Quality Manual

ECN-QAS

European Quality Assurance Scheme for Compost and Digestate

European Compost Network ECN e.V.

www.compostnetwork.info

Authored by:

Stefanie Siebert, European Compost Network ECN e.V., Germany

Wim Vanden Auweele, VLACO vzw, Belgium

Acknowledgement

We are grateful to the following people for their technical input during the development of the ECN–QAS Manual:

Florian Amlinger[1], Josef Barth[2], Angelika Blom[3], Massimo Centemero[4], Alberto Confalonieri[5], Christoph Gareis[6], Marina Himanen[6], Franz Kirchmmeyr[7], Horst Müller[8], Henrik Lystad[9], Anneleen Rotering[10], Maria Thelen-Jüngling[11], Adrie Veeken[12], David Wilken[13], Kiara Zennaro[14]

Further the authors would like to thank all ECN members of Working Group 2 'Quality Assurance' and Working Group 4 'Anaerobic Digestion' and EBA members, who were involved in the development of the ECN-QAS Quality Manual, for their contributions and exchange during the elaboration of this 2nd edition, particularly with regard to part C II 'European Quality Assurance for Digestate'.

[1] ARGE Kompost & Biogas, Austria

[2] INFORMA, Germany

[3] Avfall Sverige, Sweden

[4] Italian Compost Council, Italy

[5] Scuola Agraria del Parco di Monza, Italy

[6] Biolaitosyhdistys c/o Agropolis Oy, Finland

[7] European Biogas Association,

[8] Kompost Güteverband Österreich, Austria

[9] Avfall Norge, Norway

[10] BVOR; The Netherlands

[11] Bundesgütegemeinschaft Kompost, Germany

[12] Dutch Waste Management Association, The Netherlands

[13] Fachverband Biogas e.V., Germany

[14] Renewable Energy Association, United Kingdom

IMPRINT

EUROPEAN COMPOST NETWORK
ECN e.V.
Im Dohlenbruch 11
44795 Bochum
GERMANY

Tel. +49 (0) 234/438 94 47
Fax +49 (0) 234/438 94 48
EMail: info@compostnetwork.de
Internet: www.compostnetwork.info

Edited by:
Dr. Stefanie Siebert

Contact:
Dr. Stefanie Siebert
EMail: siebert@compostnetwork.info

© European Compost Network, 2018
Reproduction is authorised provided the source is acknowledged.

Issue-No. 03_18
Date: 11.07.2018

ISBN: 978-3-00-047599-3

ECN-QAS Trade Mark

registered at

European Register of

Community Trade Marks

‘OHIM 2012/210: TM No 011007168’

Trade mark for certified quality assurance organisations, compost and digestate products according to ECN-QAS

Preface

Quality assurance schemes for compost and digestion products have successfully been established in the last 20 years in various European Member States as key elements for the sustainable recycling of organic residues. The market and demand for quality composts and as well for digestate increased on account of the beneficial properties of organic fertilisers and soil improvers, the need for organic matter and continuously increasing prices for mineral fertilisers.

The development of End-of-Waste Standards for compost and digestate by the European Commission and the revision of the European Fertiliser Regulation led to a demand for a European uniform quality standard for composting and anaerobic digestion plants and composted/digested products. The European Compost Network ECN met this challenge and developed a concept for a European quality assurance scheme within its working groups 'Quality Assurance' and 'Anaerobic Digestion'. It includes proposals for quality standards of compost and digestate required by the Commission for a free cross-border movement of goods in the EU.

The target of setting up an EU-wide quality assurance scheme for organic resources is mainly to define this Europe-wide standard for quality management and quality organic products like compost and digestate. The pre-condition for a consistent compost and digestate quality is to harmonise the parameters of the treatment process and to check them regularly by an independent control. In addition this ECN-QAS project should show a common basis for the existing quality schemes in Europe and should support Member States to define their own quality standards and to develop a quality assurance scheme for composts and digestate.

Dr. Stefanie Siebert

European Compost Network ECN e.V.

Executive Director

INDEX

A. Targets and Structure of the ECN-QAS

B. ECN-QAS for Quality Assurance Organisations

C. European Quality Assurance Scheme - Part I ECN-QAS for Compost

C. European Quality Assurance Scheme - Part II ECN-QAS for Digestate

D. European Quality Assurance Scheme for Compost and Digestate - Guidelines[1]

I Specification for Use of Quality Compost in Growing Media

[1] Guidelines are stand-alone brochures.

A. Targets and Structure of the ECN-QAS

A. Targets and Structure of the ECN-QAS

A. Targets and Structure of the ECN-QAS

Introduction

The European Compost Network ECN, as an initiative and branch organisation of the ORBIT Association, was founded in regard to national initiatives to build up a European- wide market for compost and digestate products. For the European market standardised compost and digestate products with a defined continuously high quality and specific recommendations for its use is required. In respect to these market requirements the ECN e.V. started the initiative to build up a European-wide Quality Assurance Scheme (ECN-QAS).

The targets of ECN-QAS and of this initiative by ECN e.V. are:

- Specification of marketable compost and digestate products with a standardised and guaranteed homogenous quality
- Establishment of a harmonised control tool for compost/digestate quality
- Enhancement of the compost/digestate quality and operation quality
- Safeguarding of a successful use of compost/digestate products
- Deregulation and recognition of certified compost/digestate products by legal authorities, in agricultural production systems and by food processing industry
- Promotion of recycling of organic waste “From Waste to Product"

The ECN-QAS presents an independent quality assurance scheme and includes fundamental requirements for national quality assurance organisations (NQAO) for compost and basic requirements for a European compost standard and for a European digestate standard. Besides a positive list for suitable input materials and requirements for process quality also quality criteria for compost and digestate are laid down in the scheme (Part C).

The European quality assurance scheme includes the following elements:

- The requirements for conformity assessment of national quality assurance organisations (NQAO) to the ECN-QAS.
- Regular assessment of the production in the plants by the national quality assurance organisation (NQAO) by means of process requirements.
- Regular sample taking and analysis of the final product from independent, acknowledged labs and additionally the evaluation of the results by the national quality assurance organisation (NQAO).
- Documentation by the national quality assurance organisation (NQAO) with information on the quality properties of the product, legal requirements, the necessary compost and digestate declaration and information about use and application rates

according to good practice. Awarding of the ECN-QAS Conformity Label to national quality assurance organisations (NQAO).

- Awarding of quality labels for composting/digestion plants and compost/digestate products by conformity assessed national quality assurance organisation (NQAO) as to ECN-QAS.

1 Scope

The scope of the ECN's initiative concerning to this project is

- to harmonise the requirements for compost and digestate across Europe to build up an European-wide market for quality compost and quality digestate,
- to harmonise the existing quality assurance schemes across Europe and
- to support national quality assurance organisations (NQAO) establishing quality assurance schemes for compost and digestate.

2 Purpose

The specific aim of this ECN-QAS Quality Manual is to provide the necessary background information and standardised documentation to build up a European Quality Assurance Scheme (ECN-QAS) for composts and digestate. The Quality Manual includes the requirements for the conformity assessment of national quality assurance organisations and for composting and digestion plants.

The Quality Manual is divided in three main parts:

- Part A describes the general target and structure of the European Quality Assurance Scheme (ECN-QAS).
- Part B of the ECN-QAS Quality Manual specifies the ECN requirements to be met by a national quality assurance organisation (NQAO) for composting/digestion plants, which are preconditions for the described recognition procedure of an organisation performing quality assurance according to the European Quality Assurance Scheme of ECN.
- Part C of the ECN-QAS Quality Manual is divided into two sections:
    - CI ECN-QAS for compost
    - CII ECN-QAS for digestate.

  These sections specify requirements for the operational process management of composting and digestion, the selection of input materials and the compost and

digestate quality. They include specifications for sampling and testing. They also specify requirements for product certification and declaration to ensure that the compost and digestate products are consistently fit for their intended uses. These essential elements have to be implemented into the quality assurance scheme of the national quality assurance organisation (NQAO).

3 Definitions

For the purpose of this Quality Manual, the following definitions apply:

Applicants: national quality assurance organisation (NQAO) and their compost/digestate producing members which seek to obtain a conformity assessment of ECN-QAS.

Approval: permission for a product to be marketed to be used for stated purposes or under stated conditions (product, operation and services)

Audit: conformity assessment; systematic, independent, documented process for obtaining records, statements of fact or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled.

Certification: procedure by which a third party gives written assurance that a product, process or service complies to specified requirements.

Certificate of conformity: document issued under the rules of ECN-QAS, indicating that adequate confidence is provided that the national quality assurance scheme (NQAS) is in conformity with the requirements of ECN-QAS.

Conformity assessment scheme: Conformity assessment system as related to specified products, processes or services to which the same particular standards and rules, and the same procedure, apply.

Conformity label: label or mark applied or issued under the rules of ECN-QAS, indicating that the adequate confidence is provided that the national quality assurance scheme (NQAO) is in conformity with the requirements of ECN-QAS.

ECN-QA Manager: A person or expert designated by the ECN Board and commissioned to perform conformity assessment of national quality assurance organisation (NQAO) by external audits. The ECN-QA Manager shall be impartial and reports to the ECN-Quality Committee.

ECN-Quality Committee: This committee is responsible for the certification of national quality assurance organisations (NQAO).

External monitoring (third-party surveillance): Independent product and plant controls to obtain and use a quality label in agreement with the NQAO / ECN-QAS requirements.

License: Document, issued under the rules of a certification system, by which ECN grants a national quality assurance organisation (NQAO) the right to use the Conformity label of ECN-QAS for its quality assurance scheme in accordance with the rules of ECN-QAS, which are laid down in part B of the ECN-QAS Quality Manual.

National quality assurance scheme (NQAS): collective term covering all internal requirements for operational procedures and their documentation as well as all operational measures taken, including inspections by an external quality assurance organisation.

National quality assurance organisation (NQAO): external national or regional organisation carrying out the quality assurance scheme. Establishes, manages and monitors an independent nationwide quality control (quality assurance scheme) of the composting/digestion plants, their production and products and documents the results of monitoring with the target to award a quality label for all plants which meets the quality assurance requirements continuously.

Quality assurance: part of quality management carried out by an external NQAO aimed at fulfilling quality requirements in order to build up confidence in products and production processes.

Quality label: externally visible marking of a product by the national quality assurance organisation (NQAO)

Recognition of national quality assurance organisation: acknowledgement of the validity of a conformity assessment result provided by ECN e.V.

4 Organisational Structure of ECN-QAS

With this project ECN e.V. takes the initiative to build up a European-wide Quality Assurance Scheme (ECN-QAS) for compost and digestate. In the first stage national quality assurance organisations (NQAO) should be certified by ECN-QAS. Secondly, composting and digestion plants - monitored by national quality assurance organisation (NQAO) and acknowledged in the ECN-QAS - should have the possibility to apply for the quality label of ECN-QAS in addition to their product quality label of the national quality assurance organisation (NQAO).

The organisational structure and the course of certification of ECN-QAS is shown in figure 1:

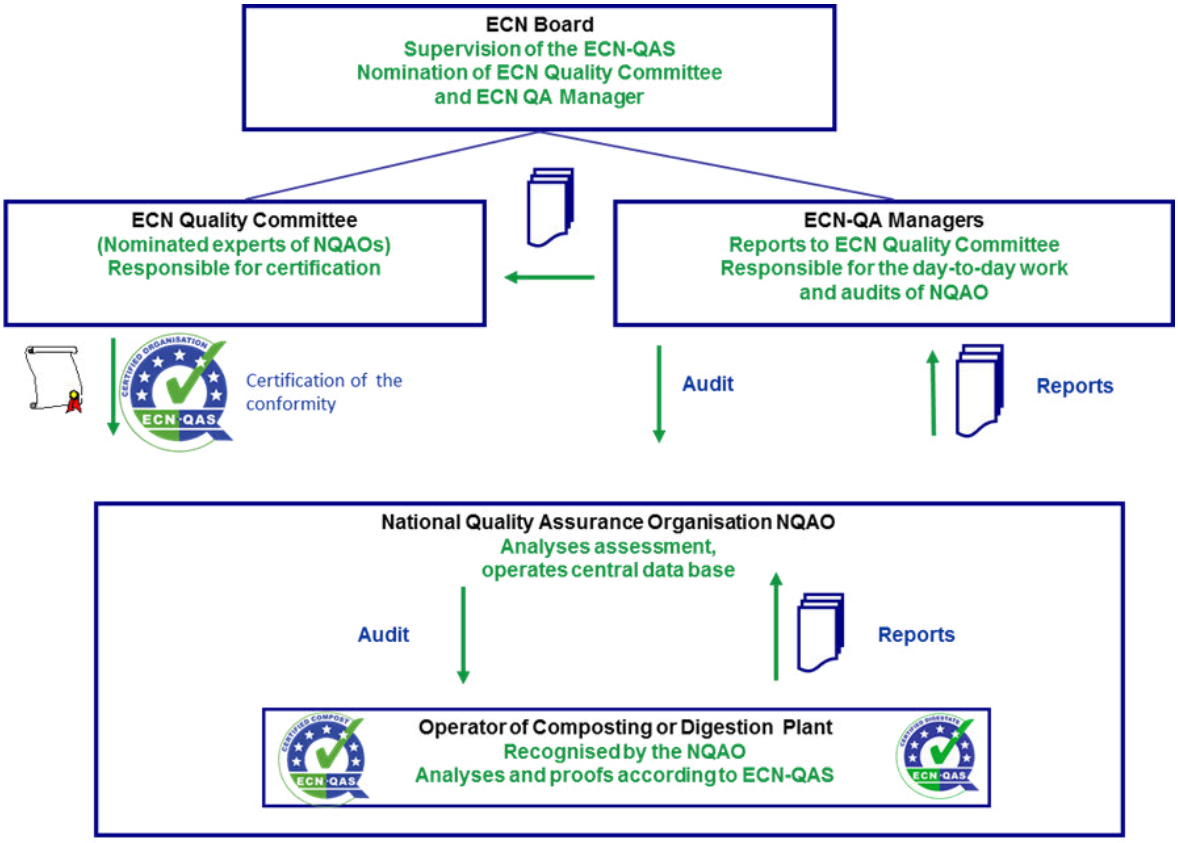


Figure 1: Organisational Structure and Course of Certification by ECN-QAS

Besides the requirements for national quality assurance organisations (NQAO) (Part B) the ECN-QAS includes basic requirements for a European product standard for compost and digestate (Part CI/II). In addition to a positive list for suitable input materials and requirements for process quality also quality criteria for compost and digestate are laid down in the scheme.

The essential elements of ECN-QAS for compost and digestate are shown in figure 2:

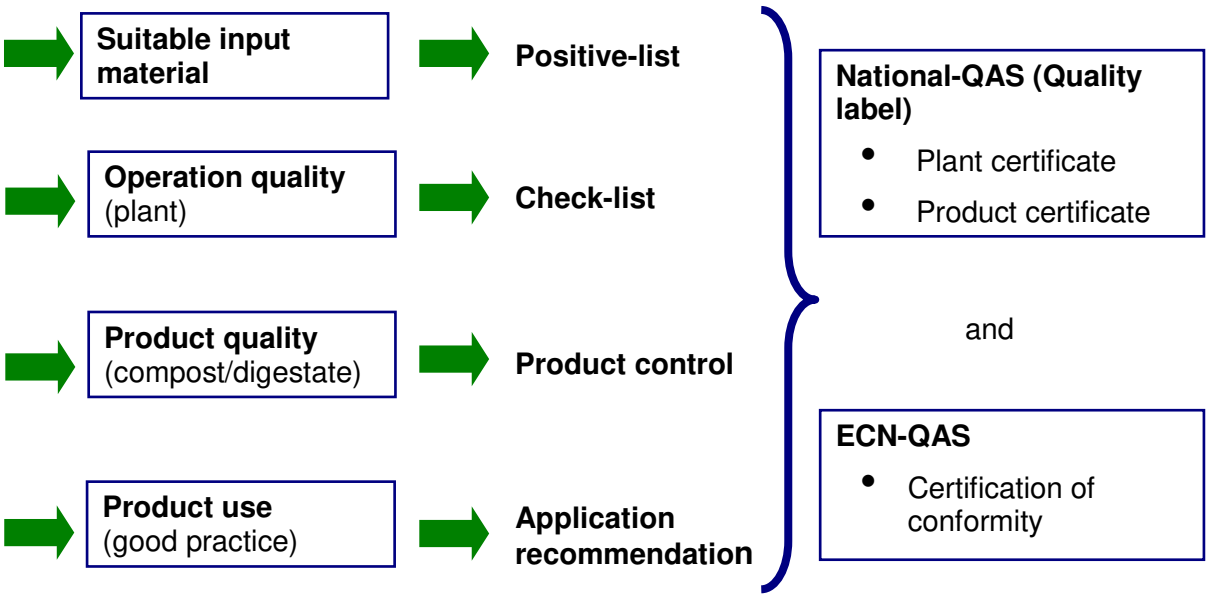


Figure 2: Elements of Quality Assurance Schemes for Compost and Digestate

The conformity label of ECN-QAS for national quality assurance organisations (NQAO) is shown in figure 3:

Figure 3: Conformity label of ECN-QAS

The quality label of ECN-QAS for composting plants is shown in figure 4:

Figure 4: Quality label for compost of ECN-QAS

The quality label of ECN-QAS for digestion plants is shown in figure 5:

Figure 5: Quality label for digestate of ECN-QAS

5 Certification of NQAO by ECN-QAS

Those NQAOs which demonstrate that they execute the quality assurance according to the ECN-QAS can be set on the list of certified QAOs which is published on the ECN-QAS website. The certification includes basic data and information about the participating biological treatment plants and their products.

5.1 External proof by ECN-QA Manager

The conformity assessment scheme includes one on-site inspection of the national quality assurance scheme and organisation according to the requirements which are laid down in part B of this Quality Manual and in Annex A 1 by the ECN-QA Manager in the first year of approval. The certification of the national quality assurance scheme has to be renewed by

external audit (on-site inspection) of the ECN-QA manager every three years. The audit by the ECN-QA Manager includes the on-site visit of composting and/or digestion plants which are recognised by the NQAO for supervising the procedure of the quality assurance system in respect to the operation and compost/digestate quality laid down in Part C of this Quality Manual.

5.2 Reporting requirements to the ECN-QA Manager / ECN-Quality Committee

The NQAO shall draw up an activity report each year and provide the data about the quality assurance of plants in a way that they can be supervised by the ECN-QA Manager and used for a European survey.

The report includes:

- reports about the composting plants and/or digestion plants (basic figures)
- common composting systems, digestion systems
- amount of input materials
- type of input materials
- documentation of the operation quality (list of plant visits)
- documentation of the product quality (data interpretation – mean values with variation of results)
- list of approved labs (documentation of ring tests)
- market report (sales areas) – as far as available

5.3 Non-compliance and withdrawal

In the case of non-compliance of the NQAO's operation with the ECN-QAS, the ECN-QA Manager shall inform the ECN-Quality Committee in writing about the type and scope of the deficiency or non-compliance and about possible solutions. The ECN-Quality Committee will define further steps to be taken.

In the case of serious deficiencies or repeated non-compliance with the conditions and deadlines the ECN-Quality Committee will decide on further recognition or withdrawal of the certificate.

