



BSI Standards Publication

**Characterization of waste —  
Overall guidance document  
for characterization of waste  
from the extractive industries**

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### National foreword

This Published Document is the UK implementation of CEN/TR 16376:2012.

The UK participation in its preparation was entrusted by Technical Committee B/508, Waste Management, to Subcommittee B/508/3, Characterization of waste.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2013

ISBN 978 0 580 72733 7

ICS 13.030.01

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 January 2013.

### Amendments issued since publication

Amd. No.	Date	Text affected
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ICS 13.030.01

English Version

## Characterization of waste - Overall guidance document for characterization of waste from the extractive industries

Caractérisation des déchets - Document guide pour la  
caractérisation des déchets issus des industries extractives

Charakterisierung von Abfällen - Leitfaden zur  
Charakterisierung von Abfällen der Bergbau- und  
Erzgewinnenden Industrie

This Technical Report was approved by CEN on 24 June 2012. It has been drawn up by the Technical Committee CEN/TC 292.

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## Foreword

This document (CEN/TR 16376:2012) has been prepared by Technical Committee CEN/TC 292 "Characterization of waste", the secretariat of which is held by NEN.

The preparation of this document by CEN is based on a mandate by the European Commission (Mandate M/395), which assigned the development of standards on the characterization of waste from extractive industries. The target audience of this guidance document includes all stakeholders concerned with the management of extractive waste including authorities, regulators, waste producers, consultants and testing laboratories.

The overall guidance document is one out of three guideline documents (TR, technical reports) and one technical specification (TS) on aspects related to the characterization of extractive wastes developed by CEN/TC 292. These four documents are:

- overall guidance document for characterization of waste from extractive industries (CEN/TR 16376);
- guidance on sampling of wastes from extractive industries (CEN/TR 16265);
- kinetic testing for sulfidic waste from extractive industries (CEN/TR 16303); and
- sampling and analysis of cyanides (WAD) discharged into tailing ponds (CEN/TS 16229).

In addition to these four documents, CEN/TC 292 developed a European Standard (EN 15875) for static determination of acid and neutralization potential of sulfidic waste (acid-base accounting).

The overall guidance document applies to waste from extractive industries according to the waste definition in Art. 3 para 1 of the Directive 2008/98/EC on Waste. Therefore, as far as residues from the extractive industries are mentioned in this document, they are only covered if they fulfil the criteria of the above mentioned waste definition.

This document provides guidance and is not a required procedure. It gives recommendations on what to evaluate during characterization of waste from extractive industries. It provides a tool box with many different methods that may or may not be applicable in a specific case, and it is not a legally binding document.

## Introduction

Waste from the extractive industries can only be managed properly if sufficient knowledge about its geochemical and physical properties and behaviour is available. Such knowledge may be obtained through characterization of the waste. Consequently, Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and the associated Commission Decisions on waste facility classification, inert waste definition and waste characterization include several requirements related to characterization of waste.

In one of its decisions the European Commission states that: "The purpose of the characterization of extractive waste is to obtain the relevant information on the waste to be managed in order to be able to assess and monitor its properties, behaviour and characteristics and thereby ensure that it is managed under environmentally safe conditions in the long term. Furthermore, the characterization of extractive waste should facilitate the determination of the options for managing such waste and the related mitigation measures in order to protect human health and the environment."

A multitude of methods and tools are available for various waste characterization purposes – some are standardized and some are not. Often several methods that differ only slightly from each other are available for the same purpose. Tradition and geography often determine which method is used. In some cases, the use of specific methods is required by legislation. Within EU legislation, European (CEN) Standards and methods are generally preferred if they are available. The implementation of Directive 2006/21/EC and the COM decisions calls for appropriate waste characterization which may be achieved by the use of several characterization methods and standards. Some of these methods and standards have been applied in the extractive industry for many years, while others have been less commonly used in this context. In a few cases, it has been necessary to develop or initiate development of new CEN standards for the purpose.

This overall guidance document has been developed by CEN under mandate M/395 by the European Commission to support stakeholders in the EU Member States involved in the characterization and management of extractive waste in selecting the appropriate waste characterization tools (standards or methods) for a given purpose related to the management of extractive wastes and to the requirements of Directive 2006/21/EC and the associated COM decisions. Furthermore; it is meant to provide information on the possibilities and limitations of the methods and to provide some guidance on where to find further information on the interpretation and application of the waste characterization results. The overall guidance document is intended to cover all the different waste categories produced by the wide range of sectors within the extractive industry and to reflect state-of-the-art with respect to waste characterization methods. It is the purpose of the document to provide the stakeholders with an overall summary of the specific aspects of characterizing waste from the extractive industries, but it will not replace the in-depth expertise required in most cases. Stakeholders include authorities, regulators, operators/waste producers, consultants and test laboratories.

## 1 Scope

This Technical Report gives guidance and recommendations on the application of methods for the characterization of waste from extractive industries<sup>1</sup>, i.e. wastes resulting from the prospecting, extraction, treatment and storage of mineral resources and the working of quarries. The document covers characterization methods for both physical and geochemical properties and also other significant aspects, from planning to interpretation and reporting.

The main purpose of the document is to aid the extractive industry and regulatory agencies in the member states in understanding how to perform waste characterization for planned, active and closed extractive operations.

The document includes a discussion on when and why characterization may be needed and on the contexts within which characterization data may need to be applied. However, it does not cover information on how to apply these characterization results, e.g. for dam design or closure planning. For guidance on how to use characterization results correctly for predictive modelling or design purposes references are made to other sources of information.

The extractive industry covers many different sectors with very different waste categories and characterization may be carried out with many different objectives. For this reason a guidance document on characterization cannot be prescriptive or provide generally applicable instructions on how waste characterization should be performed in each and every case.

## 2 Principles and procedures

### 2.1 Definition and role of waste characterization

Waste characterization is generally understood as the determination of waste properties and behaviour in terms of geochemical characteristics (e.g. composition, reactivity, thermodynamic stability, mineralogy, leaching properties) and physical properties (e.g. particle size distribution, density, permeability, compactibility, physical stability) and the interdependence and changes of these properties under varying conditions.

Whereas the above more general definition of waste characterization is fairly straightforward, the Commission (COM) decision 2009/360/EC on waste characterization applies a broader definition which includes a substantial amount of additional information. The COM decision also addresses background information on the extractive operation in question, geological background of the deposit to be exploited and on the origin and amount of wastes occurring during prospecting, extraction and operation as well as information on the classification, transport and management of the wastes produced<sup>2</sup>. These issues are discussed in Clause 4.

Waste characterization is primarily a management tool. In the extractive industry, waste characterization is often carried out to determine or estimate the present and future behaviour of a given type of waste under specified conditions to facilitate proper management of that waste. One cornerstone of the European legislation on extractive waste is the development of waste management plans, and one key component of a waste management plan is the waste characterization. The waste management plans will cover many aspects related to the waste management. Waste characterization may thus provide important information in many different contexts. For example, it may constitute an important part of an environmental impact or risk assessment, it may be used to assist in the definition of the most appropriate waste management solution in order to achieve physical and geochemical stability of the waste or it may be used to assess the suitability of an extractive waste for various construction purposes.

### 2.2 The waste characterization process at a glance

The starting point when designing a plan for waste characterization would normally be a definition of the general objective of the characterization exercise and the related questions that should be answered or may need to be answered at some time in the future.

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<sup>1</sup> as defined in Article 2 of Directive 2006/21/EC

<sup>2</sup> Sections 1, 2 and 3 of COM decision 2009/360/EC