PD CEN ISO/TS 16558-2:2015

BSI Standards Publication

Soil quality — Risk-based petroleum hydrocarbons

Part 2: Determination of aliphatic and aromatic fractions of semi-volatile petroleum hydrocarbons using gas chromatography with flame ionization detection (GC/FID)

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EH/4, Soil quality.

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

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Bodenbeschaffenheit - Mineralölkohlenwasserstoffe für die Risikobeurteilung - Teil 2: Teil 2: Bestimmung aliphatischer und aromatischer Fraktionen schwerflüchtiger Mineralölkohlenwasserstoffe mittels Gaschromatographie mit Flammenionisationsdetektion (GC/FID) (ISO/TS 16558-2:2015)

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European foreword

This document (CEN ISO/TS 16558-2:2015) has been prepared by Technical Committee ISO/TC 190 "Soil quality" in collaboration with Technical Committee CEN/TC 345 "Characterization of soils" the secretariat of which is held by NEN.

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Foreword

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The committee responsible for this document is ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

ISO 16558 consists of the following parts, under the general title *Soil quality — Risk-based petroleum hydrocarbons*:

— *Part 1: Determination of aliphatic and aromatic fractions of volatile petroleum hydrocarbons using gas chromatography (static headspace method)*

— *Part 2: Determination of aliphatic and aromatic fractions of semi-volatile petroleum hydrocarbons using gas chromatography with flame ionization detection (GC/FID)* [Technical Specification]

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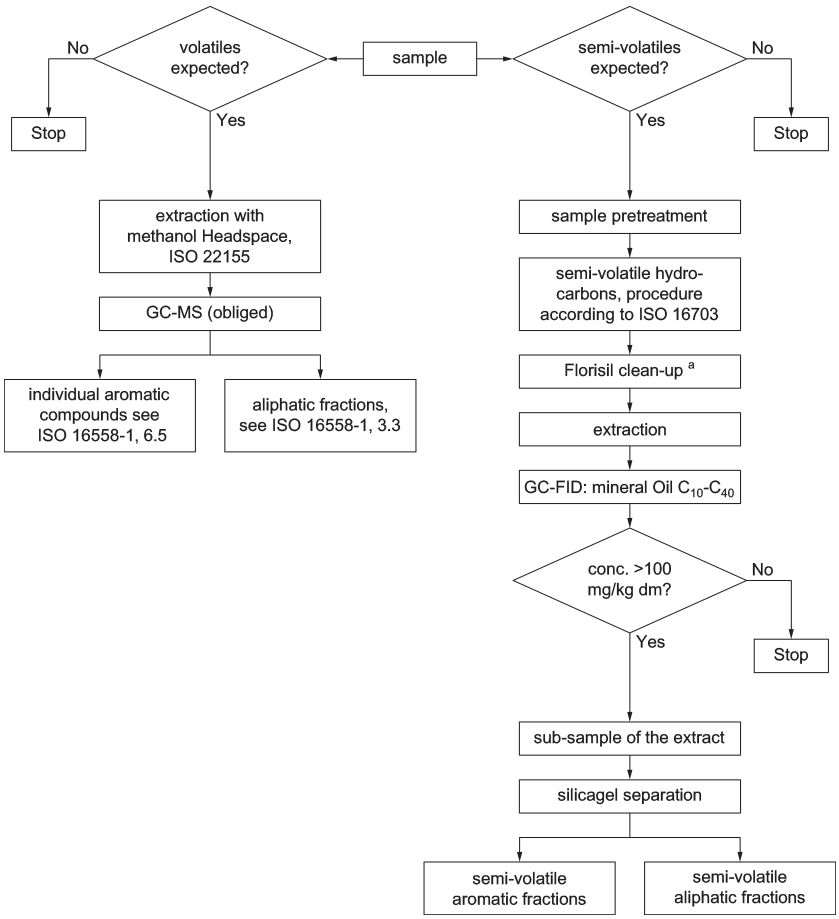
Introduction

ISO 11504 establishes a basis for the choice of fractions and individual compounds when carrying out analysis for petroleum hydrocarbons in soils and soil-like materials including sediments. It provides guidance for the appropriate use of the analytical results in risks assessment. This part of ISO 16558 specifies methods for the quantitative determination of the appropriate fractions of aliphatic and aromatic compounds. The methods described in this part of ISO 16558 are based on existing standards [mineral oil (ISO 16703) and volatile hydrocarbons (ISO 22155)]. The general use and relation between the two different parts of ISO 16558 are given in Figure 1.



Key

a Florisil®[b] clean-up: Only to be applied in case the test according to ISO 16703 is carried out. If the aliphatic and aromatic fractions have to be analysed, Florisil clean-up is not to be carried out. Florisil® is a trade name for a prepared diatomaceous substance, mainly consisting of anhydrous magnesium silicate.

b Florisil® is an example of a suitable product available commercially. This information is given for the convenience of users of this part of ISO 16558 and does not constitute an endorsement by ISO of this product.

Figure 1 — Use of different analytical International Standards during risk assessment of petroleum hydrocarbons

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Soil quality — Risk-based petroleum hydrocarbons —

Part 2: Determination of aliphatic and aromatic fractions of semi-volatile petroleum hydrocarbons using gas chromatography with flame ionization detection (GC/FID)

1 Scope

This part of ISO 16558 specifies a method for the quantitative determination of the total extractable semi-volatile, aliphatic, and aromatic fractions of petroleum hydrocarbon content in field moist soil samples by gas chromatography.

The results of the test carried out can be used for risk assessment studies related to contaminations with petroleum hydrocarbons.

This part of ISO 16558 provides a method applicable to petroleum hydrocarbon contents from about 100 mg/kg soil expressed as dry matter for the whole aliphatic fraction C_{10} to C_{40}, as well as the aromatic fraction C_{10} to C_{40}. For sub-fractions, lower limits of determination can be reached.

If lower detection limits are required, large volume injection can be used or concentration of the final extract can be carried out.

NOTE 1 Low concentrations of aliphatic and aromatic compounds can be found in natural uncontaminated organic rich soils like peat soils.

With this method, all hydrocarbons with a boiling range of 174 °C to 525 °C, *n*-alkanes between $C_{10}H_{22}$ to $C_{40}H_{82}$, isoalkanes, cycloalkanes, alkyl benzenes, and alkyl naphthalenes and polycyclic aromatic compounds are determined as total extractable semi-volatile petroleum hydrocarbons C_{10} to C_{40}; besides that, semi-volatile aliphatic and aromatic fractions are specified.

For the determination of volatile aliphatic and aromatic fractions of petroleum hydrocarbons in soil samples, see ISO 16558-1.

NOTE 2 The sub-fractions proposed in this part of ISO 16558 have shown to be suitable for risk assessment studies. However, other sub-fractions between $C_{10}H_{22}$ to $C_{40}H_{82}$ can also be determined in conformity with this part of ISO 16558.

On the basis of the peak pattern of the gas chromatogram and of the boiling points of the individual *n*-alkanes listed in Annex B, the approximate boiling range of the mineral oil and some qualitative information on the composition of the contamination can be achieved.

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.

ISO 8466-1, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 1: Statistical evaluation of the linear calibration function*

ISO 10381-1, *Soil quality — Sampling — Part 1: Guidance on the design of sampling programmes*

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