6 Conformity Assessment of Composting Plants by ECN-QAS

Composting plants and digestion plants participating in a national quality assurance organisation (NQAO), which is recognised by ECN, have the possibility to apply for the quality label of ECN-QAS in addition to their national quality label, if applicable. Preconditions, that the requirements of the operation and product quality, which are laid down in Part C of the ECN-QAS Quality Manual, are completely fulfilled by the treatment plant. These requirements shall be approved by the NQAO. The NQAO has to transmit the results of proof to the ECN-Quality Committee for the conformity assessment.

7 Rules for awarding the ECN-QAS Conformity and Quality labels and Terms of Use

In addition to the requirements, which are laid down in this quality manual the rules for awarding the ECN-QAS Conformity and Quality labels and their terms of use has to be respected in its valid form. The valid form of the rules for awarding the ECN-QAS Conformity and Quality labels and their terms of use is published on the ECN-QAS website: www.ecn-qas.eu

8 ECN-QAS Certification Fee Schedule

For taking part in the ECN-QAS a certification fee has to be paid to ECN e.V.. The valid form of the ECN-QAS Certification Fee Schedule is published on the ECN-QAS website: www.ecn-qas.eu.

9 References

EN 45011:1998: General criteria for certification bodies operating product certification

EN 45012:1998: General criteria for certification bodies operating Quality System certification

OENORM S 2206-2:2006: Requirements for a Quality Assurance System, Part 2: Quality Assurance Organisations - Tasks and Requirements. Edition 2005-03-01, authorised English translation, Austrian Standardisation Institute Vienna, 2006.

Annex A 1: Certificate of Conformity

Certificate of Conformity

According to the conformity assessment of the ECN-Quality Assurance Scheme for Compost and Digestate the European Compost Network awards the conformity label of ECN-QAS

to

_____

(Quality Assurance Organisation)

_____

Date

_____ _____

Chair of ECN e.V. Chair of ECN-Quality Committee

B. ECN-QAS for Quality Assurance Organisations (QAO)

B. ECN-QAS for Quality Assurance Organisations

B. ECN-QAS for Quality Assurance Organisations (QAO)

1 Scope

Part B of the ECN-QAS Quality Manual specifies the ECN-QAS requirements to be met by a quality assurance organisation (QAO) for composting/digestion plants. These are preconditions for the certification procedure of a QAO in accordance with the ECN-QAS.

2 Purpose

The requirements laid down in this part should guarantee the quality and effectiveness of the work of a QAO and specify the acknowledgement and co-operation with the ECN-Quality Committee.

3 Normative References

ISO/IEC 17065

ÖNORM S 2206-2:2006.

4 Definitions

For the purposes of part B, the following definitions apply:

Approval: permission for a product or process to be marketed or used for stated purposes or under stated conditions

Audit: conformity assessment; systematic, independent, documented process for obtaining records, statements of fact or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled.

ECN-QA Manager: A person or expert designated by the ECN Board and commissioned to perform conformity assessment of national quality assurance organisation (NQAO) by external audit. The ECN-QA Manager shall be impartial and reports to the ECN-Quality Committee.

ECN-Quality Committee: This committee is responsible for the certification of conformity assessment of national quality assurance organisations (NQAO).

External monitoring (third-party surveillance): Independent product and plant controls to obtain and use a quality label in agreement with the QAO requirements.

External quality control: Checks of plants, processes and final products in line with national legislation and requirements of ECN-QAS

Inspection: Activity such as measuring, examining, testing or gauging one or more characteristics of product or service and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristics.

Inspector: A specialised institute or expert designated by the QAO and commissioned to perform product and plant inspections (audits). Any inspector shall not be a member of the QAO‘s Quality Committee, shall not be the authorised expert/specialised institute or laboratory performing compost/digestate assessments and shall not be the person who decides whether certification is awarded.

National Quality assurance organisation (NQAO): external supranational, national or regional organisation approving quality assurance in a company. Establishes, manages and monitors (area-wide) an independent quality control (quality assurance system) of composting/digestion plants, their operation and work flows and products and provides standardised documents of the results with the target to award a quality label for plants which meet the quality assurance requirements.

Quality assurance organisation (QAO): <general> external organisation approving quality assurance in a company. Establishes, manages and monitors an independent quality control (quality assurance scheme) of composting/digestion plants, their operation and work flows and products and provides standardised documents of the results with the target to award a quality label for plants which meet the quality assurance requirements.

Quality assurance scheme (QAS): collective term covering all internal requirements for operational procedures and their documentation as well as all operational measures taken, including inspections by an external quality assurance organisation

Quality assurance: part of quality management aimed at fulfilling quality requirements in order to build confidence

Quality label: marking of a product by the quality assurance organisation (QAO)

Recognition of national quality assurance organisation: acknowledgement of the validity of a conformity assessment result provided by ECN-QAS

5 Introduction

The inspection of a composting/digestion plant is a procedure documenting that the production of compost and digestate complies with the applicable standards, legal provisions and administrative orders as well as other specific requirements and that this is evidenced by traceable records. It includes the examination of the external quality control and quality management aspects form composting/digestion plants as specified in Part C.

6 Requirements for a Quality Assurance Organisation (QAO)

6.1 General requirements

The trustworthiness of a QAO is achieved by applying the principles of

- objectivity,
- economic and legal independence, and
- transparency.

This is ensured by the following measures and arrangements:

1. The QAO shall be impartial in relation to its applicants;
2. The QAO shall have sole responsibility for its decisions on granting, maintaining, expanding, suspending and withdrawing quality labels;
3. The QAO shall appoint persons, officers and bodies for the autonomous management and performance of the following tasks:

   (a) Implementation of external controls and conformity assessments,

   (b) Adoption of fundamental regulations on the QAO‘s activities (e.g. by-laws, operational rules),

   (c) Decisions with regard to point (2),

   (d) Supervision of the implementation of its fundamental regulations according to point (3 (b)),

   (e) Delegation of tasks and defined activities to bodies or individuals carried out on behalf of the QAO‘s,

   (f) Organisational-technical principles for awarding a quality label;
4. The QAO ensures that decisions on granting, maintaining, expanding, suspending and withdrawing a quality label are taken by the Quality Committee; persons (inspectors) who are in charge of external monitoring (third-party surveillance) may only be involved in an advisory function without having a say in the decision itself.

6.2 Legal form

The QAO shall be recognised by law as a legal entity (e.g. as an association, federation, organisation under commercial law).

6.3 Staff

The QAO shall appoint inspectors who carry out the inspections required. These persons shall have adequate knowledge of the state of the art and expertise as well as the required practical experience for fulfilling their inspection tasks with regard to the type and scope of the work performed under a responsible management. If sub-contractors are used, an adequately documented agreement shall be made on the related arrangements, including provisions on confidentiality and conflicts of interests and requirements for expertise and training.

6.4 QAO's quality management

The QAO shall perform a regular audit of all procedural and organisational processes and provide an annual activity report. The QAO's responsible management shall ensure that all requirements of this part B are respected.

7 Tasks of a Quality Assurance Organisation

7.1 Requirements defined by the quality assurance organisation for applying compost/digestate producers

Compost/Digestate producers contracted to the QAO's undertake to meet the requirements defined by the QAO with regard to:

- scope and procedure of internal quality management (QM) measures,
- number and scope of external monitoring (third-party surveillance),
- plant operation according to this quality manual,
- relevant quality requirements pursuant to European and national legislation, and ECN-QAS demands.

7.2 Activities

On the basis of this quality manual, the QAO shall define the requirements forming the basis of the quality assurance scheme to be applied. This includes:

- Comprehensive initial testing of the composting plant based on the legal, normative and contractual requirements;
- Checking of the records/reports to be submitted on the plant;
- On-site inspection of the operation quality of the plants by means of a checklist as a minimum every two years (see Annex C I 5/C II 6);

- Additional on-site inspection should be taken into account, if any irregularities in monitoring the product analyses or any complaints arise;
- Advices, warnings and sanctions on the basis of a scheme defined in the by-laws or general rules;
- In the case of deficiencies or non-compliance, the inspector shall inform the operator of the composting/digestion plant in writing about the type and scope of the deficiency or non-compliance and possible solutions; if the operator does not appropriately respond within the period of time to be set, the QAO shall be referred to the Quality Committee that will define the further steps to be taken;
- Provide a sample taking and laboratory qualification system in accordance with ECN-QAS requirements;
- Implementing criteria for compost quality and digestate including the parameters listed in part C I/II;
- Documentation and publication of the plants awarded a quality label (e.g. on the internet, in a newsletter).

7.3 Conditions and procedures for granting, maintaining, expanding, suspending and withdrawing quality labels

The QAO shall define the conditions for granting, maintaining and expanding the quality label. Likewise, it shall lay down the conditions for suspending or withdrawing the quality label for the entire field of application or parts thereof.

The QAO shall prepare rules for:

- granting, maintaining, withdrawing and, if applicable, suspending the quality label;
- expanding or restricting the quality label‘s field of application;
- reviews upon the introduction of significant changes related to initial testing or the latest inspection in the case of modifications to the standards or provisions that the plant is to comply pursuant to quality assurance; this also applies to a change in ownership or if other well-founded information suggests that significant conditions changed that served as a basis during initial testing.

7.4 Records

The QAO shall maintain a documentation system evidencing that the quality assurance system was effectively applied.

It includes the following elements:

- Applications for the quality label;
- Sample taking and inspection report;
- Documentation of analysis results;
- Documents on granting, maintaining, expanding, suspending or withdrawing the quality label including warnings, sanctions and deadlines set;
- Activity report for the ECN-Quality Committee via the ECN-QA manager.

The records shall be identified, handled and archived in such a way that the confidentiality of the procedures described therein and data protection is ensured.

7.5 Changes to plants and products

The QAO shall oblige its members to inform the QAO about significant changes, e.g. planned modifications of the treatment plant, products, production process or, if applicable, its quality management system, that may have an impact on the products‘ and/or plant‘s conformity. The QAO shall lay down whether the changes announced require further inspections or not. If further inspections are necessary, the plant‘s operator shall not apply the quality label to materials produced after such changes until the inspections required have been concluded with a positive result.

7.6 Quality Committee

The QAO´s Quality Committee shall have at minimum three members who, due to their professional background and practical experiences, are capable to check and evaluate the assessment documents prepared in the course of the external quality control. The handling of appeals, complaints and disputes submitted by producers or third-parties to the QAO shall be governed by procedural rules defined by the QAO.

The QAO shall define a documentation system in accordance with this quality manual and make it available to its quality committee and to the compost producers.

The Quality Committee shall review the documents and record its decision.

8 References

ISO/IEC 17065: Conformity assessment - Requirements for bodies certifying products, processes and services, 2012.

OENORM S 2206-2:2006: Requirements for a Quality Assurance System, Part 2: Quality Assurance Organisations - Tasks and Requirements. Edition 2005, authorised English translation, Austrian Standardisation Institute Vienna, 2006.

Annex B1 Check-list for Recognition of NQAO

The check-list shall be used as guidance for the recognition of National Quality Assurance Organisation (NQAO).

Check-list for the Recognition of National Quality Assurance Organisations				
Necessary documents for certification bodies following EN 45011			**Date of the document**	**Document (N) // Remarks**
01	O	Declaration about legal form of enterprise and assets		
02	O	Map of the area, directions		
03	O	Organisation chart and work flow of the certification scheme		
04	O	Description of the range of responsibilities and authorisation of the individual staff member		
05	O	Proof of qualification of the executive and his substitute		
06	O	List of staff member responsible for certificates and those who are responsible for technical accuracy of certificates		
07	O	Composition and proof of qualification for persons responsible for certificates (quality committee)		
08	O	Signature of staff members following point 7: confirmation of confidence and independency		
09	O	Rules of internal procedures / articles of the board / articles of the quality committee		
10	O	Protocols of Quality Committee meetings		
11	O	Quality Assurance Manual		
		Organisational-technical rules for awarding a quality label		
		Organisational-technical rules for withdrawing or suspending a quality label		
12	O	List of subcontractors with proof of competence (if awarding of subcontractors is intended)		
		Inspectors in charge of external monitoring have an advisory function only		
		Qualification of the appointed inspectors who carry out the inspections		
		Written agreement with sub-contracted		

Check-list for the Recognition of National Quality Assurance Organisations				
Necessary documents for certification bodies following EN 45011			**Date of the document**	**Document (N) // Remarks**
		inspectors includes: provisions on confidentiality and conflicts of interests and requirements for expertise and training		
13	O	Certification reports and documentation system		
13.01		Applications for the quality label		
13.02		Inspection report		
13.03		Sampling protocol		
13.04		Documentation of analysis results		
13.05		Documents on granting, maintaining, expanding, suspending or withdrawing the quality label including warnings, sanctions and deadlines set		
13.06		Certificates		
13.07		Identification, handling, archiving of records and personal documents ensures confidentiality and data protection		
14	O	Approval of producers in the NQAS includes the following elements:		
14.01		• scope and procedure of internal quality management (QM) measures		
14.02		• number and scope of external monitoring (third-party surveillance),		
14.03		• plant operation according to this quality manual,		
14.04		• relevant quality requirements pursuant to European and national legislation, and ECN-QAS demands		
15	O	Random check of plant inspection records relate to and include:		
15.01		• Evidence of external quality control by acknowledged laboratory		
15.02		• Comprehensive initial testing of the composting/digestion plant based on the legal, normative and contractual requirements		
15.03		• Records/reports to be submitted on the		

Check-list for the Recognition of National Quality Assurance Organisations				
Necessary documents for certification bodies following EN 45011			**Date of the document**	**Document (N) // Remarks**
		plant		
15.04		• On-site inspection of the operation quality (checklist) as a minimum every two years (see Annex C I 5/ CII 6)		
15.05		• Additional on-site inspection in the case of irregularities in monitoring, product analyses or any complaints		
15.06		• Advices, warnings and sanctions on the basis of a scheme defined in the by-laws or general rules		
15.07		• In the case of deficiencies: written information of the operator (type and scope of the deficiency or non-compliance and possible solutions; in case of 'no response' within a set time frame, written information to Quality Committee)		
16	O	Provide a sample taking and laboratory qualification system in accordance with ECN-QAS requirements		
17	O	Scale of fees, business conditions		
18	O	List of the published certificates		
19	O	Regulation to design and use a conformity sign (if available)		
20	O	Prospectus and other advertising material describing the certification body		

QUALITY MANUAL

C. European Quality Assurance Scheme - Part I: ECN-QAS for Compost

C. European Quality Assurance Scheme - Part I ECN-QAS for Compost

C. European Quality Assurance Scheme - Part I: ECN-QAS for Compost

1 Scope

Part C I of the ECN-QAS Quality Manual specifies requirements for the

- operational process management of composting,
- selection of input materials, and
- compost quality.

It also includes specifications for sampling and testing and defines requirements for product certification and declaration to ensure that the compost products are consistently fit for their intended uses.

As a principle the certification of the ECN-QAS is only granted for compost which is produced from biodegradable materials stemming from natural processes that have been separately collected at the source of origin, and have not been mixed, combined or contaminated with other potentially polluting wastes, products and materials.

Compost quality criteria include parameters for the characterisation of compost as soil improver, organic fertiliser and growing media as well as limit values for human and animal indicator pathogens, potentially toxic elements (heavy metals), aerobic biological activity, physical contaminants (impurities), and weed seeds.

The ECN-QAS is applicable for composting facilities, which produce compost for the professional or private market sectors. For specific uses, such as growing media constituent, certain requirements, (e.g. electrical conductivity, maturity, plant response), have to be considered. The producer of compost is responsible for establishing and consistently fulfilling any additional quality needs, such that the compost is fit for purpose.

The ECN-QAS is also applicable for compost produced from digestate (biogas plants) as long as only source-separated biodegradable materials as defined in Annex C I /II 2 are used as input materials of the fermentation process.

2 Definitions

For the purposes of this part C I, the following definitions apply:

Animal By-Product (ABP): entire bodies or parts of animals or products of animal origin referred to EU Regulation 1069/2009

Approval: permission for a product or process to be marketed or used for stated purposes or under stated conditions

Audit: conformity assessment; systematic, independent, documented process for obtaining records, statements of fact or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled.

Batch: physically separated quantity of product manufactured by the same process under the same condition, labelled in the same manner and assumed to have the same characteristics

Note: Composting system that operate on a continuous basis will carry out monitoring and assessment on a series of "portions of production" rather than batches. Where "batch" is used in these quality manual, composters operating such systems should be interpreted batch as "portion of production".

Batch code: designation that is unique to a composting batch, set of batches or portion of production that has undergone product preparation separately from any other composting batch(s) of portion of production

Biodegradable materials: materials capable of undergoing biologically mediated decomposition

Bio-waste: biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants. Definition referred to Waste Framework Directive 2008/98/EC. It does not include sewage sludge, not separately collected household waste, textiles, paper or processed wood.

Certification: Procedure by which a third-party gives written assurance that a product, process or service conforms to specified requirements

Complaint: Expression of dissatisfaction made to a composting plant, related to its products, or the complaints-handling process itself, where a response or resolution is explicitly or implicitly expected

Compost: is defined as humified solid particulate material that is the result of composting, which has been sanitised and stabilised, and which confers beneficial effects when it is added to soil, used as growing media constituent, or used in another way in conjunction with plants

Composting: A process of controlled decomposition and humification of biodegradable

materials under managed conditions, which is aerobic and which allow the development of temperatures suitable for mesophilic and thermophilic bacteria as a result of biologically produced heat

External monitoring (third-party surveillance): Independent product and plant controls to obtain and use a quality label in agreement with the requirements of a quality assurance scheme.

Fitness for use: Suitability of a product for its intended use, determined on the basis of objective and subjective properties, and evaluated on the basis of the user´s individual needs

Grade: means of differentiating composts on the basis of particle size range

Growing media: Materials, other than soil in situ, in which plants are grown

Inspection: Activity such as measuring, examining, testing or gauging one or more characteristics of product or service and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristic.

Inspector: A specialised institute or expert designated by the QAO and commissioned to perform product and plant inspections (audits). Any inspector shall not be a member of the QAO‘s Quality Committee, shall not be the authorised expert/specialised institute or laboratory performing compost assessments and shall not be the person who decides whether certification is awarded.

Maturation: Composting phase in which decomposition processes are already slowed down and complemented by biological transformation and humus formation processes. There is a significant reduction in oxygen consumption as well as in the heat, odour and process water generated.

Monitoring: Supervision; activity, performed either manually or automatically, intended to observe the quality of compost products

Potential Toxic Elements (PTE): Chemical element that has a potential to cause toxicity to humans, flora and/or fauna. The majority are also known as heavy metals.

Quality label: Externally visible marking of a service or product (e.g. quality label, certificate, conformity label)

Operating plan: Process model or schematic representation of regular operational procedures

Operational diary: document for continuously recording operational procedures and measures

Quality assurance: Part of quality management aimed at fulfilling quality requirements in order to build trust

Quality assurance system: Collective term covering all internal requirements for operational procedures and their documentation as well as all operational measures taken,

including inspections by an external quality assurance organisation

Quality assurance organisation: External organisation verifying quality management in a composting plant

Quality management system: Management system to direct and control an organisation / a company with regard to quality

Recognition: Acknowledgement of the validity of a conformity assessment result provided by another person or body

Sanitisation: Reduction of human, animal and plant pathogens to acceptable levels as a result of the composting process

3 Operation Quality

This chapter lays down the principle of quality management as applied by composting plants. It describes the requirements for operational procedures and their documentation to be performed in a composting plant.

The operation quality is documented by general data of the composting plant and an operational plant description. This comprises the entire management of the production process as follows

- Reception of suitable input materials,
- Pre-treatment,
- Composting process,
- Sanitisation,
- Compost refining (e.g. screening),
- Storage and declaration of compost products, and
- Complaints management.

