SLOVENSKI STANDARD
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Karakterizacija odpadkov - Okvirno navodilo za pripravo in uporabo programa preskušanja - Cilji, načrtovanje in poročanje

Characterization of waste - Framework for the preparation and application of a testing programme - Objectives, planning and report

Charakterisierung von Abfällen - Rahmen für die Vorbereitung und Anwendung eines Untersuchungsprogramms - Ziele, Planung und Bericht

Caractérisation des déchets - Procédure-cadre pour l'élaboration et la mise en oeuvre d'un programme d'essai - Objectifs, planification et rapport

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Characterization of waste - Framework for the preparation and application of a testing programme - Objectives, planning and report

Caractérisation des déchets - Procédure-cadre pour l'élaboration et la mise en oeuvre d'un programme d'essai - Objectifs, planification et rapport

Charakterisierung von Abfällen - Rahmenbedingungen für die Vorbereitung und Anwendung eines Untersuchungsprogramms - Ziele, Planung und Bericht

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Foreword

This document (EN 16457:2014) has been prepared by Technical Committee CEN/TC 292 “Characterization of waste”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2014 and conflicting national standards shall be withdrawn at the latest by September 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

It is to be noted that for Germany an A-deviation applies (see Annex B).

This document has been prepared by the ad hoc group “Testing programme” of CEN/TC 292. It has been decided by CEN/TC 292 to prepare the present document and to consider separately other issues supporting this document. This would finally result in a set of four documents on waste testing as listed in the Introduction.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard was elaborated as a help for those who have to organize and apply a waste testing programme. Often several parameters need to be determined in a waste sample and for each parameter different testing steps of a different nature need to be coordinated and performed. This is done in accordance with dedicated standards developed by CEN/TC 292 (e.g. standards for the steps of sampling, extraction, leaching and analysis of eluates or extracts). In order to cope with these different parameters to be tested and with these different testing steps of different nature, the testing of a waste generally refers to different standards which should be used (and elaborated) in a coherent and coordinated way in a testing programme. This European Standard is designed for specifying such overall testing programmes.

This European Standard may be used by different interested parties in waste testing: plant operators, testing institutes, accreditation bodies, etc. as well as by industries to address the waste testing part of their contracts and by regulators to address the waste testing part of their regulations.

This European Standard can be used to:

— produce a standardized testing programme for use in regular or routine circumstances (elaboration of daughter/derived standards dedicated to well defined testing scenarios);

— incorporate the specific testing requirements of European and national legislation;

— design and develop a waste testing programme for use on a case by case basis.

This European Standard provides requirements on the programme, objective, plan and report for the execution of a waste testing programme. This is done with the intent to ensure reliable and comparable results when using the reference methods that have been developed by CEN/TC 292 in accordance with the principles specified in this standard and in the supporting documents (listed below).

As shown in Figures 2 and 3, for waste testing, the tests to be performed consist (see also the supporting documents listed below) of two main works: the sampling in the field and the analysis-quantification in the laboratory. The needed coordination and interface is the responsibility of the programme manager (see 4.4). It is also the responsibility of the programme manager to design the testing programme, to authorize the testing report and to submit it to the customer.

This European Standard includes one normative annex and one informative annex which are part of this standard. This European Standard is intended to become a part of a set of documents consisting of the present document:

— EN 16457, *Characterization of waste – Framework for the preparation and application of a testing programme – Objective, planning and report*

and of three supporting documents providing important information:

— CEN/TS (WI 00292082), *Characterization of waste – Framework for the preparation and application of a testing programme – Application of EN ISO/IEC 17025 (in preparation)*

— CEN/TS (WI 00292085), *Characterization of waste – Framework for the preparation and application of a testing programme – Guidelines for the elaboration of standardised testing methods (in preparation)*

— CEN/TR (WI 00292084), *Characterization of waste – Framework for the preparation and application of a testing programme – General information on content tests and leaching tests (in preparation)*

1 Scope

This European Standard specifies requirements for a waste testing programme regarding mainly objectives, planning and report with the intent to ensure reliable and comparable results when using the reference methods that have been developed and/or adopted by CEN/TC 292.

The planning and report aspects of this European Standard are applicable to any waste testing programme dedicated to the determination of one or several parameters. They are also applicable to all testing steps for each parameter from sampling up to reporting whether these steps are taking place in the field (e.g. sampling) or in the laboratory (e.g. analysis-quantification).

This European Standard does not address aspects of safety for activities in the field and inside laboratory.

