

# **SLOVENSKI STANDARD**

## **SIST EN ISO 11260:2018**

**01-julij-2018**

**Nadomešča:**

**SIST EN ISO 11260:2011**

---

**Kakovost tal - Določevanje efektivne kationske izmenjalne kapacitete in stopnje nasičenosti z bazičnimi kationi z raztopino barijevega klorida (ISO 11260:2018)**

Soil quality - Determination of effective cation exchange capacity and base saturation level using barium chloride solution (ISO 11260:2018)

Bodenbeschaffenheit - Bestimmung der effektiven Kationenaustauschkapazität und der Basensättigung unter Verwendung von Bariumchloridlösung (ISO 11260:2018)

Qualité du sol - Détermination de la capacité d'échange cationique effective et du taux de saturation en bases échangeables à l'aide d'une solution de chlorure de baryum (ISO 11260:2018)

**Ta slovenski standard je istoveten z: EN ISO 11260:2018**

---

**ICS:**

13.080.10	Kemijske značilnosti tal	Chemical characteristics of soils
-----------	--------------------------	-----------------------------------

**SIST EN ISO 11260:2018**

**en,fr,de**

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

SIST EN ISO 11260:2018

<https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-7ab0bcf5a2bc/sist-en-iso-11260-2018>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN ISO 11260**

May 2018

ICS 13.080.10

Supersedes EN ISO 11260:2011

English Version

**Soil quality - Determination of effective cation exchange capacity and base saturation level using barium chloride solution (ISO 11260:2018)**

Qualité du sol - Détermination de la capacité d'échange cationique effective et du taux de saturation en bases échangeables à l'aide d'une solution de chlorure de baryum (ISO 11260:2018)

Bodenbeschaffenheit - Bestimmung der effektiven Kationenaustauschkapazität und der Basensättigung unter Verwendung von Bariumchloridlösung (ISO 11260:2018)

This European Standard was approved by CEN on 19 March 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

Contents	Page
European foreword.....	3
Endorsement notice .....	3

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 11260:2018  
<https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-7ab0bcf5a2bc/sist-en-iso-11260-2018>

## European foreword

This document (EN ISO 11260:2018) has been prepared by Technical Committee ISO/TC 109 "Oil and gas burners" in collaboration with Technical Committee CEN/TC 444 "Test methods for environmental characterization of solid matrices" the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2018, and conflicting national standards shall be withdrawn at the latest by November 2018.

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

This document supersedes EN ISO 11260:2011.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**iTeh STANDARD PREVIEW**  
**Endorsement notice**  
**(standards.iteh.ai)**

The text of ISO 11260:2018 has been approved by CEN as EN ISO 11260:2018 without any modification.

SIST EN ISO 11260:2018  
<https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-7ab0bcf5a2bc/sist-en-iso-11260-2018>

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

SIST EN ISO 11260:2018

<https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-7ab0bcf5a2bc/sist-en-iso-11260-2018>

# INTERNATIONAL STANDARD

ISO  
11260

Second edition  
2018-05

---

---

## Soil quality — Determination of effective cation exchange capacity and base saturation level using barium chloride solution

*Qualité du sol — Détermination de la capacité d'échange cationique  
et du taux de saturation en bases échangeables à l'aide d'une solution  
de chlorure de baryum*

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN ISO 11260:2018

<https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-7ab0bcf5a2bc/sist-en-iso-11260-2018>



Reference number  
ISO 11260:2018(E)

© ISO 2018

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 11260:2018

<https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-7ab0bcf5a2bc/sist-en-iso-11260-2018>



### **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2018

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland



# Contents

Page

<b>Foreword</b>	<b>iv</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
<b>4 Principle</b>	<b>1</b>
<b>5 Interferences</b>	<b>2</b>
<b>6 Procedures</b>	<b>2</b>
6.1 Sample pretreatment	2
6.2 Leaching	2
6.2.1 Reagents	2
6.2.2 Leaching procedure	3
6.3 Determination of CEC	3
6.3.1 Principle	3
6.3.2 Reagents	3
6.3.3 Calibration series	3
6.3.4 Spectrometric procedure	3
6.3.5 Calculation	4
6.4 Determination of exchangeable sodium and potassium	5
6.4.1 Principle	5
6.4.2 Reagents	5
6.4.3 Calibration series	5
6.4.4 Spectrometric procedure	5
6.4.5 Calculations	5
6.5 Determination of exchangeable calcium and magnesium	6
6.5.1 Principle	6
6.5.2 Reagents	6
6.5.3 Calibration series	7
6.5.4 Spectrometric procedure	7
6.5.5 Calculation	7
<b>7 Performance characterization</b>	<b>7</b>
7.1 Calibration check	7
7.2 Repeatability and reproducibility	8
<b>8 Test report</b>	<b>8</b>
<b>Annex A (informative) Performance data</b>	<b>9</b>
<b>Bibliography</b>	<b>12</b>

## ISO 11260:2018(E)

## 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](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html). (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 190 *Soil quality*, Subcommittee SC 3, *Chemical and physical characterization*. [SIST EN ISO 11260:2018](https://standards.iteh.ai/catalog/standards/sist/90d9727e-97d7-4c5d-b24a-740b5f5e0111/iso-11260-1)

This second edition cancels and replaces the first edition (ISO 11260:1994), which has been technically revised. It also incorporates the Technical Corrigendum ISO 11260:1994/Cor.1:1996.

# Soil quality — Determination of effective cation exchange capacity and base saturation level using barium chloride solution

**WARNING** — Persons using this document should be familiar with normal laboratory practice. This document 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.

**IMPORTANT** — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

## 1 Scope

This document specifies a method for the determination of the cation exchange capacity (CEC) at the pH of the soil and for the determination of the content of exchangeable sodium, potassium, calcium and magnesium in soil.

This document is applicable to all types of air-dried soil samples. ISO 11464 can be used for pre-treatment.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 11265, *Soil quality — Determination of the specific electrical conductivity*

## 3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## 4 Principle

The determination of CEC as specified in this document is a modification of the method proposed by Gillman (see Reference [6]). The CEC of soil samples is determined at the pH of the soil and at a low total ionic strength.

The soil is first saturated with respect to barium by treating the soil three times with a 0,1 mol/l barium chloride solution. Thereafter, the soil is equilibrated with a 0,01 mol/l barium chloride solution. Subsequently a known excess of 0,02 mol/l magnesium sulfate is added. All the barium present, in solution as well as adsorbed, is precipitated in the form of highly insoluble barium sulfate and, consequently, the sites with exchangeable ions are readily occupied by magnesium. The excess magnesium is determined by inductively coupled plasma atomic emission spectrometry ICP-AES. Alternative methods with a comparable precision and detection limit may also be used.