Measures which are carried out on a regular basis shall be laid down in an operating plan. Those measures shall be recorded in the operational diary (paper or electronically).

3.1 General data

General data constitute a summary of operational and plant data that shall be collected and stored in a centralised place. The following data shall be included (if applicable to the specific plant in question).

- Legal basis (e.g. complete approval file including the technical report, technical project, all administrative orders, permits – in a clear and easily accessible form, operator contract);
- Site of the composting plant (including land registry data on the plot);
- Receipt and delivery times (opening hours);
- Data on the licensee (operator, owner, waste owner number, compost producer, addresses, telephone numbers, contacts);
- Managing director under commercial/trade law;
- Operational manager in charge (contact);
- Employees: number, tasks, responsibilities, plant-related matrix of responsibilities, including relevant training certificates;

- Compost production pursuant to legal provisions (e.g. National Biowaste Ordinance or Compost Ordinance);
- Material flow: list of material received, quantity of finished compost produced;
- Compost production (m^3 compost/year);
- Organisation of quality management and assurance (e.g. quality manual, software, documentation system): reference to the place where the relevant documentation is kept;
- Laboratory contracted for external quality control;
- File with compost declarations in compliance with compost test reports;
- Membership in a quality assurance organisation; name of the organisation, contact in charge.

3.1.1 Plant description

The plant description shall include a process model (Annex C 1) identifying control points. Further process control records for the assessment of the operational procedures should be kept.

The processes and procedures applied in the composting plant shall be described in the form of a process model describing at least the following features:

- Type of raw materials;
- Treatment steps;
- Any further processing measures;
- Documentation of control points and measures.

The process model shall include measures of the quality management system. All operational steps shall be in line with that model.

Process control measures shall be recorded and corresponding operational procedures must be laid down in a quality manual with operating instructions. Records of process control are for example, temperature measurements, measures to minimise odour, aeration, turning, watering, covering and screening.

3.1.2 Odour minimisation

From reception to the delivery of finished compost, odour emissions and exposures shall be minimised by regular measures (e.g. mixing, turning, watering, forced aeration, biofilter) as well as by taking account of prevailing weather conditions and wind directions in dependence of the plants location relative to potential points of exposure.

3.1.3 Cleanliness of the plant

In line with the material throughput and the activities performed, the plant shall be kept clean with a view to ensuring trouble-free operations. In particular, it is to be ensured that regular and timely measures are taken to check drainage facilities, to drain off surface water/leachate, to check the free capacity of leachate basins as well as to examine control drains.

3.1.4 Adequate availability of machinery capacity/machinery failure

To ensure adequate availability, the measures to be taken in the case of machinery failure or staff shortages shall be defined (e.g. in a contingency plan).

3.2 Input materials

Input materials shall be biodegradable materials that have been separately collected and have not been mixed, combined or contaminated with other potentially polluting waste, products or materials. Municipal sewage sludge and mixed municipal waste are excluded. In Annex C 2 suitable input materials are listed. This list is mandatory and can be amended by the ECN-Quality Committee on a case by case procedure.

Measures shall be taken to ensure that receipt and acceptance of input material does not give rise to an unacceptable nuisance, in particular through odours, and does not interfere with the treatment and composting process.

The plant's operator shall ensure that only input materials listed in Annex C 2 are accepted for composting. For that purpose, the operator shall meet the following requirements:

- Presence of a technically qualified person during the opening hours and immediate receipt control of the materials delivered.
- If the plant is not permanently staffed, the facility shall be equipped with a lockable gate or barrier and provided with a sign indicating the opening hours and pointing out that raw material must not be delivered outside the indicated opening hours.
- Protection of the premises against unauthorized access (at least a warning sign).
- The plant's operator shall document both the receipt and the rejection of material together with the date of delivery, type, mass, origin and supplier.
- Depending on the type of materials delivered, care shall be taken to store each type of material separately so that the desired composition of a compost batch and compost quality can be achieved (e.g. for organic farming).
- Material supplied shall be considered accepted after control and unloading at dedicated compartments on the plant's premises with the permission of the plant's

operator. Without the operator's prior consent, raw material shall not be deposited outside of the opening hours for the receipt of materials and, therefore, shall not be considered accepted (non-consensual deposition).

- Documentation of the tipping area of input materials (allocation to batches, intermediate storage), off-specification batches.
- Documentation of measures to reduce odour emissions during reception and pre-treatment.
- The plant operator or the responsible person in charge shall document whether the materials delivered are stored temporarily or directly used in a compost batch.
- The storage and treatment routes of materials which are not used for composting (e.g. separated impurities, off-specification compost batches, chopped wood) shall be documented.

3.2.1 Pre-treatment

Pre-treatment (shredding, mixing, adjusting the material's moisture) aims at producing an optimum compost input mixture for the subsequent composting process.

Materials causing intensive odour emissions shall be treated in a way to minimise odours on the day of delivery within a reasonable time frame (e.g. mixing, piling up, covering).

3.2.2 Shredding

If necessary, the input materials shall be shredded. Thereby, for example, the fibres of bulky, lignified materials should be broken up.

3.2.3 Mixing

Depending on the type of material, its structure, odour potential and water content, specific mixtures are to be produced to minimise odours and to obtain an optimum particle size distribution and air pore volume respectively.

To safeguard the procedure, it is important to make sure that the material to be composted contains an adequate share of structured material in order to guarantee optimum decomposition conditions (adjustment of the C/N ratio, structural stability, water content, odour minimisation).

3.2.4 Intermediate storage

Intermediate storage shall be done in a separately designated area.

3.3 Batch formation and documentation

Batch formation procedure shall be stated in the operational diary. A batch record shall contain the following data:

- Used input materials, including additives and their mixture,
- Origin of the input materials (intermediate storage or delivery note),
- Quantity piled up,
- Piling-up date,
- Windrow type (e.g. triangle, table, trapezoid),
- Batch location,
- Batch code.

3.4 Management of the composting process

Each composting batch shall undergo a intensive decomposition and maturation in accordance with defined control points in the operational plan.

3.4.1 Intensive decomposition phase

The intensive decomposition phase includes thermal hygienisation in order to provide the necessary reduction of human, animal and plant pathogens.

During the intensive decomposition phase, optimum conditions shall be ensured to support the decomposition processes.

Intensive decomposition may take place in closed or open systems and with or without forced aeration.

The minimum water content should be ≥ 40 to 50 % and the pH-value should be approximately 6 to 8.

Further recommendations for time-temperature profiles in closed and open composting systems are given in the table:

Time-temperature profiles for sanitisation typically applied in national regulations and composting standards			
Composting system	**Temperature**	**Time**	In all open composting systems physical agitation (turning and mixing) of the material it is recommended in order to guarantee that all the material is exposed to the minimum temperature required.
Open windrow system	> 55 °C > 65 °C	10 days 3 days	
Closed system	> 60 °C	3 days	

The proposed time-temperature profiles are recommendations. NQAO has to adopt minimum requirements for the time-temperature regime and its documentation.

Particularly in regard to composting facilities treating animal-by-products (ABP) national requirements for sanitisation of the Animal-By Product Regulation (EC No. 1069/2009) have to be considered.

During the intensive decomposition phase, operational measures (dates of turning, watering, control of forced aeration, subjective assessment of odour) shall ensure optimum decomposition conditions at minimised odour emissions.

The following measures and data of process control shall be recorded in the operational diary (together with the date):

- Temperature measurements during sanitisation,
- Determination of the water content (e.g. measurement, fist test),
- Watering,
- Turning,
- Aeration,
- Any other measures, such as covering with fleece, screening.

3.4.2 Maturation

Maturation follows immediately after the intensive decomposition phase. Degradation is complemented by transformation processes which form new complex humic substances at temperatures of less than 40 to 50 °C.

During maturation, care shall be taken to:

- prevent anaerobic conditions caused by excessive humidity or compaction as a function of structure and windrow height (e.g. by turning as required),
- prevent drying out,

- reduce dust emissions during manipulation (adjustment to an optimum water content, appropriate cleaning of roads),
- prevent re-infection resulting from the introduction of pathogenic germs from raw material batches not yet sanitised,
- prevent the introduction of seeds (preventing vegetation on compost windrows).

The documentation of maturation should include a batch documentation covering watering, turning, aeration, any other measures, such as covering with fleece, screening etc..

3.5 Storage of compost

Stabilised and matured compost should be stored:

- Either on sealed ground with proper rainwater and leachate drainage + collection, or
- On open topsoil, respecting precipitation and licensing requirements (if required coverage by fleece or under roof to prevent nutrient leaching, prevention of waterlogging).

The documentation of storage shall cover at least the following data:

- Designation of the storage area(s)
- Unambiguous batch code and declaration of the compost batch(s)
- Records on the quantity and customers or utilisation for own purposes.

3.6 Management of complaints

Within the framework of complaints management, the following minimum documentation shall be kept:

- Name, address and telephone number of the complainant
- Date and time when the complaint is received
- Subject of the complaint
- Work performed at the time of the complaint
- Weather conditions (e.g. temperature, wind direction, precipitation)
- Operational measures taken with respect to the complaint

4 Compost Quality

This chapter lays down the definition of product types and the requirements for product quality. Further it includes the requirements for analytical measurements, product declaration and recommendations for the proper use.

4.1 Compost definitions

The ECN-QAS defines a common compost standard, which includes minimum quality criteria for compost in defined market sectors. To this purpose, compost is specified as organic soil improver or fertiliser, and as constituent for growing media and potting soils.

Minimum requirements for the treatment process, which have to be met in order to achieve the necessary level of aerobic biological activity should be defined by the QAO. The aerobic biological activity should be declared, including the used analytical method. In addition application requirements have to be declared by the compost producer or importer placing the compost on the market.

Compost as constituent in growing media additionally has to comply with minimum requirements of electrical conductivity (salt content) and plant response.

4.2 Compost quality criteria

The ECN-QAS Quality Label can only be applied to compost which successfully meets the corresponding quality requirements. Value giving quality criteria are mainly defined by the content of organic matter, plant nutrients and liming value. Further specifications include physical properties, electrical conductivity and pH. An important criterion for the testing of the suitability for certain uses is the testing of plant response.

If the ECN-QAS Quality label for compost is applied the requirements which are laid down in Part C I shall be fulfilled completely.

4.2.1 Minimum set of compost properties for declaration

National regulations specifying declaration and labelling requirements which interfere with the declaration rules defined in the following table have to be respected accordingly.

Quality criteria	Parameter	Dimension	Appraisal
Soil improvement	Organic matter	[% DM]	≥ 15 %, declaration
	Liming value (CaO)	[% DM]	declaration
Fertilizing properties	Nitrogen (N) total	[% DM]	declaration
	Phosphorus (P) total	[% DM]	declaration
	Potassium (K) total	[% DM]	declaration
	Magnesium (Mg) total	[% DM]	declaration
Material properties	Maximum particle size	[mm]	declaration
	Bulk density	[g/l FM]	declaration
	Dry matter	[% FM]	declaration
	Salinity / El. conductivity	[mS/m]	declaration
	pH value		declaration
Biological parameters	Aerobic biological activity		declaration
	Plant response[1)]		declaration

[1)] The declaration of plant response is only necessary if the compost is used as mixing compound in growing media.

4.2.2 Precautionary criteria (limit values)

Precautionary compost criteria for consumer and environmental protection are the heavy metal content, the amount of impurities (glass, metals, plastics) and hygienic aspects (Salmonellae, weed seeds).

Composting plants awarding for the ECN-QAS Quality Label should meet the limit values set in the ECN-QAS Quality Manual. Independent of the ECN-QAS values the appropriate national thresholds have to be met at all times.

In the case of Cu and Zn, the values represent orientation thresholds. If Cu and Zn exceeded the concentration of 110 mg Cu kg^{-1} dry matter or 400 mg Zn kg^{-1} the elements shall be declared.

Precautionary quality criteria	Parameter	Limit value
Hygiene	Salmonellae	Absent in 25 g dry matter
Undesired ingredients and properties	Impurities (content)	≤ 0,5 % dry matter
	Weed seeds	≤ 2 seeds per liter
Inorganic pollutants	Lead (Pb)	130 mg kg^{-1} dry matter
	Cadmium (Cd)	1.3 mg kg^{-1} dry matter
	Chromium (Cr)	60 mg kg^{-1} dry matter
	Copper (Cu)[1)]	300 mg kg^{-1} dry matter[2)]
	Nickel (Ni)	40 mg kg^{-1} dry matter
	Mercury (Hg)	0.45 mg kg^{-1} dry matter
	Zinc (Zn)[1)]	600 mg kg^{-1} dry matter[2)]

[1)] Copper (Cu) and Zinc (Zn) are also considered as trace elements. Values exceeding 110 mg Cu kg^{-1} dry matter and 400 mg Zn kg^{-1} dry matter must be declared.

[2)] These values represent orientation thresholds.

The quality standard for compost concerning potential toxic elements (PTE) is based on the study “Heavy metals and organic compounds from wastes used as organic fertilisers” (Amlinger et al. 2004). This study presents a scientific and statistical concept towards threshold values for composts used in agriculture after considering general accumulation scenarios in soils and actual compost qualities from separately collected biowaste. This approach takes into account the following:

a) Soil threshold values for multifunctional soil use

- The precautionary values of the German Soil Protection Ordinance for sandy and clayed soils, these values are regarded as one of the most stringent approaches to soil safety in Europe
- The proposal of the Joint Research Centre (JRC) for acidic and neutral soils which were suggested for a revision of the EC Sewage Sludge Directive on the basis of European soil surveys on PTEs.

b) Compost PTE concentrations

- A statistically weighted average of seven country–median (or mean) values and the 90th percentile values

c) PTE outputs from the system

- Average total export of heavy metals via harvest (cereals, maize, sugar beet, potatoes) and leaching taken from figures in Germany.

d) Time scale of accumulation scenarios

- 100 and 200 years as reference time frames for the accumulation of PTEs against the assumed soil threshold values in order to allow for a sufficiently long time-frame to address the issue of diffuse contamination at the source through improved technology in industrial processes, transport etc.

e) Soil depths and density

- 20 and 30 cm at 1.5 g cm^{-3} resulting in 3.000 and 4.500 t ha^{-1} respectively.

f) Soil background concentrations for PTEs

- Differentiated for sandy and clayey soils taken from average values of national surveys or three European Countries (DK, FR, DE).

g) Yearly application of compost

- This is derived from lower (30 kg ha^{-1} y^{-1}) and higher (60 kg ha^{-1} y^{-1}) phosphorus supply on the basis of P_2O_5 contents in biowaste compost (0.65 % dry matter). It resulted in 4.6 and 9.2 t dry matter compost ha^{-1} y^{-1} respectively.

The proposed values can be regarded as general threshold values for sustainable, regular use of compost in food and feeding stuff production as well as hobby gardening.

4.3 Compost analysis

The ECN-QAS includes regular sample taking and compost analysis of the relevant quality parameters conducted by independent laboratories (see chapter 4.3.3).

It is recommended on account of long years experiences to have 100 % external sampling. In agreement with the ECN-QAS it can be admitted that up to 50 % of the samples can be taken by the correspondingly educated plant manager.

The relevant quality parameters for the ECN-QAS are documented in chapter 4.2. The analytical report and the assessment are delivered directly to the Quality Assurance Organisation (QAO) by the laboratory.

The frequency of compost analyses and sample taking should be calculated on the basis of following equation as a minimum requirement:

Amount of input material / 10.000 [t] + 1 = Analyses per year, 12 per year at maximum.

Any non-integer value should be rounded up to the next integer.

In the first year of recognition at least four inspections for composting plants with a treatment capacity > 4000 t input material per year should be carried out - one for every season - for assessing the essential quality characteristics over the course of the year. For plants with an annual input of more than 30.000 tonnes the sampling and analysis frequency in the first year of recognition is calculated according to the general formula. Generally one sample should be taken every three months.

For small composting plants with a treatment capacity ≤ 4000 t input material per year one sample for every 1000 t input material, rounded to the next integer, is required in the recognition year.

Sampling and analysis frequency for composting plants		
Input material	**Recognition year**	**Monitoring phase**
≤ 1000 t	1	1
1001 - 2000 t	2	1
2001 - 4000 t	3	1
4001 – 10.000 t	4	2
10.001 - 20.000 t	5	3
20.001 – 30.000 t	5	4
30.001 – 40.000 t	5	5
40.001 - 50.000 t	6	6
50.001 – 60.000 t	7	7
60.000 – 70.000 t	8	8
70.001 – 80.000 t	9	9
80.001 – 90.000 t	10	10
90.001 – 100.000 t	11	11
> 100.000 t	12	12

Existing analytical reports and assessments which comply with the requirements set out in Part C of this Quality Manual and which are not older than 18 months can be accepted by the QAO.

4.3.1 Sampling

Samples for investigation should be taken from the marketable compost.

According to the production each type and grade of compost should be sampled

- when the batch has completed the composting process,
- after screening, and
- before any blending with other materials.

Each final sample sent for analysis shall be representative of the batch or portion from which it is obtained. Sampling should be done according to EN 12579.

The maximum batch size or portion of production from which the representative sample is derived should be appropriate to the system, test results for the compost grade and the indented customer's supply.

The volume of the final sample should be sufficient for all analyses including in the ECN-QAS. As a general rule the sample quantity should be approximately 15 to 20 l.

It is recommended that a retain sample is stored for at least 6 month. To minimize any changes in the compost properties, retain samples should be kept in a dark, dry place at a temperature between 1 and 10°C.

The compost producer and/or the sample taker should make and keep a sampling protocol (see for example Annex C I 3) of each sample, including

- the name of production plant,
- the name of sample taker,
- date of sampling,
- code(s) of the batch(s) from which the sample was taken,
- code of sample,
- location of sampled batch or portion,
- compost type and grade,
- total processing time of sampled compost batch,
- the laboratory, contracted with the analyses and tests.

4.3.2 Analytical test methods

The European Commission has mandated CEN with the development of horizontal standards (test methods) in the field of sludge, (treated) biowaste and soil under

consideration of the characterisation of waste (Mandate M/330). The test methods are needed in view of upcoming EU Directives.

The mandate considers standards on sampling and analytical methods for hygienic and biological parameters as well as inorganic and organic parameters. Consequently the CEN Technical Board (BT) created a Task Force /TF 151) “Horizontal Standards in the fields of sludge, bio-waste and soil” (CEN/BT TF 151). On most sampling and analytical topics, the final consultation and validation of the draft standards took place in autumn 2007. The work of the former TF 151 has been continued by a technical project committee, CEN TC 400.

Until horizontal standards elaborated under the guidance of CEN TC 400 become available and commonly accepted, it is recommended to carry out testing and sampling in accordance with the current test methods developed by Technical committee CEN 223 ‘Soil improvers and growing media’.

Until no European standards (EN) for methods are required in an EU legislative on biowaste national test methods and accepted test methods by national provisions may be used.

Analysis should be carried out by approved laboratories for the performance of the required tests in an acknowledged quality assurance system.

4.3.2.1 Terms and definitions

The glossary is regarded to be useful for a uniform comprehension and in order to keep univocal interpretation on test methods.

Bulk density: Ratio of the dry mass and volume of the sample in grams per litre measured under standard suction conditions (suction pressure: 10 cm); it is sometimes referred to as “apparent density”.

Dry matter: The portion of substance that is not comprised of water. The dry matter content (%) is equal to 100 % minus the moisture content %.

