



National Standards Authority of Ireland

IRISH STANDARD

I.S. CEN/TR 15310-1:2006

ICS 13.030.10
13.030.20

**CHARACTERIZATION OF WASTE - SAMPLING
OF WASTE MATERIALS - PART 1: GUIDANCE
ON SELECTION AND APPLICATION OF
CRITERIA FOR SAMPLING UNDER VARIOUS
CONDITIONS**

National Standards
Authority of Ireland
Glasnevin, Dublin 9
Ireland

Tel: +353 1 807 3800
Fax: +353 1 807 3838
<http://www.nsai.ie>

Sales
<http://www.standards.ie>

*This Irish Standard was
published under the
authority of the National
Standards Authority of
Ireland and comes into
effect on:
24 January 2007*

**NO COPYING WITHOUT NSAI
PERMISSION EXCEPT AS
PERMITTED BY COPYRIGHT
LAW**

© NSAI 2006

Price Code V

Údarás um Chaighdeán Náisiúnta na hÉireann

TECHNICAL REPORT
RAPPORT TECHNIQUE
TECHNISCHER BERICHT

CEN/TR 15310-1

November 2006

ICS 13.030.10; 13.030.20

English Version

**Characterization of waste - Sampling of waste materials - Part 1:
Guidance on selection and application of criteria for sampling
under various conditions**

Caractérisation des déchets - Prélèvement des déchets -
Partie 1 : Guide relatif au choix et à l'application des
critères d'échantillonnage dans diverses conditions

Charakterisierung von Abfall - Probenahme - Teil 1:
Richtlinien zur Auswahl und Anwendung von Kriterien für
die Probenahme unter verschiedenen Bedingungen

This Technical Report was approved by CEN on 21 February 2006. It has been drawn up by the Technical Committee CEN/TC 292.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword.....	4
Introduction	5
1 Scope	7
2 Terms and definitions.....	7
3 Specify the objective of the Testing Programme	12
4 Develop the technical goals from the objective	13
4.1 General.....	13
4.2 Define the population to be sampled	14
4.2.1 General.....	14
4.2.2 Overall population	14
4.2.3 Population	14
4.2.4 Sub-population.....	14
4.2.5 Examples	15
4.3 Assess variability.....	16
4.3.1 General.....	16
4.3.2 Spatial variability	16
4.3.3 Temporal variability	17
4.3.4 Random variability.....	17
4.4 Select the sampling approach	17
4.4.1 General.....	17
4.4.2 Probabilistic sampling.....	18
4.4.3 Judgemental sampling	18
4.5 Identify the scale.....	18
4.6 Choose the required statistical parameter.....	19
4.7 Choose the desired reliability.....	20
4.7.1 General.....	20
4.7.2 Precision and Confidence.....	20
4.7.3 Errors in the Testing Programme.....	20
5 Determine the Practical Instructions	21
5.1 General.....	21
5.2 Sampling pattern.....	22
5.2.1 General.....	22
5.2.2 Simple random sampling	23
5.2.3 Stratified random sampling	23
5.2.4 Systematic sampling	24
5.2.5 Judgemental sampling	24
5.3 Determine the increment and sample size (mass / volume).....	24
5.3.1 General.....	24
5.3.2 Liquids	25
5.3.3 Powders and sludges	25
5.3.4 Particulate / granular materials	25
5.4 The use of composite versus individual samples.....	26
5.5 Determine the required number of increments and samples.....	26
6 Define the Sampling Plan.....	27
Annex A The scale	28
A.1 Scale.....	28
A.2 Fundamental variability.....	32
Annex B Statistical methods for characterising a population	33
B.1 Terms and Definitions	33

