

ISO/TC 134

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Fertilizers — Extraction of total calcium, total magnesium, total sodium and total sulfur in the forms of sulfates

Engrais — Extraction du calcium total, du magnésium total, du sodium total et du soufre total présent sous forme de sulfate

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

ISO 15960 was prepared by CEN/TC 260 as CEN/TS 15960:2009 and was adopted (without modification other than that stipulated below) by Technical Committee ISO/TC 134, *Fertilizers and soil conditioners*.

The following has been added to the former edition of the European Standard:

- a) the CEN Technical Specification has been adopted as a European Standard;
- b) editorial revision.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Fertilizers — Extraction of total calcium, total magnesium, total sodium and total sulfur in the forms of sulfates

1 Scope

This International Standard specifies a method for the extraction of total calcium, total magnesium and total sodium and for the extraction of total sulfur present in the form of sulfates, so that the same extract can be used for the determination of each nutrient required.

The method is applicable to fertilizers listed in Regulation (EC) 2003/2003, Annex I,^[3] for which a declaration of total calcium, total magnesium, total sodium, and total sulfur in the form of sulfates is provided for in this Regulation.

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.

EN 1482-2, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

EN 12944-1, *Fertilizers and liming materials and soil improvers — Vocabulary — Part 1: General terms*

EN 12944-2, *Fertilizers and liming materials and soil improvers — Vocabulary — Part 2: Terms relating to fertilizers*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1, EN 12944-2 and the following apply.

4 Principle

Extraction of the calcium, magnesium, sodium and sulfur present in the form of sulfates in the fertilizer by boiling in diluted hydrochloric acid under the specified conditions.

5 Sampling

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in EN 1482-1.

Sample preparation shall be carried out in accordance with EN 1482-2. Grinding of the laboratory sample is recommended for homogeneity reasons.

6 Reagents

6.1 Water, distilled or demineralized.

6.2 Diluted hydrochloric acid, mix one volume of hydrochloric acid, $p = 1,18$ g/ml, with one volume of water.

7 Apparatus

7.1 Standard laboratory equipment.

7.2 **Electric hot plate**, with adjustable temperature.

7.3 **Beaker**, capacity 600 ml.

7.4 **Graduated flask**, capacity 500 ml.

7.5 **Dry filter-paper**, porosity 8 μm to 20 μm .

8 Procedure

8.1 Test portion

Weigh, to the nearest 1 mg, 5 g of the laboratory sample and place it in the beaker (7.3).

When the fertilizer contains more than 15 % of sulfur (S), i.e. 37,5 % SO_3 , and more than 18,8 % of calcium (Ca), i.e. 26,3 % CaO, carry out the extraction of calcium and sulfur using a test portion of 1 g, weighed to the nearest 1 mg. Place it in the beaker (7.3).

8.2 Extraction

Add approximately 400 ml of water (6.1) to the test portion (8.1) and, taking care when the sample contains a significant quantity of carbonates, slowly add 50 ml of diluted hydrochloric acid (6.2). Bring to a boil and maintain for 30 min. Allow to cool, stirring occasionally. Decant quantitatively into a graduated flask (7.4). Make up to 500 ml volume with water (6.1), and mix. Pass through a filter (7.5) into a dry container, discarding the initial portion.

The extract shall be completely transparent. Stopper the filtrate if it is not used immediately. Carry out the analysis of calcium, magnesium, sodium and sulfur (in sulfate form) by an appropriate method (some of which are mentioned in the Bibliography).

Bibliography

- [1] ISO 3696, *Water for analytical laboratory use — Specifications and test methods*
- [2] EN 1482-1, *Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling*
- [3] *Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers*, Official Journal L 304, 21.11.2003, p. 1-194, Annex I and Annex IV, Method 8.1
- [4] EN 16199, *Fertilizers — Determination of the sodium extracted by flame-emission spectrometry*
- [5] EN 16197, *Fertilizers — Determination of magnesium by atomic absorption spectrometry*
- [6] EN 16198, *Fertilizers — Determination of magnesium by complexometry*
- [7] EN 16196, *Fertilizers — Manganimetric determination of extracted calcium following precipitation in the form of oxalate*
- [8] EN 15749, *Fertilizers — Determination of sulfate content using three different methods*

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