Electrical Conductivity: Measure of a solution’s capacity to carry an electrical current; it varies both with the number and type of ions contained in the solution; it is an indirect measure of salinity.

Heavy Metals: Elements whose specific gravity is approximately 5 or higher. They include lead, copper, cadmium, zinc, mercury, nickel, chromium.

Impurities: Physical impurities are defined as all non-biodegradable materials (glass, metals, plastics) with a size > 2 mm.

Liming value: Calcium and magnesium in basifying form (e.g. as oxide, hydroxide and carbonate)

Maturity: Maturity (see also ‘stability’) can be defined as the point at which the end product

is stable and the process of rapid degradation is finished, or, a biodegraded product that can be used in horticultural situations without any adverse effects. The term maturity can also be interpreted in a wide sense, and also includes the term stability. An attempt to define maturity could be that it is a measure of the compost's readiness for use that is related to the composting process. This readiness depends upon several factors, e.g. high degree of decomposition, low levels of phytotoxic compounds like ammonia and volatile organic acids.

Test methods: Analytical methods approved by Member States, institutions, standardising bodies (CEN, UNI, DIN, BSI, AFNOR, OENORM etc.) or by reliable manufacturers' associations (BGK in Germany, AFOR in UK, etc.).

Moisture content: The liquid fraction (%) that evaporates at 103 ± 2°C (EN 13040).

Organic matter (OM): The carbon fraction of a sample of compost which is free from water and inorganic substances, clarified in EN 12829 as 'loss on ignition' at 550 ± 10 °C or in EN 13039 as 'loss on ignition' at 450 ± 10 °C.

Plant response: Compost quality testing in order to prevent composts with any plant growth inhibiting factors from entering in the market (Pre-normative European standards of CEN/TC 223 prEN 16086:2010 and prEN 16089:2010) for soil improvers and growing media).

Stability/Stabilisation: Refers to a stage in the decomposition of organic matter during composting. The stability is measured as residual biological activity like the Oxygen uptake rate (Pre-normative European standard of CEN/TC 223 16087:2010 for soil improvers and growing media), Self-heating test (DIN V 11539; Pre-normative European standard CEN/TC 223 for compost 16088:2010). Material that is not stable, but still putrescent, gives rise to nuisance odours and may contain organic phytotoxins.

Weed seeds: All viable seeds (and plant propagules) found in end products (FprCEN/TS 16201).

4.3.2.2 Test methods

Testing parameters	Methods	Methods
General parameters	**CEN TC 223**	**CEN TC 400 HORIZONTAL**
pH value	EN 13037	EN 15933
Electrical conductivity	EN 13038	EN 15937
Water content	EN 13040	EN 15934
Dry matter content	EN 13040	EN 15934
Organic matter content	EN 13039	EN 15935

Testing parameters	Methods	Methods
Nutrients	**CEN TC 223**	**CEN TC 400 Horizontal**
N (total)	EN 13654-1 (solid)	EN 16168/16169
P (total)	EN 13650	EN 16174/EN 16170/EN 171
K (total)	EN 13650	EN 16174/EN 16170/EN 171
Mg (total)	EN 13650	EN 16174/EN 16170/EN 171
Biological parameters		
Weed seeds	-	EN TS 16201
Physical contaminants		
Impurities	-	EN TS 16202
Chemical contaminants		
Pb	EN 13650	EN 16174/EN 16170/EN 171
Cd	EN 13650	EN 16174/EN 16170/EN 171
Cu	EN 13650	EN 16174/EN 16170/EN 171
Cr	EN 13650	EN 16174/EN 16170/EN 171
Ni	EN 13650	EN 16174/EN 16170/EN 171
Zn	EN 13650	EN 16174/EN 16170/EN 171
Hg	ISO 16772	EN 16174/EN 16170/EN 171
Hygienic aspects		
Salmonellae	ISO 6579	CEN/TR 15215-1, CEN/TR 15215-2, CEN/TR 15215-3

4.3.3 Approval of laboratory

Sampling and analyses should be done by approved laboratories. The approved labs have to pass regularly (every three years) laboratory ring tests for compost analyses.

4.4 Compost storage

Compost products should be stored according to chapter 3.5. The stored products should be labelled with information about the batch, the product type and grade.

Any batch sample for testing shall be kept on site until the test results have been properly checked by the operator.

4.5 Compost declaration and labelling

The following information shall be provided with the compost product dispatched from the composting facility (whether the product is packaged or unpackaged), either written on the packaging or on accompanying fact sheets (see Annex C I 6):

(a) the name and address of the compost producer,

(b) compost designation identifying the product by type,

(c) compost grade,

(d) batch code,

(e) the quantity (in weight and/or volume),

(f) the main input materials (those over 5 % by volume) from which the product has been manufactured,

(g) the main quality characteristics (value giving parameters and precautionary criteria),

(h) product declaration in line with national regulations (e.g. fertiliser regulation, biowaste or compost ordinance),

(i) the conformity with national quality assurance requirements,

(j) the conformity with the requirements of ECN-QAS,

(k) the recommended conditions of storage,

(l) a description of the application areas for which the compost can be used and any limitations on use,

(m) recommendations for the proper use.

With the recommendations for proper application, based on the product characteristics, it should be guaranteed that the compost use follows best practice within the specified use area.

Typical application areas and market sectors for compost are:

- Agriculture and soil-grown horticulture;
- Horticulture;

- Hobby gardening;
- Potting soil and growing media;
- Landscaping and turf production;
- Land restoration and reclamation.

5 Certification Process

5.1 Procedure of quality assurance

Quality assurance of operational processes shall be evidenced by

- the recognition procedure (initial on-site inspection) performed by the QAO,
- continuous internal production control, and
- regularly third-party inspection by the QAO.

In this respect, a distinction is to be made between the requirements set out for initial testing and the parameters to be tested continuously. An inspection contract shall be concluded between operators of composting plants and the QAO. That contract may already come into existence when an operator joins a QAO and thereby agrees to comply with its statutes and other regulations.

5.1.1 Recognition procedure

The recognition procedure includes comprehensive initial testing and examination by the QAO approving compliance with the requirements set out in Part C I. Only after passing the recognition procedure a QAO member is entitled to use the ECN-QAS Quality label.

All specifications defined in the ECN-QAS Quality Manual have to be implemented within 12 months. Based on well documented justification a prolongation up to 6 months can be granted by the QAO. If recognition cannot be granted due to a serious deficiency within that period of time, the recognition procedure is suspended for one year.

5.1.2 Initial testing

The plant data submitted and/or otherwise available shall be checked at the plant's site. During a thorough on-site inspection, the plant should be examined following the check-list in Annex C I 5. In particular, the following requirements shall be met:

- Standardised process management;
- Availability of equipment/downtimes of machinery;
- Operational procedure pursuant to operation plan.

5.1.3 Administrative orders and conditions imposed, including reporting duties

All the administrative orders issued shall be examined together with the plant's operator with a view to their implementation and compliance with deadlines set therein. Special attention is to be paid to reporting and documentation duties

5.1.4 External quality control

External quality control is the key process for compost production and product approval. It is the pre-requisite for the appropriate marketing of compost in line with ECN-QAS.

Available compost test reports shall be checked with a view to their timely commissioning, completeness, correctness and plausibility. Only technically correct test reports will be recognized. The QAO should provide a list of approved laboratories which are authorised to perform external quality control (third-party surveillance).

5.1.5 Inspection of records and the plant's documentation

The existing internal records shall be inspected for plausibility, completeness and correctness under the terms of the ECN-QAS Quality Manual. The records shall be examined for compliance with the actual operational procedure and the operational plan.

The inspection shall examine:

- at least the entire biography of one batch (from receipt to compost supply), and
- at least one period of time (from one week to one month depending on the plant's size).

The following general data shall be examined:

- Basic facility data;
- Plant description;
- Standardized process management (process model, process control records, odour minimisation, cleanliness of the plant, strong rainfalls, elimination of interfering substances);
- Operational procedure (suitable input materials, receipt and acceptance, interfering substances, preparation and intermediate storage, main digestion, maturation, fine screening, storage of finished compost);
- Plant-specific complaints management;
- Compost supply or marketing.

5.1.6 Periodical third-party surveillance

The QAO shall perform an on-site inspection at minimum once every two years.

Special attention shall be given to the following aspects:

- Follow-up of the results of initial testing,
- Control of quality management according to ECN-QAS quality manual

On the basis of the recognition procedure or subsequent inspections, the QAO shall check the records of general data on actuality (listed under 5.1.5) on an annual basis.

5.1.6.1 On-site inspection of the composting plant

All the administrative orders issued shall be examined together with the plant's operator for on-site-inspection.

The existing internal records shall be inspected for plausibility, completeness and correctness including

- Reception and receipt control: type, quantity, origin, date, supplier, etc.;
- Batch management: storage, piling up (date), batch composition, batch number, merging of batches, location;
- Composting technique: temperature, humidity of the material, turning, irrigation, screening, etc.;
- Compost quality: number of analyses per year, checking compost assessments for plausibility and correctness;
- Completeness and correctness of compost designation and labelling;
- Correspondence of compost labelling and the results of external quality control;
- Availability of the compost data sheet to compost customers and users;
- Sorted impurities: quantity, storage and disposal;
- Other materials received that are not composted (quantity and further treatment) - separate accounting.

During a thorough on-site inspection, the plant shall be examined for compliance with the criteria listed in Annex C I 5. Care shall be taken to ensure that the following requirements are met:

- Protection of the plant against unauthorised access (at least by a warning sign),
- Sign of company (name, address, opening hours),
- Cleanliness at the plant,

- Correspondence between the batch plan/batch codes and records,
- Storage of materials,
- Materials received in line with records,
- Composting technique,
- Free capacity of drainage water tanks,
- Description of striking emissions (e.g. dust, wind transport, gaseous or liquid emissions).

5.1.6.2 Quality control of compost analyses

Available external quality assessments shall be checked with a view to their timely commissioning, completeness, accuracy and plausibility. Only technically correct compost test reports will be recognized. If test reports are rejected, the company shall supply corrected or new test results within a maximum period of four months. Failure to meet this deadline means that the quality label (seal) shall be withdrawn.

To efficiently check the correctness of external quality control, the acknowledged laboratory shall send a copy of the test report to the QAO at the same time as the original is dispatched.

The QAO is entitled to request additional analyses with regard to scope and frequency - differing from the ECN-QAS - for granting the ECN-Quality Label.

5.2 Compost certificate

If all requirements are fulfilled the ECN-QAS Quality Label is awarded to the compost products. A compost certificate (Annex C 6), based on the analytical results and the on-site inspection, is generated. This compost certificate includes following information:

a) The name and address of the compost producer responsible for marketing;

b) Product type and grade;

c) The main input materials (those over 5 % by volume) from which the compost is generally manufactured;

d) The main quality characteristics (listed in chapter 4) and analytical results (average, minimum and maximum values);

e) Product declaration in line with national regulations (e.g. fertiliser regulation, biowaste or compost ordinance);

f) The conformity with national quality assurance requirements;

g) The conformity with the requirements of ECN-QAS;

h) The quality label of NQAO:

i) The recommended conditions of storage;

j) The fitness of use in intended applications and any limitations on use.

6 References

Amlinger, F., Favoino, E., Pollak, M., Peyr, S., Centemero, M., Caima, V., 2004: Heavy metals and organic compounds from wastes used as organic fertilisers. Study on behalf of the European Commission, Directorate-General Environment, ENV.A.2; http://europa.eu.int/comm/environment/ waste/compost/index.htm

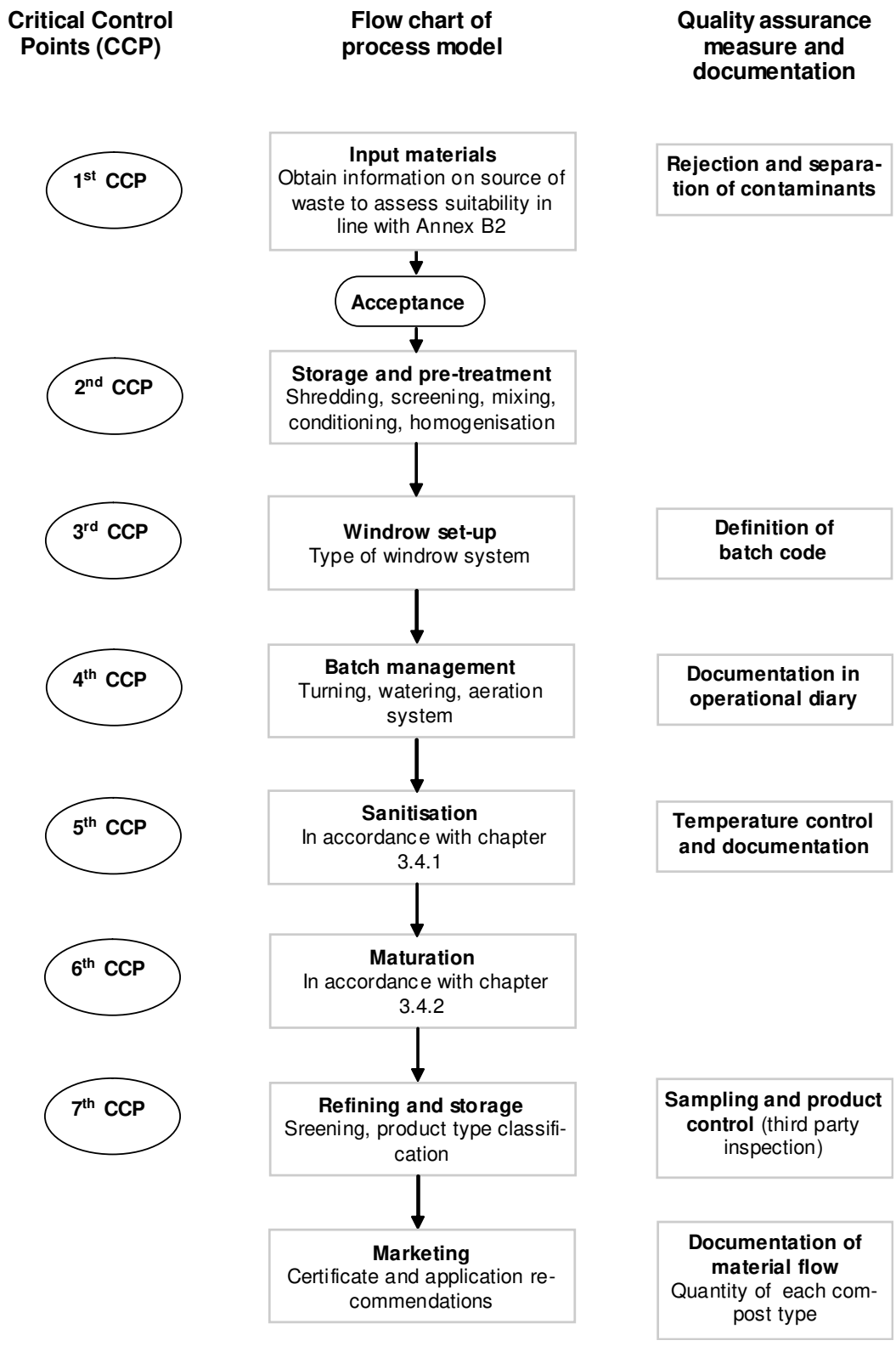
BGK, 2006: Methodenbuch zur Analyse organischer Düngemittel, Bodenverbesserungsmittel und Kultursubstrate, ISBN 3-939790-00-1

ÖNORM S 2206-1:2006: Requirements for quality assurance system for the production of composts. Part 1: Principles for quality assurance of a company and of the internal technical processes. Edition 2004, authorised English translation, Austrian Standardisation Institute Vienna, 2006.

ONR 192206: Implementation of quality assurance on composting plants. Edition 2006, authorised English translation, Austrian Standardisation Institute Vienna, 2006.

RAL, 2007: Kompost – Gütesicherung RAL-GZ 251, Sankt Augustin

Annex C I 1: Process Model



Annex C I 2: Suitable raw material with references to the European Waste Catalogue

The materials listed below are in principle suitable for biological treatment.

In case of production of compost, the producer shall put in place the necessary controls on the incoming biowastes to ensure that there is no intentional dilution of polluting substances.

General Remarks

- Category 2 and 3 animal by-products listed in this annex suitable for biological treatment are also subject to Regulation (EC) No 1069/2009 laying down health rules concerning animal by-products not intended for human consumption. The material can only be utilised if compatible with the Regulation (EC) No 1069/2009. Input materials underlying the ABP-Regulation are marked in colunm “remark”.
- Digestion residues: Digestion residues are suitable for composting, only from the treatment of separately collected biodegradable materials, which are listed as input materials in this annex. Input materials which should be treated anaerobically before composting are indicated in column “remark”.
- Sewage sludge is excluded from the input list and regarded as not suitable for the production of quality compost labelled according to the ECN-QAS.
- In order to assess if the used input materials are approved in biological agriculture the specific provisions of the Regulation (EC) No. 834/2007 and No 889/2008 must be respected.