NOTE The term planning a testing programme is used here with the general meaning of organizing a testing programme and being in accordance with the terms testing plan, sampling plan, laboratory plan used in the present European Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.[1)]

EN 12457-1, *Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 1: One stage batch test at a liquid to solid ratio of 2 l/kg for materials with high solid content and with particle size below 4 mm (without or with size reduction)*

EN 12457-2, *Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 2: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 4 mm (without or with size reduction)*

EN 12457-3, *Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 3: Two stage batch test at a liquid to solid ratio of 2 l/kg and 8 l/kg for materials with high solid content and with particle size below 4 mm (without or with size reduction)*

EN 12457-4, *Characterisation of waste - Leaching - Compliance test for leaching of granular waste materials and sludges - Part 4: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 10 mm (without or with size reduction)*

EN 13137, *Characterization of waste - Determination of total organic carbon (TOC) in waste, sludges and sediments*

EN 13656, *Characterization of waste - Microwave assisted digestion with hydrofluoric (HF), nitric (HNO3) and hydrochloric (HCl) acid mixture for subsequent determination of elements*

EN 13657, *Characterization of waste - Digestion for subsequent determination of aqua regia soluble portion of elements*

EN 14039, *Characterization of waste - Determination of hydrocarbon content in the range of C10 to C40 by gas chromatography*

EN 14345, *Characterization of waste - Determination of hydrocarbon content by gravimetry*

1) Useful information may be found in several CEN/TRs as mentioned in Annex A. The use of CEN/TRs is not mandatory and other sources of information may be used provided that the requirements of the basic EN or CEN/TS are fulfilled. The list of such CEN/TR is given in the Bibliography, references [5] to [15].

EN 14346, *Characterization of waste - Calculation of dry matter by determination of dry residue or water content*

CEN/TS 14405, *Characterization of waste - Leaching behaviour tests - Up-flow percolation test (under specified conditions)*

prEN 14429, *Characterisation of waste - Leaching behaviour test - Influence of pH on leaching with initial acid/base addition*

EN 14582, *Characterization of waste - Halogen and sulfur content - Oxygen combustion in closed systems and determination methods*

EN 14735, *Characterization of waste - Preparation of waste samples for ecotoxicity tests*

EN 14899, *Characterization of waste - Sampling of waste materials - Framework for the preparation and application of a Sampling Plan*

prEN 14997, *Characterisation of waste - Leaching behaviour test - Influence of pH on leaching with continuous pH control*

EN 15002, *Characterization of waste - Preparation of test portions from the laboratory sample*

EN 15169, *Characterization of waste - Determination of loss on ignition in waste, sludge and sediments*

EN 15192, *Characterisation of waste and soil - Determination of Chromium(VI) in solid material by alkaline digestion and ion chromatography with spectrophotometric detection*

EN 15308, *Characterization of waste - Determination of selected polychlorinated biphenyls (PCB) in solid waste by using capillary gas chromatography with electron capture or mass spectrometric detection*

EN 15309, *Characterization of waste and soil - Determination of elemental composition by X-ray fluorescence*

EN 15216, *Characterization of waste - Determination of total dissolved solids (TDS) in water and eluates*

CEN/TS 15364, *Characterization of waste - Leaching behaviour tests - Acid and base neutralization capacity test*

EN 15527, *Characterization of waste - Determination of polycyclic aromatic hydrocarbons (PAH) in waste using gas chromatography mass spectrometry (GC/MS)*

CEN/TS 15862, *Characterisation of waste - Compliance leaching test - One stage batch leaching test for monoliths at fixed liquid to surface area ratio (L/A) for test portions with fixed minimum dimensions*

prEN 15863, *Characterisation of waste - Leaching behaviour test for basic characterisation - Dynamic monolithic leaching test with periodic leachant renewal, under fixed conditions*

CEN/TS 15864, *Characterisation of waste - Leaching behaviour test for basic characterisation - Dynamic monolithic leaching test with continuous leachant renewal under conditions relevant for specified scenario(s)*

EN 15875, *Characterization of waste - Static test for determination of acid potential and neutralisation potential of sulfidic waste*

CEN/TS 16023, *Characterization of waste - Determination of gross calorific value and calculation of net calorific value*

EN 16192, *Characterization of waste - Analysis of eluates*

CEN/TS 16229, *Characterization of waste - Sampling and analysis of weak acid dissociable cyanide discharged into tailings ponds*

EN 16377, *Characterization of waste - Determination of brominated flame retardants (BFR) in solid waste*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.[2)]

3.1
additional parameter (AP)
parameter that needs to be tested so that the test results could be calculated and/or interpreted

Note 1 to entry: For instance, the dry matter for expressing the test results on a dry basis, or pH in eluate to be able to understand and check consistency of test data and to understand/investigate unexpected outcome or unexpected variations.

3.2
analysis / quantification
step in the testing programme where the magnitude of the parameters is determined and the obtained data can be directly delivered for final use and reporting or from which the data can be delivered for further calculations

EXAMPLE Measuring the length with a measuring tape, measuring the temperature with a thermometer, determining (analysing) the concentrations of substances in an extract or eluate.

Note 1 to entry: In the last example, the concentration of the substance in a material or the leachable fraction from a material would be calculated, using the data on the concentrations in the extract or the eluate.

3.3
customer
organization or person that orders for a test and that receives the final test report

[SOURCE: EN ISO 9000:2005, 3.3.5]

3.4
involved parties
individuals and organizations that are directly or indirectly involved in the specification of the testing programme and or in the execution of the programme

[SOURCE: EN 14899:2005, 2.7, modified]

Note 1 to entry: Such parties include, for instance, the customer, (e.g. the producer or the user of the material), the regulator, a certification body, the sampler, the analyst, the laboratory. The person responsible for the final specification of the testing programme and the final test report is the programme manager.

