



BSI Standards Publication

Soil quality — Determination of linear alkylbenzene sulfonate (LAS) — Method by HPLC with fluorescence detection (LC-FLD) and mass selective detection (LC-MSD)

National foreword

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**Soil quality — Determination of linear
alkylbenzene sulfonate (LAS) —
Method by HPLC with fluorescence
detection (LC-FLD) and mass selective
detection (LC-MSD)**

*Qualité du sol — Détermination des sulfonates d'alkyl benzène
linéaires (SAL) — Méthode par chromatographie liquide à haute
performance (CLHP) avec détection par fluorescence (CL-DFL) et
détection sélective de la masse (CL-DSM)*





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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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

ISO/TS 13896 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 3, *Chemical methods and soil characteristics*.

Introduction

The anionic surfactant LAS (Linear Alkylbenzene Sulfonate) is found in the environment due to its use in detergents. For more than 30 years, LAS has been the largest single surfactant used in detergents, and the use continues on a high level.

Although LAS is readily biodegradable during wastewater treatment, considerable amounts may still be found in sludge of municipal origin. By the use of sludge for soil improvement, LAS can end up in agricultural soil, where a rapid biodegradation takes place.

The method describes the determination of LAS in sludge, soil, treated biowaste and neighbouring fields. LAS is the sodium salt of alkylbenzene sulfonic acids, and it consists of a mixture of the homologues C₁₀-LAS, C₁₁-LAS, C₁₂-LAS, C₁₃-LAS and C₁₄-LAS. LAS is determined as the sum of the homologues.

This Technical Specification is applicable and validated for several types of matrices as indicated in Table 1 (see also Annex A for the results of the validation).

Table 1 — Matrices for which this Technical Specification is applicable and validated

Matrix	Materials used for validation
Sludge	Municipal sewage sludge
Biowaste	Fresh compost
Soil	Sludge amended soil

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WARNING — Persons using this Technical Specification should be familiar with usual laboratory practice. This Technical Specification does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted according to this Technical Specification be carried out by suitably trained staff.

1 Scope

This Technical Specification specifies a method for the determination of linear alkylbenzene sulfonate (LAS) in sludge, treated biowaste and soil using high-performance liquid chromatography (HPLC) with a fluorescence detector (FLD) or a mass selective detector (MSD).

This Technical Specification specifies the determination of the sum of LAS. Under the conditions specified in this Technical Specification, typically a limit of detection of 20 mg/kg (expressed as dry matter) for sludge and of 0,2 mg/kg to 0,5 mg/kg for soil and treated biowaste may be achieved.

Lower limits of detection may be achieved by concentrating the extract by solvent evaporation.

NOTE The single LAS homologues C₁₀ to C₁₄ can be determined by this Technical Specification.

2 Normative references

The following referenced documents are indispensable for the application of this document. 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 11465, *Soil quality — Determination of dry matter and water content on a mass basis — Gravimetric method*

ISO 14507, *Soil quality — Pretreatment of samples for determination of organic contaminants*

ISO 22892, *Soil quality — Guidelines for the identification of target compounds by gas chromatography and mass spectrometry*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 analyte

mixture of homologues (i.e. C₁₀-LAS, C₁₁-LAS, C₁₂-LAS, C₁₃-LAS and C₁₄-LAS) where each homologue consists of a mixture of four to six isomers depending on the length of the alkyl group

NOTE The dominant homologues in detergents and environmental samples are C₁₁-LAS and C₁₂-LAS. C₁₀ to C₁₄ refers to the chain length of the linear alkyl group.