EWC code	Waste type	Specification of permitted materials	Remark
02	**WASTE FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING**		
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**		
02 01 01	Sludges from washing and cleaning	e.g. Soil sludges from sugar beet, potato and other vegetable processing	Washing is done without using any synthetic agents and additives
02 01 02	Animal-tissue waste	Bristle and horn waste, wool, feathers, hair, horns, hoof cuts, raw milk, shell from shellfish, eggs, hatchery by-products, digestion tract content, blood	ABPR [1)] Blood: ABPR Cat. 3 material only; digestion [2)]
02 01 03	Plant-tissue waste	Algae; feed waste; crop waste; mowings; waste plant tissues form agriculture; vegetable components of driftings, plant tissue waste from biofilter materials, Straw, riverine vegetation and spent growing media based on plant tissues, such as compost derived from source-segrated biowaste, peat and bark. sea weed	
02 01 06	Animal faeces, urine and manure, effluent, collected separately and treated off-site	Solid and liquid manure including the following bedding materials: straw, sawdust, wood shavings, and chipped wood	ABPR [1)], Used animal bedding not allowed if it contains veneers, other coatings or preserving substances.
02 01 07	Wastes from forestry	Bark	Not allowed if contains veneers, other coatings or preserving substances.
02 01 99	Wastes not otherwise specified	Spent mushroom substrate	
02 02	**Waste from the preparation and processing of meat, fish and other foods of animal origin**		
02 02 01	Sludges from washing and cleaning	Sludge from milk processing	ABPR [1)] Digestion [2)] Washing is done without using any synthetic agents and additives
02 02 02	Animal-tissue waste	Bristle and horn waste, wool, feathers, hair, horns, hoof cuts, raw milk, shell from shellfish, eggs, hatchery by-products , digestion tract content, blood	ABPR [1)] Blood: ABPR Cat. 3 material only; digestion [2)]

EWC code	Waste type	Specification of permitted materials	Remark
02 02 03	Materials unsuitable for consumption or processing	Former foodstuff	ABPR [1)], products of animal origin, or foodstuffs containing products of animal origin, which are no longer intended for human consumption for commercial reasons or due to problems of manufacturing or packaging defects or other defects from which no risk to public or animal health arise;
02 02 04	Sludges from on-site effluent treatment	Content of fat separators and flotation agents (possible sources: slaughter-houses and meat/fish processing plants)	ABPR [1)], Digestion [2)] Washing is done without using any synthetic agents and additives
02 02 99	Waste not otherwise specified	Sludges from gelatine production, gelatine stampings, filtrations effluents from methionin production	ABPR [1)], Digestion [2)]
02 03 Wastes from the fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation			
02 03 01	Sludges from washing, cleaning, peeling, centrifuging and separation		Washing is done without using any synthetic agents and additives
02 03 04	Materials unsuitable for consumption or processing	Expired flour; Bleach earth de-oiled; Fermentation residues from enzyme production; Crop waste; Yeast and yeast-like residues; Coco fibre; Molasses residues; Oilseed residues; Residues from the production of potatoes, rice, corn or starch; Residues from processing coffee, tea and cocoa; Residues from processing fruit, vegetable and corn; Residues from tinning processes;	

EWC code	Waste type	Specification of permitted materials	Remark
		Seasonings residues; Husk, husk dust and cereal dust; Tobacco dust, veins and sludge Expired foodstuff; Spent filters and absorbing mass (diatomaceous earth) active earth, active carbon; Defective cigarette batches (without filter);	
02 03 05	Sludges from on-site effluent treatment		Digestion [2)] Washing is done without using any synthetic agents and additives
02 04 Wastes form sugar processing			
02 04 03	Sludges from on-site effluent treatment	Soil sludges from sugar beet cleaning and other processing steps	Washing is done without using any synthetic agents and additives
02 05 Wastes from the dairy products industry			
02 05 01	Materials unsuitable for consumption or processing	Former foodstuff Milk and milk processing products	ABPR [1)]
02 05 02	Sludges from on-site effluent treatment		Digestion [2)] Washing is done without using any synthetic agents and additives
02 06 Wastes from the production of baking and confectionary industry			
02 06 01	Materials unsuitable for consumption or processing	Expired bread, pastry, Expired foodstuff Waste dough	
02 06 03	Sludges from on-site effluent treatment		Washing is done without using any synthetic agents and additives
02 07 Wastes from the production of alcoholic and non-alcohol beverages (except coffee, tea and cocoa)			
02 07 01	Wastes from washing, cleaning, and mechanical reduction of raw materials		It has to be ensured that no synthetic detergents and additives are used during washing and cleaning.
02 07 02	Wastes form spirits distillation	e.g. Spent grains fruit, cereal and potato pulp	

EWC code	Waste type	Specification of permitted materials	Remark
02 07 04	Materials unsuitable for consumption or processing	e.g. Yeast and yeast-like residues spent hops malt husks, malt sprouts, malt dust, pomace expired beverages spent filters and absorbing mass (diatomaceous earth) active earth, active carbon	
02 07 05	Sludges from on-site effluent treatment		Digestion [2)] Washing is done without using any synthetic agents and additives
03 WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD			
03 01 01	Waste bark and cork		Natural barks and unmixed products for further processing made from bark only. Not allowed if contains veneers, other coatings or preserving substances.
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer		Only material from untreated wood from the wood processing industry Not allowed if contains veneers, other coatings or preserving substances
03 03 Wastes form pulp, papers and cardboard production and processing			
03 03 01	Waste bark and wood		Natural bark and wood. Not allowed if contains veneers, other coatings or preserving substances.
04 WASTES FORM THE LEATHER AND TEXTILE INDUSTRIES			
04 02 Waste from the textile industry			
04 02 21	Wastes from unprocessed textile fibres	Cellulose fibre wastes Plant fibre waste Wool waste	
07 WASTES FROM ORGANIC CHEMICAL PROCESSES			
07 02 Wastes from plastics, synthetic rubber and synthetic fibres			

EWC code	Waste type	Specification of permitted materials	Remark
07 02 13	Waste plastic	Biodegradable packaging and bioplastics	certified according to EN 13432 If accepted in national regulations and / or in the permission of the composting plant

EWC code	Waste type	Specification of permitted materials	Remark
15 PACKAGING: ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED			
15 01 Packaging (including separately collected municipal packaging waste)			
15 01 02	Plastic packaging	Biodegradable packaging and bioplastics	certified according to EN 13432 If accepted in national regulations and / or in the permission of the composting plant
19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREAMENT, PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION			
19 05 Waste from aerobic treatment of solid wastes			
19 05 03	Off-specification compost	Oversize fraction of screened compost Drainage and waste water from composting	Oversize fraction of screened compost that has been produced from input materials listed in this Annex; Drainage and waste water from composting of input materials listed in this Annex
19 06 05	Liquor from anaerobic treatment of animal and vegetable waste		Liquor from anaerobic digestion of input materials listed in this Annex
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste		Digestate from anaerobic digestion of input materials listed in this Annex
19 09 Wastes from the preparation of water intended for human consumption or water for industrial use			
19 09 02	Sludges from water purification		Digestion [2)]
19 09 03	Sludges from decarbonation		Digestion [2)]
20 MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS			
20 01 Separately collected fractions (except 15 01)			

EWC code	Waste type	Specification of permitted materials	Remark
20 01 08	Biodegradable kitchen and canteen waste	Catering waste [1)]	ABPR [1)] Individual national regulations with diverting treatment requirements for catering waste must be considered
20 01 25	Edible oil and fat		Digestion [2)] Only edible oil and fat of animal origin is covered by ABPR [1)] In this case it is included in the definition of *catering waste*
20 01 38	Wood other than mentioned in 20 01 37		Natural wood. Not allowed if contains veneers, other coatings or preserving substances.
20 01 99	Other fractions not otherwise specified	Separately collected biowaste from households and similar institutions	Bio-bin; brown-bin collection; If it contains catering/ kitchen waste: ABPR [1)] Individual national regulations with diverting treatment requirements for catering waste must be considered
20 02 Garden and park wastes (including cemetery waste)			
20 02 01	Biodegradable waste	Garden and park waste Algae, pond waste Landscape gardening waste	
20 03 Other municipal wastes			
20 03 02	Waste from markets	Separately collected vegetable and other biowaste	

ABPR [1)] Input materials underlying the ABP-Regulation (EC) Nr. 1069/2009
Digestion [2)] Those Input materials are recommended to use preferably in anaerobic digestion before being composted

List of possible additives

EWC code	Waste type	Specification of permitted materials	Remark
10 WASTES FROM THERMAL PROCESSES			
10 01 Wastes from power stations and other combustion plants			
10 01 01	Bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)	Ashes from the incineration of natural plant tissue Ashes from the incineration of faecal matter Ashes from the incineration of meat and bone meal	Only as additive: less than 2% (m/m) in initial mix for composting
19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREAMENT, PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION			
19 01 Waste from incineration or pyrolysis of waste			
19 01 12	Bottom ash and slag other than those mentioned in 19 01 11	Ashes from the incineration of natural plant tissue Ashes from the incineration of faecal matter Ashes from the incineration of meat and bone meal	

Annex C I 3 Sampling record

Sampling record		Sample No.	
Date:			

Compost Producer

surname | name

ZIP | town

street | street no.

Firm name (if applicable)

.

Composting Plant, Site of sampling

Name/designation

ZIP | town

street | street no.

Contact person

If not identical with compost producer

surname | name

Tel. No | fax No. (optional) | e-mail (optional)

National Quality assurance System

Name/designation

ZIP | town

Intended Declaration

Batch No.	Quantity of matured compost after screening [t] [m³]	Compost type					
		Mature Compost	☐	Fresh Compost	☐	Compost for potting soil	☐

Brand mark	

Intended Declaration						
Quality-Class (in addition to ECN-QAS)	Reg. 2092/91	☐	EU Eco Label	☐	National…..	☐
Used feedstock categories	Manure	☐	Green waste	☐	Bio waste from households (bio bin)	☐
	Other ABP cat 2	☐	ABP Cat. 3		Catering waste	☐
					Former foodstuff	☐
					Other cat. 3 ABP	☐
	Food industry	☐		☐		☐
		☐		☐		☐

Foreseen areas of application					
organic agriculture	☐	vinyards orchards	☐	general landscaping (non food)	☐
land reclamation in agricultural	☐	Horticulture/green house	☐	Sports grounds	☐
conventional agriculture	☐	Tree nurseries	☐	leisure and playgrounds	☐
arable land	☐	Forestry/silviculture	☐	reclamation of landfills, brown fields	☐
grass land	☐	private gardening	☐	biofilter	☐
field vegetable	☐	Growing media constituent	☐	**Sacked**	☐

Remarks (also excluded areas of application (in order to determine the necessary parameters to be analysed)***:***

Weather conditions

°C ..... dry ☐ rain ☐ Comment: .....

.....

Evaluation of process management (hygienisation)

Temperature protocol → sanitisation phase	Yes ☐	No ☐
Temperature protocol → maturing phase	Yes ☐	No ☐
Temperature protocol → **copy received**	Yes ☐	No ☐

Temperature monitoring: .....

.....

.....

Measures of ***Process control*** documented properly		Yes ☐	No ☐
	turning dates	*Yes* ☐	No ☐
	regulation of forced aeration	*Yes* ☐	No ☐
	watering	*Yes* ☐	No ☐
	addition of feedstocks and additives	*Yes* ☐	No ☐
	other:	*Yes* ☐	No ☐
		Yes ☐	No ☐
		Yes ☐	No ☐
Documentation → copy received		Yes ☐	No ☐

Remarks: .....

.....

Total duration of rotting covering all batches included

Remarks .....

.....

.....

.....

Sampling frequency last period?

.....

.....

Latest compost analyses

Batch-No.:	*No. Report*	*Sample taking:*	*date of report:*
(1).....	.....	.....	.....
..... *Laboratory*			

Sampling description

Sampled lot, designated unequivocally?	yes ☐	no ☐

Notes: .....

.....

Size of sampled lot

..... lot.-No.	..... screen (mm)	Data provided ☐ measured ☐	length	width	height	m³	t
			---------- Meter ----------				

Size of total compost batch

..... batch.-No.	..... screen (mm)	Data provided ☐ measured ☐					

Description of sampling (No. of incremental samples; Sample taking from conveyor or screen; quantity of incremental samples; preparation of combined sample; preparation of laboratory sample; parallel samples; packaging etc.; reference to sampling standard)**:**

.....

.....

.....

.....

.....

.....

.....

Description of the sampled lot

Site/plant compartment: ..... **Size:**..... m²

Date of Batch SET-UP: ..... **Batch composition:** **yes**☐ **no** ☐

Batch composition (%age of input materials): .....

.....

.....

All materials, in accordance with consent?: yes ☐ no ☐

No. of batches on the site compartment:.....

Capacity covered: ¼☐ ½ ☐ ¾ ☐ 1/1 ☐ > 1/1 ☐

Pre-treatment of sampled lot

Screening / mesh size: .....mm

Magnetic separator: yes ☐ no ☐ **Wind separator:** yes ☐ no ☐

Notes / Observations

Odour: very strong ☐ strong ☐ medium ☐ slight ☐ non ☐

Moisture: very dry ☐ dry ☐ humid ☐ very humid ☐ wet ☐

Impurities: very high amount ☐ high amount ☐ medium ☐ few ☐ non ☐

Mould/fungi: very high amount ☐ high amount ☐ medium ☐ few ☐ non ☐

Homogeneity: very good ☐ good ☐ medium ☐ low ☐ cannot be sampled ☐

Coverage: covered ☐ partly covered ☐ not covered ☐

Traffic area: clean ☐ partly muddy ☐ very muddy ☐

Notes:.....

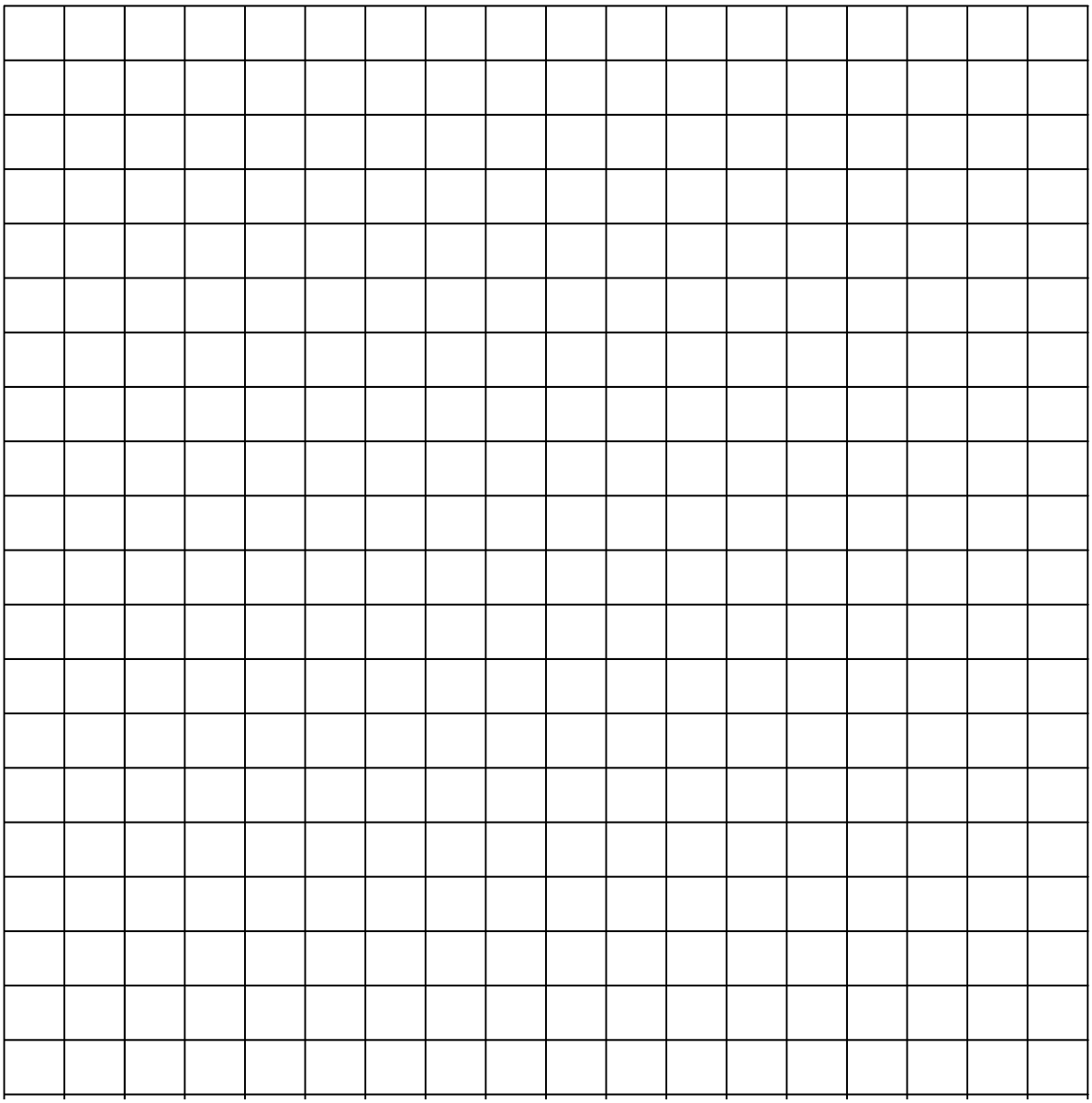
.....

.....

.....

.....

Site drawing of sampled compost batches



Date:

……..

Sample Taker:

Responsible Person Composting Plant:

…… ……

Annex C I 4: Test report Compost Quality

Test report

Product type: **Batch code:**

Date of sampling: **Sample No.:** **Sample protocol No.:**

Name of laboratory **Date of analysis:** **Laboratory No.:**

Name of responsible person:

	Physical parameters			**Plant nutrients**	
1.	Maximum particle size	mm	8.	Nitrogen total (N)	% DM
2.	Bulk density (volume weight)	g/l FM	9.	Phosphate total (P_2O_5)	% DM
3.	Water content	% FM	10.	Potassium total (K_2O)	% DM
4.	Impurities > 2 mm (total)	% DM	11.	Magnesium total (MgO)	% DM
	(including glass, metals and plastics)				
	Biological parameters			**Soil improvement**	
5.	Biological activity		12.	Organic matter (OM)	% DM
	Maximum temperature		13.	Liming value (CaO)	% DM
	Oxygen uptake rate		14.	Electrical conductivity	mS/cm
	Alternative method		15.	pH ($CaCl_2$)	
6.	Plant response (rel.)		16.	C/N ratio (calc. from OM (LOI))	
	with 25 % test substrate content	%		**Hygiene**	
	with 50 % test substrate content	%	17.	Salmonellae	
7.	Viable weed seeds	per l FM			

Precautionary quality criteria

		ECN-QAS	**National regulations**	**Sample**
	Heavy metal			
			mg/kg TM	
19.	Lead (Pb)	130		
20.	Cadmium (Cd)	1.3		
21.	Chromium (Cr)	60		
22.	Copper (Cu)	300		
23.	Nickel (Ni)	40		
24.	Mercury (Hg)	0.45		
25.	Zinc (Zn)	600		

Signature of responsible Person:

DM – Dry matter; FM – Fresh matter

Annex C I 5: Check-list

As guidance for external as well as for internal control of the operation quality the check-list shall be used. If the questions are answered with "yes" the requirements for a good operational practice are fulfilled. If any question is not affirmatively answered, additional remarks should be given.

Check-list for operation quality

General information about the plant	**Yes**	**Remark**
Is the plant properly enclosed?		
Has the entrance a sign where company name, hours or opening, telephone number etc. are mentioned?		
Is a recent operation plan of the plant present?		
Are the intake- and storage areas sufficient by marked?		
Traffic and composting areas		
Are all traffic areas paved?		
Are all the composting areas sufficient by paved with asphalt or concrete?		
Are the traffic- and composting areas sufficient for the permitted capacity?		
Is all leakage water from the composting-areas collected and sufficient dispatched or removed?		
Is all the run-off water from the traffic-areas collected and sufficient by dispatched or removed?		
Equipment, facilities and staff		
Is the required machinery for the workload available?		
Are there safety devices (e.g. dust mask, air filter for wheel loader) on hand?		
Is the plant regularly cleaned?		
Is an office for documentation and administration available?		

Is the staff adequately and regularly trained for specific tasks (e.g. composting skills, regulatory skills)?		
Are responsibilities (e.g. for quality control, hygiene) clearly assigned?		
Does the staff have regular medical checks?		
Is the staff informed about occupational health and safety?		
Quality assurance aspects		
Is there a quality control from an independent control organisation?		
Is a flow diagram of the composting process available?		
Delivery and acceptance of input materials		
Is a controlled weighbridge present?		
Is a functional control of input-material given?		
Are acceptance criteria given?		
Are origin, type and quantity of the delivered materials daily documented?		
Storage and processing of input materials		
Is there a designated intake-area with sufficient flooring?		
Is input material that is unsuitable for storage (e.g. biowaste from bins) processed daily?		
Is input material that is suitable for storage (e.g. root wood) stored separately for mixing purposes?		
In case of a breakdown, is there sufficient storage-capacity and also back-up capacity (e.g. in other plants)?		

Conditioning of input material and build-up of the composting pile		
Are the different input materials mixed properly and is the processing function able and acceptable?		
Are there instructions for the composition of the material (e.g. material mix, moisture, structure-stability)?		
Monitoring and record keeping		
Is an operation log regularly maintained?		
Is the batch separate by recognisable?		
Is the batch classified and documented (e.g. charge-designation, date)?		
Are the different streams traceable in the documentation?		
Are there instructions regarding the number of turns?		
Are calibrated thermometers present?		
Are the temperature-/time-protocols accessible and controllable filed?		
Are the temperature-/time-protocols conform with national/European regulations (like ABP)?		
Are the following aspects recorded in the operational diary - temperature during sanitisation - duration of sanitisation step - number of turns during sanitisation step		
Are the measurements taken to prevent odour?		
Are possible biofilter well-functioning?		
Are striking emissions recorded and described (e.g. dust, gaseous or liquid emissions)?		
Is cross-contamination of treated and untreated biowaste barred (no double use of wheel-loaders)?		