B.2	Probability distributions	35
B.3	Statistical parameters	37
Annex C Calculating the required numbers of increments and samples		43
C.1	Notation	43
C.2	Estimating a mean concentration	43
C.3	Estimating a standard deviation	46
C.4	Estimating a percentile	47
C.5	Estimating a percentage compliance with a given limit	48
Annex D Minimum increment and sample size (mass / volume)		49
D.1	Estimation of increment and sample size	49
D.2	Determination of the number of increments and/or samples	51
D.3	Calculation of the actual increment and/or sample size	51
Annex E Example sampling scenarios		53
E.1	Sampling scenarios	53
E.2	Example 1: Waste producer to carry out a basic characterisation on the concentration of Cr ⁶⁺ in a waste liquid during discharge to the on-site lagoon	57
E.3	Example 2: Waste producer to undertake a regular compliance testing programme to check conformance with data obtained from the basic characterisation	59
E.4	Example 3: Regulator to undertake an on-site verification of supernatant liquid in the hazardous waste lagoon	61
E.5	Example 4: Waste producer to carry out a basic characterisation on the concentration of Cr ⁶⁺ in a waste liquid held in drum storage at the factory, for disposal purposes	63
E.6	Example 5: Waste producer to carry out a compliance testing of the Cr ⁶⁺ concentration of waste liquid held in drums prior to disposal, against a permitted mean limit of 100 mg/l	65
E.7	Example 6: Carrier or Disposal company to carry out an on-site verification of drums containing Cr-contaminated liquid sludge prior to treatment	67
E.8	Example 7: Carrier or Disposal Company to carry out an on-site verification of the contents of tankers containing Cr ⁶⁺ contaminated liquid sludge prior to treatment	68
E.9	Example 8: Treatment plant operator applying basic characterisation to identify variability of Cr ⁶⁺ in a treated waste using a two-step leaching test at LS 2 and LS 8	70
E.10	Example 9: Treatment plant operator to perform compliance testing to determine whether the treated hazardous waste complies with a limit determined on the basis of the basic characterisation, using a combined one-step leaching test at LS10	72
E.11	Example 10: On-site verification	74
E.12	Example 11: Compliance testing	74
E.13	Example 12: On-site verification	74
E.14	Example 13: On-site verification	75
E.15	Example 14: Basic characterisation	75
Bibliography		76

CEN/TR 15310-1:2006 (E)

Foreword

This Technical Report (CEN/TR 15310-1:2006) has been prepared by Technical Committee CEN/TC 292 "Characterization of waste", the secretariat of which is held by NEN.

This Technical Report has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This Technical Report is one of a series of five Technical Reports dealing with sampling techniques and procedures, and provides essential information and instructions for the application of the EN-standard:

EN 14899 Characterisation of Waste - Sampling of waste materials - Framework for the preparation and application of a Sampling Plan

The principal component of the EN Standard is the mandatory requirement to prepare a Sampling Plan. This EN 14899 standard can be used to:

- produce standardised sampling plans for use in regular or routine circumstances (i.e. the elaboration of daughter/derived standards dedicated to well defined sampling scenarios);
- incorporate specific sampling requirements into national legislation;
- design and develop a Sampling Plan on a case by case basis.

The Technical Reports display a range of potential approaches and tools to enable the project manager to tailor his sampling plan to a specific testing scenario (i.e. a 'shop shelf' approach to sampling plan development for waste testing). This approach allows flexibility in the selection of the sampling approach, sampling point, method of sampling and equipment used.

This Technical Report describes the statistical principles related to sampling, and provides methods based on these principles enabling a testing programme to be defined that will produce results sufficiently reliable for the decision-making process for which they are required.

Wastes arise in a wide variety of types (e.g. pastes, liquids, granular materials, mixes of different materials) and sampling situations (e.g. during a waste production process, stockpiles, tanks, drums). There can also be a variety of sampling objectives within each of the three broad categories (basic characterisation, compliance testing and on-site verification). Consequently the Report cannot provide definitive instructions for each and every case on the practical details of the testing programme, such as the required number of samples, the size of these samples, and whether they should be spot or composite samples. Instead, its aim is to expose the factors that influence the choice of these detailed components of the sampling exercise, and to provide statistical tools that can then be applied to determine the most appropriate testing programme for any given sampling scenario.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-