3.5
laboratory plan
plan, which is part of the testing plan, including all the required steps and relevant information pertinent to a particular laboratory activity

Note 1 to entry: The laboratory plan includes the preparation of the test sample(s), the extraction, leaching or other activity with the sample(s), analysis, calculations and reporting.

Note 2 to entry: The laboratory plan includes specification of the tests to be executed, the laboratory (or laboratories) involved, and the planning.

2) The terms and definitions listed in this clause are needed for the present European Standard with regards to the design and execution of a testing programme. In many other standardized documents useful terms and definitions are available and these will not be repeated here. The supporting document *Guidelines for the elaboration of standardized testing methods (in preparation)* referred to in the Introduction would consolidate and harmonize the definitions in all CEN/TC 292 standards.

3.6
parameter
measurable property whose value is a determinant of the characteristics of a waste material

Note 1 to entry: For instance, relevant parameters for waste material may be substances (e.g. cadmium, mercury, lead, salt, PAH), pH, temperature, humidity, compressive strength, grain size, etc.

3.7
programme manager
individual responsible for the development of the testing programme (including the sampling plan and the laboratory plan) the execution of the testing programme including the preparation and submission of the final report

Note 1 to entry: The programme manager may be directly concerned with the sampling work and/or the laboratory work as employee of a sampling organization and/or a laboratory organization. He/she also may be a 'third party' just organizing the whole process and responsible for the final reporting.

3.8
records
written and/or electronic files in which, during the sampling procedure, testing procedure, test results, time, place and instruments of testing, and observations are recorded

Note 1 to entry: Records (also named testing files or work files) are the basis for calculations and for drafting the final test programme report. The report includes relevant data and observations; usually it is not necessary to include all complete testing files in the final report. It is important that the testing files be available upon request, for example, when in a later stage questions arise on the testing and the testing report.

3.9
sampling plan
all the information pertinent to a particular sampling activity

Note 1 to entry: The sampling plan includes the taking of the sample, the production of a laboratory sample, and the transport (to the laboratory), and may include the storage of the laboratory sample.

Note 2 to entry: In case the measurement can be done directly in the field, transport and storage might not be necessary and then will not be elaborated further in the sampling plan.

[SOURCE: EN 14899:2005, 3.18, modified]

3.10
sampling report
report providing information on all field activities during waste sampling and including any important observation of the sampler

Note 1 to entry: A sampling report is prepared for each sampling operation.

Note 2 to entry: Sampling plan and sampling report can both summarize their information in a form, including nearly the same items, which facilitates reporting during the sampling activities and which facilitates comparison of planned activities and the way the sampling was executed.

3.11
testing programme
total test operation, from the first step in which the objectives of the test(s) are defined to the last step in which data are analysed and reported

Note 1 to entry: The test programme may include analyses of the data, evaluation and statistical treatment of the data and comparison with the legal, scientific or other requirements.

Note 2 to entry: A testing programme may include data from several tests with each its own test report, e.g. in production control where each month one batch of one day's production is tested and the testing programme provides information and conclusions on the performance of the product over the whole of the year.

Note 3 to entry: If the test results are to be used for formal evaluation, such as requirements from legislation, permits, certification procedures, the objectives and requirements on the methods to be used may directly come from such formal requirements.

Note 4 to entry: The testing programme objectives amongst others include specification of the location and material to be investigated, the scale of material to be tested, the parameters to be investigated, the required reliability, the reference test methods. The objectives of the testing programme need to be specified by the customer.

[SOURCE: EN 14899:2005, 3.24, modified]

3.12
testing plan
plan, containing both the sampling plan and the laboratory plan

3.13
testing steps
main parts of the testing programme which include:

1) defining or further specifying the testing plan,

2) taking the sample,

3) sample preparation, transport to the laboratory and storage,

4) test sample and test portion preparation,

5) required treatment of the test portion, such as extraction, leaching, testing for compressive strength,

6) analysis, quantification,

7) elaborating the overall report

Note 1 to entry: For all or most of the steps, specific standardized methods exist or are under development that cover that step as reference method (see 4.5 and Table A.1).

Note 2 to entry: In some cases, instructions for different steps are combined in one specific standard, e.g. the extraction and the analysis of substances specified in one test standard. Often a standard on a specific step includes instructions on the final reporting of the results and observations of that step.

Note 3 to entry: It might be possible that a number of parameters need to be measured which are covered by different measurement standards; however, the production of the laboratory sample may be the same for all of the parameters. In such cases, all parameters can be covered by a single testing programme.

4 Defining a waste testing programme

4.1 Principles

In order to secure reliable and comparable results representative of the tested waste, the testing programme with its objectives shall be based on the following principles:

a) the testing programme and its objectives are available before execution tasks are carried out;

b) a sampling plan is specified in the testing programme to meet the objective and the sampling sites/locations are identified to enable representative sample(s) to be taken;

c) the laboratory testing requirements are specified in the testing plan to ensure acceptance by the laboratory and guarantee that the specified tests can be performed on the samples to be provided;