Storage of the products		
Has the selling product been sieved (particle size)?		
Is the contaminated screening overflow (> 5 % contamination) re-used as structural material or sluiced from the process?		
Are further measurements done by screening (e.g. finer screen) in case of contamination with impurities (> 0.2 % in finished compost)?		
Is the storage separated from input and processing material?		
Are designated areas for the various products present and are those products properly marked?		
What is the quantity and whereabouts of the interfering and residual materials?		
Are the products protected from water (cover)?		
Are the products protected from seeds flying in?		
Sampling		
Are the samples taken by independent sample takers?		
Is the yearly demanded quantity of samples equally spread?		
Is the laboratory acknowledged by national quality assurance organisation (NQAO)?		
Are the recent certificates of essay available on the plant and do they meet the demand?		
Product declaration		
Is the declaration in line with national/ European regulations?		
Is the declaration in compliance with the test results?		
Are specific instructions for the use of the product taken in the declaration?		

Product delivery		
Are there complete recordings of the delivered products in a year?		
Are there instructions to prevent that products not in line with declaration have been sold?		
Are there instructions how to handle products not in line with declaration?		

Annex C 1 6: Compost Declaration

Composting Plant:	**Product Type:**	**Quality Assurance**
Batch code:		**Grade:**

Declaration	**Product Characteristics**	kg/t	kg/m^3
Soil improver / Organic fertiliser:	Organic matter:		
Main input materials:	Nitrogen toal		
Product quantity:	Phosphorus:		
Fitness for use:	Potassium:		
Storage conditions:	Magnesium:		
Application rates:	Liming value:		
	Dry matter:		
	pH-value:		
Detailed application recommendations on further pages	Electrical conductivity: (optional) [mS/m]		

According to regulations:	**Environmental health aspects**
EU Fertiliser Regulation:	Free of viable weeds:
EU Ecolabel Regulation 66/2010:	Free of salmonellae:
EC Regulation 834/2007; 889/2008:	Precautionary environmental criteria according to ECN-QAS:

Certification by NQAO:	**Date/Signature**

C. European Quality Assurance Scheme - Part II: ECN-QAS for Digestate

C. European Quality Assurance Scheme - Part II ECN-QAS for Digestate

C. European Quality Assurance Scheme - Part II: ECN-QAS for Digestate

1 Scope

Part C II of the ECN-QAS Quality Manual specifies requirements for the

- operational process management of anaerobic digestion,
- selection of input materials, and
- digestate quality.

It also includes specifications for sampling and testing and defines requirements for product certification and declaration to ensure that the digestate products are consistently fit for their intended uses.

As a principle the certification of the ECN-QAS is only granted for digestate which is produced from bio-waste and agricultural residues stemming from natural processes and energy crops that have been separately collected at the source of origin, and have not been mixed, combined or contaminated with other potentially polluting wastes, products and materials.

Digestate quality criteria include parameters for the characterisation of digestate as organic fertiliser, soil improver and growing media as well as limit values for human and animal indicator pathogens, potentially toxic elements (heavy metals), physical contaminants (impurities), and weed seeds.

The ECN-QAS is applicable for anaerobic digestion facilities/biogas plants, which produce digestate for the professional or private market sectors. For specific uses, such as growing media constituent, additionally certain requirements (e.g. electrical conductivity, plant response) have to be considered. The producer of digestate is responsible for establishing and consistently fulfilling any additional quality needs, such that the digestate is fit for purpose.

2 Definitions

For the purposes of this part C II, the following definitions apply:

Agricultural residues: Material that occurs in agricultural harvesting and works including manure and process residues in subsequent treatment of agricultural products.

Anaerobic digestion: A process of controlled decomposition of biodegradable materials under managed conditions where free oxygen is absent, at temperatures suitable for naturally occurring mesophilic or thermophilic anaerobic and facultative bacteria species, that convert (easily) degradable organic matter into biogas and digestate.

Anaerobic digestion plant: A facility where bio-waste, agricultural residues and animal by-products and/or energy crops are processed under anaerobic conditions with the aim to produce biogas and digestate.

Animal By-Product (ABP): Products of animal origin not intended for human consumption including manure from farmed animals, catering waste and former foodstuff. Definition referred to European ABP-Regulation 1069/2009.

Approval: Permission for a product or process to be marketed or used for stated purposes or under stated conditions.

Audit: Conformity assessment; systematic, independent, documented process for obtaining records, statements of fact or other relevant information and assessing them objectively to determine the extent to which specified requirements are fulfilled.

Biodegradable materials: Materials capable of undergoing biologically mediated decomposition.

Biogas: Combustible energy rich gaseous mixture of methane and carbon dioxide and other trace gases like hydrogen sulphide, ammonia and steam produced during an anaerobic digestion process

Bio-waste: Biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants. Definition referred to Waste Framework Directive 2008/98/EC. It does not include sewage sludge, not separately collected household waste, textiles, paper or processed wood.

Certification: Procedure by which a third-party gives written assurance that a product, process or service conforms to specified requirements.

Complaint: Expression of dissatisfaction made to a biogas plant, related to its products, or the complaints-handling process itself, where a response or resolution is explicitly or implicitly expected.

Compost: is defined as humified solid particulate material that is the result of composting,

which has been sanitised and stabilised, and which confers beneficial effects when it is added to soil, used as growing media constituent, or used in another way in conjunction with plants.

Note: post-composted digestate materials are defined as compost

Digestate: Product of anaerobic digestion of biodegradable materials, including bio-waste, agricultural residues, energy crops and animal by-products. It can be presented in whole or separated in a liquid and solid digestate. Digestate can be post-composted or dried and further upgraded to pellets or granulates.

Note: The wording 'digestate product' is used as a general expression, not in the legally sense of 'End-of-Waste' regulation.

Dry digestion: Anaerobic digestion with dry matter content over 15 % in the digester

External monitoring (third-party surveillance): Independent product and plant controls to obtain and use a quality label in agreement with the requirements of a quality assurance scheme.

Fitness for use: Suitability of a product for its intended use, determined on the basis of objective and subjective properties, and evaluated on the basis of the user´s individual needs

Growing media: Materials, other than soil in situ, in which plants are grown

Hydraulic retention time (HRT): Average time that material stays in the digester vessel, determined by the loading rate and operational digester capacity.

Note: The hydraulic retention time can be calculated by dividing the digester working volume by the rate of flow of input materials into the digester: HRT [days] = digester volume [m^3] / influent flow rate [m^3 per day]

Inspection: Activity such as measuring, examining, testing or gauging one or more characteristics of product or service and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristic.

Liquid digestate: Digestate from wet digestion or the liquid fraction of material by separating the whole digestate

Note: Less than 15 % of its mass should be dry matter in order that the sample is suitable for laboratory tests as a liquid material. It should contain sufficient moisture to be pumpable.

Monitoring: Supervision; activity, performed either manually or automatically, intended to observe the quality of digestate products

Potential Toxic Elements (PTE): Chemical element that has a potential to cause toxicity to humans, flora and/or fauna. The majority are also known as heavy metals.

Quality label: Externally visible marking of a service or product (e.g. quality label, certificate, conformity label)

Operating plan: Process model or schematic representation of regular operational procedures

Operational diary: Document for continuously recording operational procedures and measures

Quality assurance: Part of quality management aimed at fulfilling quality requirements in order to build trust

Quality assurance system: Collective term covering all internal requirements for operational procedures and their documentation as well as all operational measures taken, including inspections by an external quality assurance organisation

Quality assurance organisation: External organisation verifying quality management in a biogas plant

Quality management system: Management system to direct and control an organisation / a company with regard to quality.

Recognition: Acknowledgement of the validity of a conformity assessment result provided by another person or body

Sanitisation: Reduction of human, animal and plant pathogens to acceptable levels as a result of the hygienisation process.

Solid digestate: Digestate from a dry digestion or the solid or fibrous fraction of material by separating the coarse fibres from whole digestate

Note: At least 15 % of its mass should be dry matter in order that the sample is suitable for laboratory tests as a solid material.

Wet digestion: Anaerobic digestion with dry matter content ≤ 15 % in the digester

3 Operation Quality

This chapter lays down the principle of quality management as applied by anaerobic digestion plants. It describes the requirements for operational procedures and their documentation to be performed in a anaerobic digestion plant.

The operation quality is documented by general data of the anaerobic digestion plant and an operational plant description. This comprises the entire management of the production process as follows

- Acceptance of suitable input materials,
- Storage of input materials,
- Pre-treatment,
- Sanitisation,
- Anaerobic digestion process,
- After treatment of digestate (e.g. separation),
- Storage and declaration of end products,
- Loading and transportation,
- Marketing and declaration of digestate products, and
- Complaints management.

Measures which are carried out on a regular basis shall be laid down in an operating plan. Those measures shall be recorded in the operational diary (paper or electronically).

3.1 General data

General data constitute a summary of operational and plant data that shall be collected and stored in a centralised place. The following data shall be included (if applicable to the specific plant in question):

- Legal basis (e.g. complete approval file including the technical report, technical project, all administrative orders, permits – in a clear and easily accessible form, operator contract)
- Site of the anaerobic digestion plant (including land registry data on the plot)
- Receipt and delivery times (opening hours)
- Data on the licensee (operator, owner, waste owner number, digestate producer, addresses, telephone numbers, contacts)

- Managing director under commercial/trade law
- Operational manager in charge (contact)
- Employees: number, tasks, responsibilities, plant-related matrix of responsibilities, including relevant training certificates
- Digestate production pursuant to legal provisions (e.g. National Biowaste Ordinance)
- Material flow: list of material received, quantity of finished digestate produced
- Digestate production (m^3 digestate/year)
- Organisation of quality management and assurance (e.g. quality manual, software, documentation system): reference to the place where the relevant documentation is kept
- Laboratory contracted for external quality control
- File with digestate declarations in compliance with digestate test reports
- Membership in a quality assurance organisation; name of the organisation, contact inarge.

3.1.1 Plant description

The plant description shall include a process model (Annex C II 1) identifying control points. Further process control records for the assessment of the operational procedures should be kept.

The processes and procedures applied in the anaerobic digestion plant shall be described in the form of a process model describing at least the following features:

- Type of raw materials
- Treatment steps
- Sanitisation (time-temperature measurement, max. particle size)
- Documentation of critical control points and measures

The process model (Annex C II 1) shall include measures of the quality management system. All operational steps shall be in line with that model.

Process control measures shall be recorded and corresponding operational procedures must be laid down in a quality manual with operating instructions. There is an operational check-list of control points (Annex C II 6) that is used on a regular basis, with aspects regarding site accessibility and cleanliness of the production site, input material (acceptance and storage), the monitoring of the treatment process and the end products.

3.1.2 Odour minimisation

Odour emissions and exposures shall be minimised. The storage of putrescible feed stocks, besides energy crops etc. which are usually stored in flat silos, and the pre-treatment of organic waste should be done in closed rooms and the exhaust air should be cleaned (typically, in bio-filters).

3.1.3 Cleanliness of the plant

In line with the material throughput and the activities performed, the plant shall be kept clean with a view to ensuring trouble-free operations.

3.1.4 Adequate availability of machinery capacity/machinery failure

To ensure adequate availability, the measures to be taken in the case of machinery failure or staff shortages shall be defined (in a contingency plan). Whenever appearing, this should be recorded (operational diary).

3.2 Input material

Input materials shall be biodegradable materials that have been separately collected and have not been mixed, combined or contaminated with other potentially polluting waste, products or materials. Municipal sewage sludge and mixed municipal waste are excluded. In Annex C II 2 suitable input materials and additives are listed. This list is mandatory and can be amended by the ECN-Quality Committee on a case by case procedure.

3.2.1 Acceptance of input material

Measures shall be taken to ensure that receipt and acceptance of input material does not give rise to an unacceptable nuisance, in particular through odours, and does not interfere with the treatment and digestion process.

The suppliers shall deliver input material in accordance with Annex C II 2. All deliverers shall receive information regarding the types of input material approved and the obligation for source separation of it. The delivery must be managed in such a way that the amount of undesirable substances is minimized. The supplier of input materials must also perform self-monitoring in order to ensure that quality of the material meets the standards for input material and final products (Annex C II 3 Agreement of acceptance).

The plant operator shall ensure that only input materials listed in Annex C II 2 are accepted for anaerobic digestion. For that purpose, the operator shall meet the following requirements:

- Presence of a technically qualified person during the hours opening or during delivering

time and immediate receipt control of the materials delivered.

- If the plant is not permanently staffed, the facility shall be equipped with a lockable gate or barrier and provided with a sign indicating the opening hours and pointing out that raw material must not be delivered outside the indicated opening hours.
- Protection of the premises against unauthorized access (at least a warning sign).
- The responsible person for acceptance shall be informed about the planned transports of input material.
- The plant operator shall document both the acceptance and the rejection of material together with the date of delivery, type, mass, origin and supplier.
- Material supplied shall be considered accepted after control and unloading at dedicated compartments on the plants' premises with the permission of the plant operator.
- Without the plant's operator prior consent, raw material shall not be delivered outside of the opening hours.
- Documentation of the tipping area of input materials, off-specification portions of material, indication of a quarantine zone.
- Documentation of measures to reduce odour emissions during reception and pre-treatment.
- The plant operator or the responsible person in charge shall document whether the material delivered is stored temporarily or directly used in the anaerobic digestion process.
- The plant operator can take a backup sample for storage and eventual analysis.
- The storage and treatment routes of material which are not used for anaerobic digestion (e.g. separated impurities, off-specification portions of material) shall be documented.

3.2.2 Pre-treatment

Pre-treatment (screening. pulping, shredding, mixing, adjusting the material's moisture) aims at producing an optimum substrate input mixture for the subsequent anaerobic digestion process.

3.2.3 Safety for anaerobic digestion plants

There are different kinds of dangerous aspects on anaerobic digestion plants and resulting from the biogas process. The operator has to make sure that all safety requirements of the permission of the plant are fulfilled and has to follow the instructions of the safety plan in cases of breakdowns.

3.2.4 Intermediate storage

Intermediate storage shall be done in a separately designated area. Materials causing intensive odour emissions shall be treated directly in the biogas reactor or shall be stored in a closed storage vessel to minimise odours.

- Solid input materials shall be stored in flat or deep silo which should be covered air-tied. It should be safeguarded that rain and leachate water are drained off.
- Liquid and semi-liquid materials should be stored in vessels. It should be ensured that the materials of the vessels and pipings are suitable for the stored input materials (e.g. corrosion, resistance to acids, temperature impacts)

3.3 Documentation

The production process shall be stated in the operational diary. This may contain the following data:

- Type and quantity of input materials and additives.
- Sanitisation protocol (time, temperature).
- Temperature and pH (if recorded) in the digester.
- Time between digestion chamber loadings.
- Hydraulic retention time.
- Delivery of digestate.

3.4 Management of the anaerobic digestion process

During the treatment process, optimum conditions shall be ensured to support the biogas production and the anaerobic digestion process.

3.4.1 Treatment process

Depending on the used feedstock the treatment process requires sanitisation in order to provide the necessary reduction of human, animal and plant pathogens. The process requirements for digestion plants treating animal by-products are laid down in the Animal By-Products Regulation (EC No. 1069/2009 and EU No. 142/2011).

Particularly in regard to anaerobic digestion facilities treating animal by-products (ABP) national requirements for sanitisation of the Animal By-Product Regulation should be considered. Member States have the possibility to implement alternative process validation systems for the treatment of input material entering composting and digestion plants.

3.5 Management of complaints

Within the framework of complaints management, the following minimum documentation shall be kept for two years:

- Name, address and telephone number of the complainant.
- Date and time when the complaint is received.
- Subject of the complaint.
- Work performed at the time of the complaint.
- Operational measures taken with respect to the complaint.

4 Digestate Quality

This chapter lays down the definition of product types and the requirements for product quality. Further it includes the requirements for analytical measurements, product declaration and recommendations for the proper use.

4.1 Digestate definitions

The ECN-QAS defines a common digestate standard, which includes minimum quality criteria for digestate in defined market sectors. To this purpose, digestate is specified mainly as organic fertiliser or as soil improver. Digestate can be differentiated in liquid and solid digestate.

If digestate are post-composted the end product is regarded as compost and has to fulfil the quality criteria for compost (ECN-QAS Manual Part C I ECN-QAS for Compost).

4.2 Digestate quality criteria

The ECN-QAS Quality Label can only be applied to digestate, which successfully meets the corresponding quality requirements. Value giving quality criteria are mainly defined by the content of organic matter and plant nutrients. Further specifications include physical properties and pH-value. Electrical conductivity should be characterised for digestate used as mixing compound in growing media.

If the ECN-QAS Quality label is applied to digestate the requirements, which are laid down in Part C II, shall be fulfilled completely.

4.2.1 Minimum set of digestate properties for declaration

National regulations specifying declaration and labelling requirements, which interfere with the declaration rules defined in the following table, have to be respected accordingly.

Quality criteria	Parameter	Dimension	Appraisal
Soil improvement	Organic matter	[% DM]	≥ 15 %, declaration
	pH value		declaration
Fertilizing properties	Nitrogen (N) total	[% DM]	declaration
	Phosphorus (P) total	[% DM]	declaration
	Potassium (K) total	[% DM]	declaration
	Sulphur (S) total	[% DM]	declaration
General parameters	Dry matter	[% FM]	declaration
	Salinity / El. conductivity	[mS/m]	declaration[1]
[1)] The electrical conductivity should be mandatorily declared, if digestate is not used in agriculture.			

4.2.2 Precautionary criteria (limit values)

Precautionary digestate criteria for consumer and environmental protection are the heavy metal content, the amount of impurities (glass, metals, plastics) and hygienic aspects (Salmonellae, weed seeds).

Anaerobic digestion plants awarding for the ECN-QAS Quality Label should meet the limit values set in the ECN-QAS Quality Manual. Independent of the ECN-QAS values the appropriate national thresholds have to be met at all times.

In the case of Cu and Zn, the values represent orientation thresholds. If exceeded the measured concentration shall be declared. The proposed values can be regarded as general threshold values for sustainable, regular use of digestate in food and feeding stuff production.

Precautionary quality criteria	Parameter	Limit value
Hygiene	Salmonellae	Absent in 25 g dry matter
Undesired ingredients and properties	Impurities (content)	≤ 0,5 % dry matter
	Weed seeds	≤ 2 seeds per liter
Inorganic pollutants	Lead (Pb)	130 mg kg^{-1} dry matter
	Cadmium (Cd)	1.3 mg kg^{-1} dry matter
	Chromium (Cr)	60 mg kg^{-1} dry matter
	Copper (Cu)[1)]	300 mg kg^{-1} dry matter[2)]
	Nickel (Ni)	40 mg kg^{-1} dry matter
	Mercury (Hg)	0.45 mg kg^{-1} dry matter
	Zinc (Zn)[1)]	600 mg kg^{-1} dry matter[2)]

[1)] Copper (Cu) and Zinc (Zn) are also considered as trace elements. Values exceeding 110 mg Cu kg^{-1} dry matter and 400 mg Zn kg^{-1} dry matter must be declared.

[2)] These values represent orientation thresholds.

Note: E.coli and/or Enterococcae should be tested, if required by Animal-by-Product-Regulation or any other provisions.

