year).

Is the toilet used in combination with outdoor (external/outer) compost tanks ?

- External uninsulated compost tanks. No. of tanks
- External insulated compost tanks. No. of tanks
- Large insulated home compost tanks. No. of tanks
- Other

Were any particular problems encountered during installation or assembly

.....
.....
.....

Is part or all of the toilet located in an unheated room?

- The toilet (including bowl, decomposition tank etc.) is located in a room that is heated at all times (>15C).
- The toilet bowl is located in a room that is heated at all times, but where the decomposition tank(s) is located in a cold room and/or under the floor.
- The toilet bowl is located in a room that is only heated during use and where the decomposition tank(s) is located in a cold room (<15C) and/or under the floor.
- The toilet (with bowl, decomposition tank etc.) is located in a room that is cold at all times.
- Other

How is the toilet ventilated?

- The toilet is ventilated by means of an air duct from the decomposition tank. The air duct is mechanically ventilated by means of:
 - Electrical fan (220/230 V).
 - Electrical fan (12/24 V).
 - Other (describe).
- Ventilation of the toilet is based on a draught through the vent from the decomposition tank.
 - The vent has one or more bends.
 - The vent extends over the roof ridge.
 - The vent is connected to some form of filter. Describe
 - The vent is insulated.
 - The vent is partially insulated.
 - The vent is not insulated.

Have there been any problems with odours ?

- The toilet is virtually free of odour/has an acceptable odour.
 - Indoors.
 - Outdoors.
 - During emptying of the toilet.
 - During emptying of external compost tanks.
- Please describe the problem:
-

3 Use and care

How many adults usually use the toilet ? (number)

How many children usually use the toilet ? (number)

Is the toilet used by everyone or do some people go elsewhere to urinate ?

- The toilet is used by everyone and has sufficient fluid capacity.
- Sometimes some people go elsewhere to urinate.
- Some members of the family frequently go elsewhere to urinate because of the low fluid capacity of the toilet.

State the number of days (24-hour periods) that the toilet is in use during the year ?

- 1 to 30 days
- 30 to 60 days
- 60 to 90 days
- 90 to 180 days
- 365 days (the whole year).

At what times of the year is the toilet most in use ?

Is food waste put into the toilet ?

- Food waste is not put in.
- Food waste of the order of litres or kg per week is put in.
- Just as much food waste as other waste is put in.
- More food waste than other waste is put in.

Is water put into the toilet ?

- Water is not put into the toilet or external tank.
- Water is put into the toilet or external tank. Amounts? litres per week.

Is fluid drained off the toilet ?

- Fluid is not drained off the toilet or external tank.
- Fluid is drained off the toilet or external tank. Amounts? litres per year.

How many times per day are pellets added to the toilet?

- Every time the toilet is used.
- Once per day.
- Other(describe)

What quantity of pellets is added to the toilet per day ?

- 1 to 5 dl
- 0.5 to 5 litres
- Other (describe)

What type of material is used as pellets ?

- Turf.
- Bark.
- Woodshavings/sawdust.
- Grass/leaves etc.
- Other (describe)

Are any special composting materials used ?

- Composting materials are not used.
- Composting materials are used. Type/manufacturer:
Quantity:

4 Emptying**When was the toilet and/or external compost tank last emptied ?**

Date:

- | | |
|---|---|
| <input type="checkbox"/> Less than 4 weeks ago. | <input type="checkbox"/> More than 1 year ago. |
| <input type="checkbox"/> 1 to 3 months ago. | <input type="checkbox"/> More than 2 years ago. |
| <input type="checkbox"/> 3 to 6 months ago. | <input type="checkbox"/> More than 3 years ago. |
| <input type="checkbox"/> 6 to 12 months ago. | |

How frequently is the compost emptied from the toilet ?

- More than 12 times per year.
- 5 to 12 times per year.
- 2 to 4 times per year.
- Once per year.
- Every other year or less frequently.

Describe the condition of the compost at the time of emptying ?

- The compost is dry or relatively dry.
- The compost is dripping wet or relatively wet.

- The compost is porous and air-filled and easy to handle/empty.
- The compost is hard and solid. It is difficult to empty.
- The compost is wet or partially fluid and difficult or unpleasant to handle/empty.

- The smell of the compost is acceptable (smells of earth).
- The compost smells unpleasant (smell of ammonia, acid, faeces, etc.)

- The compost is dark brown to black in colour.
- The compost has more or less the same colour as faeces.

- There are few insects and/or larvae in the compost.
- There are a great many (i.e. >100) insects and/or larvae in the compost during emptying.

How much compost is emptied from the toilet ?

State approximate amount in litres

How is the compost used?

- The compost is used to enrich the soil/fertilize our own garden/land.
- The compost is buried in our own garden/land.

Any comments:

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