4.3 Digestate analysis

The ECN-QAS includes regular sample taking and digestate analysis of the relevant quality parameters conducted by independent laboratories (see chapter 4.3.3) or an acknowledged quality assurance organisation.

It is recommended on account of long years experiences to have 100 % external sampling. In agreement with the ECN-QAS it can be admitted that up to 50 % of the samples can be taken by the correspondingly educated plant manager.

The relevant quality parameters for the ECN-QAS are documented in chapter 4.2. The analytical report and the assessment are delivered directly to the Quality Assurance Organisation (QAO) and to the plant operator by the laboratory.

The frequency of the investigations during the one year recognition procedure and the sub-sequent on-going monitoring procedure depends on treatment capacity and the type of input material.

The frequency of digestate analyses and sample taking for **digestate from bio-waste** should be calculated on the basis of following equation as a minimum requirement:

Amount of input material / 10.000 [t] + 1 = Analyses per year, 12 per year at maximum.

The frequency of digestate analyses and sample taking **for digestate from energy crops and manure** should be calculated on the basis of following equation as a minimum requirement:

Amount of input material / 10.000 [t] + 1 = Analyses per year, 4 per year at maximum.

At least four inspections for anaerobic digestion plants with a treatment capacity > 6000 t input material per year should be carried out during the first year of operation - one for every season – to control the essential quality characteristics over the course of the year. Generally one sample should be taken every three months. For small anaerobic digestion plants with a treatment capacity ≤ 6.000 t input material per year 2 analyses are sufficiently in the first year of recognition:

Sampling and analysis frequency for anaerobic digestion plants		
Input material	**Recognition year**	**Monitoring phase**
≤ 6000 t	2	1
6001 – 10.000 t	4	2
10.001 - 20.000 t	5	3
20.001 – 30.000 t	5	4
30.001 – 40.000 t	5	5
40.001 - 50.000 t	6	6
50.001 – 60.000 t	7	7
60.000 – 70.000 t	8	8
70.001 – 80.000 t	9	9
80.001 – 90.000 t	10	10
90.001 – 100.000 t	11	11
> 100.000 t	12	12
Note: Any non-integer value should be rounded up to the next integer.		

Existing analytical reports and assessments which comply with the requirements set out in Part C II of this Quality Manual and which are not older than 18 months and no major change of the input material has taken place can be accepted by the QAO.

4.3.1 Sampling

Samples for investigation should be taken from the marketable digestate. According to the production each type and grade of digestate should be sampled

- when the fermentation process has completed and the digestate is marketed directly, or
- after separation as liquid and/or semisolid digestate,
- after post-treatment (e.g drying, pellitising) before blending with other materials.

Each final sample sent for analysis shall be representative of the final product. Sampling should be done according to EN ISO 5667-13.

The maximum portion of production from which the representative sample is derived should be appropriate to the system, test results for the digestate type and the indented customer's supply.

The volume of the final sample should be sufficient for all analyses including in the ECN-QAS.

It is recommended that a retain sample is stored for a reasonable time. To minimize any changes in the digestate properties, retain samples should be kept in a dark, dry place at a temperature between 1 and 10°C.

The digestate producer and/or the sample taker should make and keep a sampling protocol (see for example Annex C II 4) of each sample, including

- the name of production plant,
- the name of sample taker,
- date of sampling,
- code of sample,
- location of sampled batch or portion,
- digestate type and grade,
- total processing time of sampled batch or portion,
- the laboratory, contracted with the analyses and tests.

4.3.2 Analytical test methods

The European Commission mandated CEN with the development of horizontal standards

(test methods) in the field of sludge, (treated) bio-waste and soil under consideration of the characterisation of waste (Mandate M/330). The mandate considered standards on sampling and analytical methods for hygienic and biological parameters as well as inorganic and organic parameters. On most sampling and analytical topics, the final consultation and validation of the draft standards has taken place in autumn 2007. The horizontal test methods are listed in chapter 4.3.2.2. Further European standards for soil improver and growing media, developed by CEN/TC 223, exists which are suitable for analysing organic fertilisers as well (see chapter 4.3.2.2). In respect to the development on End-of-waste criteria and the revision of the EU Fertiliser Regulation the proposed methods according to these legislative approaches should be used in future.

Until no European standards (EN) for methods are required in an EU legislative approach national test methods and accepted test methods by national provisions may be used.

Analysis should be carried out by approved laboratories for the performance of the required tests in an acknowledged quality assurance system.

4.3.2.1 Terms and definitions

The glossary is regarded to be useful for a uniform comprehension and in order to keep univocal interpretation on test methods.

Dry matter: The portion of substance that is not comprised of water. The dry matter content (%) is equal to 100 % minus the moisture content %.

Electrical Conductivity: Measure of a solution's capacity to carry an electrical current; it varies both with the number and type of ions contained in the solution; it is an indirect measure of salinity.

Heavy Metals: Elements whose specific gravity is approximately 5 or higher. They include lead, copper, cadmium, zinc, mercury, nickel, chromium.

Impurities: Physical impurities are defined as all non-biodegradable materials (glass, metals, plastics) with a size > 2 mm.

Organic matter (OM): The carbon fraction of a sample of compost which is free from water and inorganic substances, clarified in EN 15935 as 'loss on ignition' at 550 ± 10 °C or clarified in EN 13039 as 'loss on ignition' at 450 ± 10 °C.

Weed seeds: All viable seeds (and plant propagules) found in end products.

4.3.2.2 List of test methods

Testing parameters	Methods	Methods
General parameters	**CEN TC 223**	**CEN TC 400 HORIZONTAL**
pH value	EN 13037	EN 15933
Electrical conductivity	EN 13038	EN 15937
Water content	EN 13040	EN 15934
Dry matter content	EN 13040	EN 15934
Organic matter content	EN 13039	EN 15935
Nutrients		
N (total)	EN 13654-1 (solid)/ EN13654-2 (liquid)	EN 16168/16169
P (total)	EN 13650	EN 16174/EN 16170/EN 171
K (total)	EN 13650	EN 16174/EN 16170/EN 171
Mg (total)	EN 13650	EN 16174/EN 16170/EN 171
S (total)	EN 13650	EN 16174/EN 16170/EN 171
NH_4-N	EN 13652	
Biological parameters		
Weed seeds	-	EN TS 16201
Physical contaminants		
Impurities	-	EN TS 16202
Chemical contaminants		
Pb	EN 13650	EN 16174/EN 16170/EN 171
Cd	EN 13650	EN 16174/EN 16170/EN 171
Cu	EN 13650	EN 16174/EN 16170/EN 171

Cr	EN 13650	EN 16174/EN 16170/EN 171
Ni	EN 13650	EN 16174/EN 16170/EN 171
Zn	EN 13650	EN 16174/EN 16170/EN 171
Hg	ISO 16772	EN 16174/EN 16170/EN 171
Hygienic aspects		
Salmonellae	ISO 6579	CEN/TR 15215-1, CEN/TR 15215-2, CEN/TR 15215-3

4.3.3 Approval of laboratory

All analyses should be done by approved laboratories. The approved labs have to pass regularly (every three years) laboratory ring tests for digestate analyses.

4.4 Digestate storage

In respect to avoid further emission, like methane, any storage of liquid digestate shall be covered airtight and connected to biogas treatment system until the stability of the digestate is proved.

4.5 Digestate declaration and labelling

The following information shall be provided with the digestate product dispatched from the anaerobic digestion facility, either written on the packaging or on accompanying fact sheets (Annex C II 7):

(a) Name and address of the digestate producer;

(b) Digestate designation identifying the product by type;

(c) Digestate grade; manufactured;

(e) Quantity (in weight and/or volume);

(f) Main input materials of the categories: manure, energy crops, agricultural waste, green waste, separately collected biowaste from households and industry from which the product has been processed;

(g) Main quality characteristics (value giving parameters and precautionary criteria);

(h) Product declaration in line with national regulations (e.g. fertiliser regulation, biowaste ordinance);

(i) Conformity with national quality assurance requirements;

(j) Conformity with the requirements of ECN-QAS;

(k) The recommended conditions of storage;

(l) Description of the application areas for which the digestate can be used and any limitations on use;

(m) Recommendations for the proper use.

With the recommendations for proper application, based on the product characteristics, it should be guaranteed that the digestate use follows best practice within the specified use area.

5 Certification Process

5.1 Procedure of quality assurance

Quality assurance of operational processes shall be evidenced by

- the recognition procedure (initial on-site inspection) performed by the QAO,
- continuous internal production control, and
- regular third-party inspection by the QAO.

In this respect, a distinction is to be made between the requirements set out for initial testing and the parameters to be tested continuously. An inspection contract shall be concluded between operators of anaerobic digestgion plants and the QAO. That contract may already come into existence when an operator joins a QAO and thereby agrees to comply with its statutes and other regulations.

5.1.1 Recognition procedure

The recognition procedure includes comprehensive initial testing and examination by the QAO approving compliance with the requirements set out in Part C II. Only after passing the recognition procedure a QAO member is entitled to use the ECN-QAS Quality label for digestate.

All specifications defined in the ECN-QAS Quality Manual have to be implemented within 12 months. Based on well documented justification a prolongation up to 6 months can be granted by the QAO. If recognition cannot be granted due to a serious deficiency within that period of time, the recognition procedure is suspended for one year.

5.1.2 Initial testing

The plant data submitted and/or otherwise available shall be checked at the plant's site. During a thorough on-site inspection, the plant should be examined following the check-list in Annex C II 6. In particular, the following requirements shall be met:

- Standardised process management;
- Availability of equipment/downtimes of machinery;
- Operational procedure pursuant to operation plan.

5.1.3 Administrative orders and conditions imposed, including reporting duties

All the administrative orders issued shall be examined together with the plant's operator with

a view to their implementation and compliance with deadlines set therein. Special attention is to be paid to reporting and documentation duties.

5.1.4 External quality control

External quality control is the key process for digestate production and product approval. It is the pre-requisite for the appropriate marketing of digestate in line with ECN-QAS.

Available digestate test reports shall be checked with a view to their timely commissioning, completeness, correctness and plausibility. Only technically correct test reports will be recognised. The QAO should provide a list of approved laboratories which are authorised to perform external quality control (third-party surveillance).

5.1.5 Inspection of records and the plant's documentation

The existing internal records shall be inspected for plausibility, completeness and correctness under the terms of the ECN-QAS Quality Manual. The records shall be examined for compliance with the actual operational procedure and the operational plan.

The inspection shall examine:

- at least the entire biography of one portion of production (from receipt to digestate supply), and
- at least one period of time (from one week to one month depending on the plant's size).

The following general data shall be examined:

- Basic facility data;
- Plant description:
- Standardized process management (process model, process control records, odour minimisation, cleanliness of the plant, elimination of interfering sub-stances);
- Operational procedure (suitable input materials, receipt and acceptance, records of incoming transports, interfering substances, pre-treatment and intermediate storage, main digestion, after-treatment, storage of end-products);
- Plant-specific complaints management;
- Digestate supply or marketing.

5.1.6 Periodical third-party surveillance

The QAO shall perform an on-site inspection at minimum once every two years. Special attention shall be given to the following aspects:

- Follow-up of the results of initial testing, and
- Control of quality management according to ECN-QAS Quality Manual

On the basis of the recognition procedure or subsequent inspections, the QAO shall check the records of general data on actuality (listed under 5.1.5) on an annual basis.

5.1.6.1 On-site inspection of the anaerobic digestion plant

All the administrative orders issued shall be examined together with the plant's operator for on-site-inspection. The existing internal records shall be inspected for plausibility, completeness and correctness including

- Reception and receipt control: type, quantity, origin, date, supplier, etc.,
- Portion of production: storage of input materials, mixing compounds, hydraulic retention time,
- Anaerobic digestion technique: temperature, humidity of the material, pH-value,
- Digestate quality: number of analyses per year, checking digestate assessments for plausibility and correctness,
- Completeness and correctness of digestate designation and labelling,
- Correspondence of digestate labelling and the results of external quality control,
- Availability of the digestate data sheet to customers and users,
- Sorted impurities: quantity, storage and disposal,
- Other materials received that are not treated (quantity and further treatment) - separate accounting.

During a thorough on-site inspection, the plant shall be examined for compliance with the criteria listed in Annex C II 6. Care shall be taken to ensure that the following requirements are met:

- Protection of the plant against unauthorised access (at least by a warning sign),
- Sign of company (name, address, opening hours),
- Cleanliness at the plant,
- Storage of materials,
- Materials received in line with records,
- Digestion technique,
- Free capacity of drainage water tanks,

- Description of striking emissions (e.g. dust, wind transport, gaseous or liquid emissions).

5.1.6.2 Quality control of digestate analyses

Available external quality assessments shall be checked with a view to their timely commissioning, completeness, accuracy and plausibility. Only technically correct digestate test reports will be recognized. If test reports are rejected, the company shall supply corrected or new test results within a maximum period of four months. Failure to meet this deadline means that the quality label (seal) shall be withdrawn.

To efficiently check the correctness of external quality control, the acknowledged laboratory shall send a copy of the test report to the QAO at the same time as the original is dispatched.

The QAO is entitled to request or carry out additional analyses with regard to scope and frequency - differing from the ECN-QAS - for granting the ECN-Quality label.

5.2 Digestate certificate

If all requirements are fulfilled the ECN-QAS Quality label is awarded to the digestate products. A digestate certificate (Annex C II 7), based on the analytical results and the on-site inspection, is generated. This digestate certificate includes following information:

a) The name and address of the digestate producer responsible for marketing;

b) Product type;

c) The main input materials from which the digestate is generally manufactured;

d) The main quality characteristics (listed in chapter 4) and analytical results (average, minimum and maximum values);

e) Product declaration in line with national regulations (e.g. fertiliser regulation, biowaste ordinance);

f) The conformity with national quality assurance requirements;

g) The conformity with the requirements of ECN-QAS;

h) The quality label of NQAO;

i) The recommended conditions of storage;

j) The fitness of use in intended applications and any limitations on use.

6 References

Avfall Sverige 2009: Rapport B2009 Certification rules for digestate.

Austrian Standards Institute 2009: Vorschlag ÖNORM S 2207-1: Technische Anforderungen an Biogasanlagen. Teil 1: Begriffe und Grundlagen. Ausgabe 2009-07-13

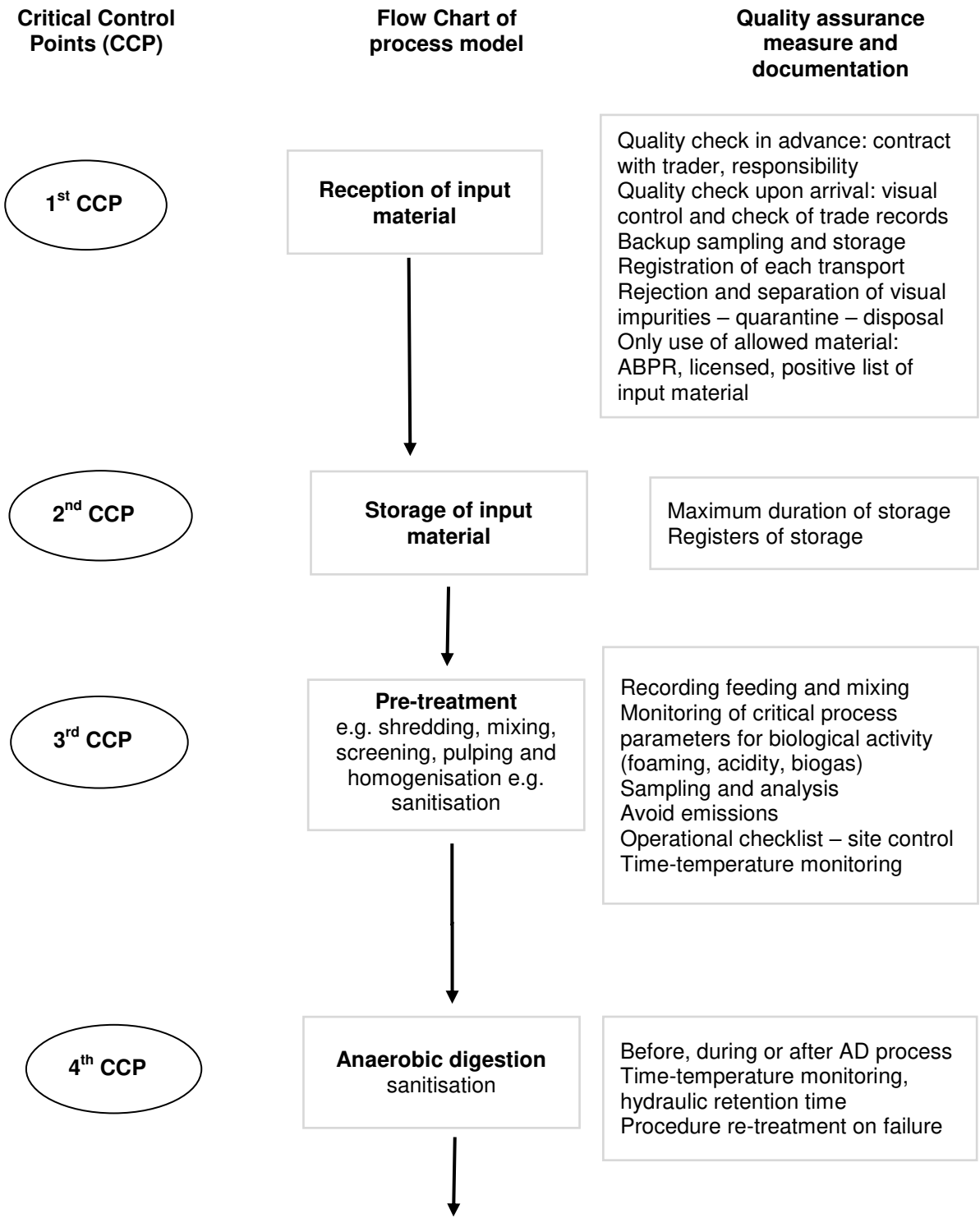
Austrian Standards Institute 2009: Vorschlag ÖNORM S 2207-2: Technische Anforderungen an Biogasanlagen. Teil 2: Anforderungen an die Verfahrenstechnik. Ausgabe 2009-07-13

BSI 2010: PAS 110:2010 Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated biodegradable materials.

RAL 2007: Gütezeichen Gärprodukt GZ 245 Güte- und Prüfbestimmungen sowie Durchführungsbestimmungen für die Verleihung und Führung des RAL-Gütezeichens Gärprodukt. Hrsg.: RAL Deutsches Institut für Gütesicherung und Kennzeichnung, St. Augustin.

VLACO 2010: General Regulations of the certification of end products of biological treatment of bio-waste to become a secondary raw material (as a fertiliser or soil improver). Edition 01-10-2010

Annex C II 1: Process Model



Critical Control Points (CCP)	Flow Chart of process model	Quality assurance measure and documentation
	Post-treatment Mechanical separation, drying, composting (CCP composting) sanitisation	Time-temperature monitoring Avoid emissions during after-treatment Avoid re- or cross-contamination Foresee storage capacity
5th CCP		
	Storage end-product	Avoid re- or cross-contamination Sampling and analysis of end-product Pest control measures
6th CCP		
	Loading and transportation	Clean / unclean zone: trucks should follow indicated pathway for loading (separate from unloading) Trucks cleaned: avoid re- or cross-contamination Register of outgoing loads
7th CCP		
	Marketing Certificate and application recommendations	End-product documents Declaration Certificate

Annex C II 2: Suitable input material with references to the European Waste Catalogue

The materials listed below are in principle suitable for digestion.

In case of production of digestate, the producer shall put in place the necessary controls on the incoming biowaste to ensure that there is no intentional dilution of polluting substances.

General Remarks

- Material of category 2 and 3 animal by-products listed in this annex suitable for biological treatment are also subject to Regulation (EC) No 1069/2009 laying down health rules concerning animal by-products not intended for human consumption. The material can only be utilised if compatible with the Regulation (EC) No 1069/2009. Input materials underlying the ABP-Regulation are marked in column “remark”.
- Sewage sludge is excluded from the input list and regarded as not suitable for the production of quality digestate labelled according to the ECN-QAS.
- In order to assess if the used input materials are approved in organic farming the specific provisions of the Regulation (EC) No. 834/2007 and No 889/2008 must be respected if the digestate will be used in organic farming
- In addition to the numerated waste materials below suitable non-waste materials are allowed as well as mixtures of materials that are listed below (acceptance by treatment plants after mixing), provided that the suitability of each input material is checked and a traceability system for individual input materials is in place.

EWC code	Waste type	Specification of permitted materials	Remark
02	**WASTE FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD PREPARATION AND PROCESSING**		
02 01	**Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing**		
02 01 01	Sludges from washing and cleaning	e.g. Soil sludges from sugar beet, potato and other vegetable processing	Washing is done without using any synthetic agents and additives
02 01 02	Animal-tissue waste	Bristle and horn waste, wool, feathers, hair, horns, hoof cuts, raw milk, shell from shellfish, eggs, hatchery by-products, digestion tract content, blood	ABPR [1)] Blood: ABPR Cat. 3 material only;
02 01 03	Plant-tissue waste	Algae; feed waste; crop waste; movings; waste plant tissues form agriculture; vegetable components of driftings, plant tissue waste from biofilter materials, Straw, riverine vegetation and spent growing media based on plant tissues, such as compost derived from source-segrated biowaste, peat and bark. sea weed	
02 01 06	Animal faeces, urine and manure, effluent, collected separately and treated off-site	Solid and liquid manure including the following bedding materials: straw, sawdust, wood shavings, and chipped wood, Including excrements from zoo animals, circus animals, domestic animals, laboratory animals, guano of seafowls and bats Sludges from aquaculture	ABPR [1)], Used animal bedding not allowed if it contains veneers, other coatings or preserving substances. Not ABPR relevant
02 01 07	Wastes from forestry	Bark	Not allowed if contains veneers, other coatings or preserving substances.
02 01 99	Wastes not otherwise specified	Spent mushroom substrate	
02 02	**Waste from the preparation and processing of meat, fish and other foods of animal origin**		
02 02 01	Sludges from washing and cleaning	Sludge from milk processing, flotation sludges from washing and cleaning	ABPR [1)] Washing is done without using any synthetic agents and additives
02 02 02	Animal-tissue waste	Bristle and horn waste, wool, feathers, hair, horns, hoof cuts, raw milk, shell from shellfish, eggs, hatchery by-products , digestion tract content, blood	ABPR [1)] Blood: ABPR Cat. 3 material only;

EWC code	Waste type	Specification of permitted materials	Remark
02 02 03	Materials unsuitable for consumption or processing	Former foodstuff, former feedstuff	ABPR [1)], products of animal origin, or foodstuffs containing products of animal origin, which are no longer intended for human consumption for commercial reasons or due to problems of manufacturing or packaging defects or other defects from which no risk to public or animal health arise;
02 02 04	Sludges from on-site effluent treatment	Content of fat separators and flotation agents (possible sources: slaughter-houses and meat/fish processing plants)	ABPR [1)], Washing is done without using any synthetic agents and additives
02 02 99	Waste not otherwise specified	Sludges from gelatine production, gelatine stampings, filtrations effluents from methionin production	ABPR [1)],
02 03 Wastes from the fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation			
02 03 01	Sludges from washing, cleaning, peeling, centrifuging and separation		Washing is done without using any synthetic agents and additives
02 03 03	Wastes from solvent extraction	Plant scraps from extraction	The solvent should be biodegradable and not toxic.
02 03 04	Materials unsuitable for consumption or processing	Expired flour; Bleach earth de-oiled; Fermentation residues from enzyme production; Crop waste; Yeast and yeast-like residues; Coco fibre; Molasses residues; Oilseed residues; Residues from the production of potatoes, rice, corn or starch; Residues from processing coffee, tea and cocoa; Residues from processing fruit, vegetable and corn; Residues from tinning processes; Seasonings residues;	

EWC code	Waste type	Specification of permitted materials	Remark
		Husk, husk dust and cereal dust; Tobacco dust, veins and sludge Expired foodstuff; Spent filters and absorbing mass (diatomaceous earth) active earth, active carbon; Defective cigarette batches (without filter);	
02 03 05	Sludges from on-site effluent treatment		Washing is done without using any synthetic agents and additives
02 03 99	Waste not otherwise specified	Fat and residues from the production of biofuels	
02 04 Wastes form sugar processing			
02 04 03	Sludges from on-site effluent treatment	sludges from sugar beet cleaning and other processing steps	Washing is done without using any synthetic agents and additives
02 04 99	Waste not otherwise specified	Sugar water, sugar vinasse, sugar	
02 05 Wastes from the dairy products industry			
02 05 01	Materials unsuitable for consumption or processing	Former foodstuff Milk and milk processing products	ABPR [1)]
02 05 02	Sludges from on-site effluent treatment		Washing is done without using any synthetic agents and additives
02 06 Wastes from the production of baking and confectionary industry			
02 06 01	Materials unsuitable for consumption or processing	Expired bread, pastry, Expired foodstuff Waste dough	
02 06 03	Sludges from on-site effluent treatment		Washing is done without using any synthetic agents and additives
02 07 Wastes from the production of alcoholic and non-alcohol beverages (except coffee, tea and cocoa)			
02 07 01	Wastes from washing, cleaning, and mechanical reduction of raw materials		It has to be ensured that no synthetic detergents and additives are used during washing and cleaning.

EWC code	Waste type	Specification of permitted materials	Remark
02 07 02	Wastes form spirits distillation	e.g. Spent grains fruit, cereal and potato pulp	
02 07 04	Materials unsuitable for consumption or processing	e.g. Yeast and yeast-like residues spent hops malt husks, malt sprouts, malt dust, alcohol, pomace expired beverages spent filters and absorbing mass (diatomaceous earth) active earth, active carbon	
02 07 05	Sludges from on-site effluent treatment		Washing is done without using any synthetic agents and additives
02 07 99	Waste not otherwise specified	Sludges from the production process	
03 WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD			
03 01 01	Waste bark and cork		Natural barks and unmixed products for further processing made from bark only. Not allowed if contains veneers, other coatings or preserving substances.
03 01 05	Sawdust, shavings, cuttings, wood, particle board and veneer		Only material from untreated wood from the wood processing industry Not allowed if contains veneers, other coatings or preserving substances
03 03 Wastes form pulp, papers and cardboard production and processing			
03 03 01	Waste bark and wood		Natural bark and wood. Not allowed if contains veneers, other coatings or preserving substances.
03 03 11	Sludges from on-site effluent treatment other than those mentioned in 03 03 10 (fibre rejects, filler- and coating sludges from mechanical separation)	Paper sludge	without any synthetic agents and additives
04 WASTES FORM THE LEATHER AND TEXTILE INDUSTRIES			
04 02 Waste from the textile industry			

EWC code	Waste type	Specification of permitted materials	Remark
04 02 10	Organic matter from natural products	Grease, wax	
04 02 21	Wastes from unprocessed textile fibres	Cellulose fibre wastes Plant fibre waste Wool waste	
07 WASTES FROM ORGANIC CHEMICAL PROCESSES			
07 01 Wastes from the manufacture, formulation, supply and use (MFSU) of basic organic chemicals			
07 01 99	Other fractions not otherwise specified	fat and residues of fat, glycerine, soapstock, bleach earth, dimers, wheat yeast concentrate	From the production of biofuel
07 01 99	Other fractions not otherwise specified	Laitance, ethanol	From the production technical alcohol
07 01 12	Sludges from on-site effluent treatment other than those mentioned in 07 01 11 (containing dangerous substances)	Sodium acetate (by-product of clean organic materials production), dimers, soapstocks.	Analyses requested,
07 02 Wastes from the manufacture, formulation, supply and use (MFSU) of plastics, synthetic rubber and synthetic fibres			
07 02 13	Waste plastic	Biodegradable packaging and bioplastics	certified according to EN 13432 If accepted in national regulations and / or in the permission of the composting plant
07 05 Wastes from the manufacture, formulation, supply and use (MFSU) of pharmaceuticals			
07 05 14	Solid wastes other than mentioned in 07 05 11 (containing dangerous substances	Residues from medical plants, spice plants, amino acid, protein	not containing dangerous substances

EWC code	Waste type	Specification of permitted materials	Remark
15 PACKAGING: ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED			
15 01 Packaging (including separately collected municipal packaging waste)			
15 01 02	Plastic packaging	Biodegradable packaging and bioplastics	certified according to EN 13432 If accepted in national regulations and / or in the permission of the composting plant

EWC code	Waste type	Specification of permitted materials	Remark
15 02 Absorbents, filter materials, wiping cloths and protective clothing			
15 02 03	absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02 (contaminated by dangerous substances)	vegetable used filter material with cellulose, corn starch, bentonite, perlite, cellite or diatomite	
19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREAMENT, PLANTS AND THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION			
19 05 Waste from aerobic treatment of solid wastes			
19 05 02			
19 05 03	Off-specification compost	Oversize fraction of screened compost Drainage and waste water from composting	Oversize fraction of screened compost that has been produced from input materials listed in this Annex; Drainage and waste water from composting of input materials listed in this Annex
19 06 Waste from anaerobic treatment of solid wastes			
19 06 05	Liquor from anaerobic treatment of animal and vegetable waste		Liquor from anaerobic digestion of input materials listed in this Annex
19 06 06	Digestate from anaerobic treatment of animal and vegetable waste		Digestate from anaerobic digestion of input materials listed in this Annex
19 08 Wastes from waste water treatment plants not otherwise specified			
19 08 09	Grease and oil mixture from oil/water separation containing only edible oil and fats		
19 09 Wastes from the preparation of water intended for human consumption or water for industrial use			
19 09 02	Sludges from water purification		
19 09 03	Sludges from decarbonation		
20 MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS			
20 01 Separately collected fractions (except 15 01)			
20 01 08	Biodegradable kitchen and	Catering waste [1)]	ABPR [1)]

EWC code	Waste type	Specification of permitted materials	Remark
	canteen waste		Individual national regulations with diverting treatment requirements for catering waste must be considered
20 01 25	Edible oil and fat		Only edible oil and fat of animal origin is covered by ABPR [1)] In this case it is included in the definition of *catering waste*
20 01 38	Wood other than mentioned in 20 01 37		Natural wood. Not allowed if contains veneers, other coatings or preserving substances.
20 01 99	Other fractions not otherwise specified	Separately collected biowaste from households and similar institutions	Bio-bin; brown-bin collection; If it contains catering/ kitchen waste: ABPR [1)] Individual national regulations with diverting treatment requirements for catering waste must be considered
20 02 Garden and park wastes (including cemetery waste)			
20 02 01	Biodegradable waste	Garden and park waste Algae, pond waste Landscape gardening waste, green waste from cemeteries	
20 03 Other municipal wastes			
20 03 02	Waste from markets	Separately collected vegetable and other biowaste	
ABPR [1)] Input materials underlying the ABP-Regulation (EC) Nr. 1069/2009			

List of possible additives

Additives should be restricted in the use up to 2 % to fresh material of the input material. Also only additives can be used which verifiable are necessary to improve the anaerobic digestion process.

The following additive groups are commonly used:

- Flocculation agents and flocculation aids
- Trace elements: Trace elements are necessary for a stable anaerobic digestion process and to increase of the biogas production
- Precipitants: Precipitants are used to reduce the amount of sulphur in the biogas.
- Enzymes: Enzymes are used for increasing the biodegradation of special compounds (e.g. cellulose, hemicellulose, lignin) and so the biogas production.
- Free and immobilized prokaryotic and eukaryotic biomass: Free and immobilized prokaryotic and eukaryotic biomasses are used to start the anaerobic digestion process and to guarantee a stable and optimized process as well as improving the conditions of the process.
- Emulgators (e.g. tensides)
- Antifoam agents: Anti foam agents are necessary to prevent foam forming and floatings in the biogas process
- Complexing agents: Complexing agents are used for keeping trace elements in dilution.
- Antiscalants
- Macronutrients (Na, Mg, Ca …)

Annex C II 3: Agreement on acceptance

This agreement on the delivery and acceptance of input material for biological treatment is mutual between:

The treatment plant (production site)

Name of the plant	
Address	
Contact	

Represented by the responsible person:

And the supplier:

Name of the supplier	
Address	
Contact	

Represented by the responsible person:

For the delivery of the following product(s):

•
•
•

On the production site, the acceptance of the following products is forbidden:

- Animal by-products of category I
- Material from unknown origin
- Biowaste with EWC-code not mentioned in the positive list of Annex C II 2

By signing this contract, the supplier further agrees with the specific conditions for delivery:

- The supplier clearly indicates the exact origin of the material, all the way back to the initial production (producer).
- The supplier respects the opening hours of the treatment plant **(<specify>)**
- The supplier agrees with the quality control of the delivered material by the treatment plant (visual check, control of guidance papers, backup sampling, registration, …)
- If requested by the treatment plant, the supplier provides a test batch or sample of the material, or performs the requested analyses (recent analysis report not older than 12 months)

- All deliveries must be carried out according to the applicable legislation: register, identification form, commercial documents, cleaning requirements,
- The supplier clearly indicates the type of the input material and its main properties
- Parameters that are not analysed, may not lead to contamination in the final product
- The supplier takes full responsibility for the delivered product(s) and guarantees the composition as reported in advance.
- The supplier or the transport company implements the obligations for cleaning and disinfection of the transport vehicles and containers after each delivery of animal by-products (excl. manure)
- The supplier provides the necessary acknowledgements of the producer and the transport company.
- The supplier engages himself to take back the material immediately, whenever the internal quality check of the treatment plant reveals that the material is not in comparison with the acceptation protocol
- The supplier agrees that, whenever the delivered material fails the treatment specifications for safe use in a fertiliser or soil improver, the treatment plant informs the quality assurance organisation or competent authority.
- The supplier agrees that the treatment plant staff can take samples of the delivered material, for instant or later use for analytical purposes.

We kindly request the representative of the supplier to send a signed copy of this document to

_____

(name of the plant)

Read and approved in: _____ on _____

(location) (date)

Representing the treatment plant:

Name: _____

Title: _____

Representing the supplier:

Name: _____

Title: _____

Annex C II 4: Sampling Record

Sampling		Sample code		
Date:				
Time:				

Sample taker	
Name:	
Company:	

Compost/Digestate Producer	
Address:	
Person(s) present during sampling:	

Product	
Description of the way the material is available for sampling (stock batch, conveyor, static tank, …)	
Description of the product (type of material, color, moisture content, odour, homogenity…)	

			length	width	height	m³	tonnes
Size of sampled lot			-------Meter-------				
Size of sampled batch							

Method	
Description of sample taking	

Used equipment:
Amount of incremental samples:
Amount of sample containers:

Situation drawing of the sampled material:

Sample pre-treatment
Method of pre-treatment:
Size of the laboratory sample:

Transport and Analysis order
Laboratory:
Packaging:
Circumstances of transport (cooled / not cooled):
Description of analysis parameters: e.g. Process control / Product control Agronomic parameters / environmental parameters

Other perceptions / remarks during sample taking (admission, weather conditions, visual impurities of the material or the site, odour emissions on site, possible measurements or controls)

Annex C II 5: Test Report for Digestate Quality

Test report

Product type: **Portion of production:**

Date of sampling: **Sample No.:** **Sample protocol No.:**

Name of laboratory **Date of analysis:** **Laboratory No.:**

Name of responsible person:

	Physical parameters	
1.	Maximum particle size	mm
2.	Bulk density (volume weight)	g/l FM
3.	Water content	% FM
4.	Impurities > 2 mm (total) (including glass, metals and plastics)	% DM
	Biological parameters	
7.	Viable weed seeds	per l FM

	Plant nutrients	
8.	Nitrogen total (N)	% DM
9.	Ammonium (NH_4-N)	% DM
10.	Phosphate total (P_2O_5)	% DM
11.	Potassium total (K_2O)	% DM
12.	Magnesium total (MgO)	% DM
13.	Sulphur (S)	% DM

	Soil improvement	
14.	Organic matter (OM)	% DM
15.	Electrical conductivity	mS/cm
16.	pH ($CaCl_2$)	
17.	C/N ratio (calc. from OM (LOI))	

	Hygiene	
18.	Salmonellae	

Precautionary quality criteria

		ECN-QAS	National regulations	Sample
	Heavy metal		mg/kg TM	
19.	Lead (Pb)	130		
20.	Cadmium (Cd)	1.3		
21.	Chromium (Cr)	60		
22.	Copper (Cu)	300		
23.	Nickel (Ni)	40		
24.	Mercury (Hg)	0.45		
25.	Zinc (Zn)	600		

Signature of responsible Person:

DM – Dry matter; FM – Fresh matter

Annex C II 6: Operational checklist

Date								
Time								
Name								
Weather conditions	Good ☐		Clear ☐		Cloudy ☐		Rain ☐	
Wind	No ☐		Weak ☐		Normal ☐		Strong ☐	
Wind direction	N ☐	NE ☐	E ☐	SE ☐	S ☐	SW ☐	W ☐	NW ☐

Control point	**OK**	**Remark**
General information		
The plant should be enclosed properly or completed according to the permission		
There are no deviating odour emissions		
The washing and cleaning area is in clean condition		
There is no uncontrolled leachate or spoilt material		
The equipment / material is in a clean condition		
Input material (acceptance and storage)		
The stored material is recorded and the records are traceable		
The material is adequately stored / covered		
The necessary backup samples are taken		
Non-compliant input material is stored		

Monitoring of the treatment process		
Sanitation protocol is recorded (number of batches, time, temperature) The temperature in the digesters is measured		
There is no foam development in the digesters		
Critical process parameters are monitored		
Appearance of the digestate (colour, dry matter) is normal		
Gas quality is checked		
Gas cover is airtight and in good condition		
Exhaust Air treatment is working optimally		
Monitoring quality of end products		
The end products are stored in optimal conditions		
There is no recontamination of the end products		
The after-treatment of the digestate is carried out according to the quality manual (separation, drying)		
Needed analyses if the end products are done and recorded		

ANNEX C II 7: Declaration and Certificate for Digestate

Digestion Plant: **Product Type:** **Quality Assurance**

Code of portion:

Declaration	**Product Characteristics**	kg/t	kg/m^3
Organic fertiliser:	Organic matter:		
Main input materials:	Nitrogen total:		
Product quantity:	Phosphorus (P_2O_5):		
Fitness for use:	Potassium (K_2O):		
Storage conditions:	Magnesium (MgO):		
Application rates:	Sulphur total:		
	Dry matter:		
	NH_4-N [mg/l]:		
	pH-value:		
Detailed application recommendations on further pages	Electrical conductivity: (optional) [mS/m]		

According to regulations:	**Environmental health aspects**
EU Fertiliser Regulation:	Free of viable weeds:
EU Ecolabel Regulation 66/2010:	Free of salmonellae:
EC Regulation 834/2007; 889/2008:	Precautionary environmental criteria according to ECN-QAS

Certification by NQAO: **Date/Signature**