



**SLOVENSKI STANDARD**  
**SIST EN 13038:2001**

**01-september-2001**

---

±Vc`ýYj UW`HU`]b`fUghb]`gi VghfUj]!`8c`c Yj Ub`Y`Y`Y`f] bY`dfYj cXbcgh]

Soil improvers and growing media - Determination of electrical conductivity

Bodenverbesserungsmittel und Kultursubstrate - Bestimmung der elektrischen Leitfähigkeit

Amendements du sol et supports de culture - Détermination de la conductivité électrique

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

**Ta slovenski standard je istoveten z: EN 13038:1999**

<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9f6f-4c22-928c-c9255f5be27a/sist-en-13038-2001>

**ICS:**

65.080

Gnojila

Fertilizers

**SIST EN 13038:2001**

**en**

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

SIST EN 13038:2001

<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9f6f-4c22-928c-c9255f5be27a/sist-en-13038-2001>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 13038

December 1999

ICS 65.080

English version

## Soil improvers and growing media - Determination of electrical conductivity

Amendements du sol et supports de culture -  
Détermination de la conductivité électrique

Bodenverbesserungsmittel und Kultursubstrate -  
Bestimmung der elektrischen Leitfähigkeit

This European Standard was approved by CEN on 23 October 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 13038:2001](https://standards.iteh.ai/catalog/standards/sist/e0209df9-9f6f-4c22-928c-c9255f5be27a/sist-en-13038-2001)

<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9f6f-4c22-928c-c9255f5be27a/sist-en-13038-2001>



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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents	Page
Foreword	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Principle	4
5 Reagents	4
6 Apparatus	5
7 Preparation	5
8 Procedure	5
9 Precision	7
10 Test report	7
Annex A (informative) Results of an interlaboratory trial to determine specific electrical conductivity	8
Bibliography	9

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

[SIST EN 13038:2001](#)

<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9ff6-4c22-928c-c9255f5be27a/sist-en-13038-2001>

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 223 "Soil improvers and growing media", the secretariat of which is held by BSI.

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 June 2000, and conflicting national standards shall be withdrawn at the latest by June 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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

SIST EN 13038:2001

<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9f6f-4c22-928c-c9255f5be27a/sist-en-13038-2001>

## 1 Scope

This European standard specifies an instrumental method for the routine determination of electrical conductivity in a water extract of a soil improver or growing medium. The determination is carried out to obtain an indication of the content of water soluble electrolytes in either soil improvers or growing media.

NOTE 1 The method is not applicable to liming materials or sewage sludges and is not suitable for materials like rockwool and foam slabs.

NOTE 2 The requirements of the standard may differ from the national legal requirements for the declaration of the products concerned.

## 2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 13040:1999 Soil improvers and growing media - Sample preparation for chemical and physical tests, determination of dry matter content, moisture content and laboratory compacted bulk density

EN ISO 3696 Water for analytical laboratory use - Specification and test methods. (ISO 3696:1987)

ISO 1770 Solid stem general purposes thermometers  
<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9ff6-4c22-928c-c9255f5be27a/sist-en-13038-2001>

## 3 Terms and definitions

For the purposes of this standard the terms and definitions given in EN 13040 : 1999 and the following apply.

### 3.1

#### electrical conductivity

ability of an aqueous extract of the sample to conduct electricity as a function of the ion concentration.

## 4 Principle

A test portion is extracted with water at  $22\text{ °C} \pm 3,0\text{ °C}$  in an extraction ratio of 1+5 (V/V) to dissolve the electrolytes. The specific electrical conductivity of the extract is measured and the result is adjusted to a measurement temperature of 25 °C.

## 5 Reagents

5.1 **Water** having an electrical conductivity not higher than 0,2 mS/m at 25 °C and a pH >5,6 (grade 2 water according to EN ISO 3696).

**5.2 Potassium chloride solution,  $\alpha(\text{KCl}) = 0,100 \text{ mol/l}$ .**

Dissolve 7,456 g potassium chloride, (KCl), previously dried for 2 h at 105 °C, in water (5.1) and dilute to 1000 ml. The specific electrical conductivity of this solution at 25 °C is 1290 mS/m.

**5.3 Potassium chloride solution,  $\alpha(\text{KCl}) = 0,0100 \text{ mol/l}$** 

Add 100,0 ml of potassium chloride solution (5.2) into a 1000 ml volumetric flask and dilute to the mark with water (5.1) at 20 °C. The specific electrical conductivity of this solution at 25 °C is 141 mS/m.

NOTE All potassium chloride solutions used for calibration should be stored in tightly sealed glass bottles which do not release alkali metal or alkali earth cations.

## 6 Apparatus

**6.1 Conductivity meter** fitted with a conductivity cell and equipped with adjustable measuring range setting and (automatic) temperature correction and having a resolution no greater than 1mS/m at 25 °C. Preferably, the conductivity meter should also be equipped with a cell constant control.

**6.2 Analytical balance** with an accuracy of 0,001 g.

**6.3 Thermometer** capable of measuring to the nearest 0,1 °C complying with type C according to ISO 1770

**6.4 Plastic or glass containers**, of sufficient capacity to accommodate the volume of the sample, extractant and 10 % air volume.

**6.5 Shaking or mixing machine**, capable of holding container (6.4) and maintaining the sample in suspension without damaging the structure of the sample.

**6.6 Filter paper**, with low ash content and high retentive properties.

## 7 Preparation

Prepare the sample in accordance with Clause 8 of EN 13040 : 1999 and determine the compacted laboratory bulk density of the sample in accordance with - Annex A of EN 13040 : 1999.

## 8 Procedure

### 8.1 Test samples passing through a 20 mm sieve

Take a weight equivalent 60 ml of the sample volume to the nearest 1 g and transfer to the container (6.4). Add 300 ml of water (5.1), secure the cap and shake for 1 h on the shaking machine (6.5) at 22 °C  $\pm$  3 °C.

### 8.2 Test samples passing through a 40 mm sieve

Take a weight equivalent 250 ml of the sample volume to the nearest 1 g and transfer to the container (6.4). Add 1250 ml of water (5.1), secure the cap and shake for 1 h on the shaking machine (6.5) at 22 °C  $\pm$  3 °C.

### 8.3 Filtration

Filter through filter paper (6.6) discarding the first 10 ml. In some cases paper filtration is too slow or even impossible. In such cases alternative procedures, (e.g. centrifugation, glass fibre filter papers) can be used to obtain a clear supernatant. The technique used shall be reported.

### 8.4 Blank

Repeat the procedures in (8.1 to 8.2) but omitting the sample. Any modifications to the filtration procedure should also be repeated.

NOTE Measurement of a blank is introduced to determine the contribution of the water, glassware and filter paper used to the electrical conductivity of the extracts.

### 8.5 Measuring conductivity

8.5.1 Measure the conductance ( $G$ ) of the potassium chloride solutions (5.2 and 5.3) according to the instruction manual of the instrument.

8.5.2 Calculate for potassium chloride solution (5.3) the cell constant according to:

$$k = \frac{K_s}{G} \quad (1)$$

where

- $k$  is the cell constant, in reciprocal metres;
- $K_s$  is the specific electrical conductance of one of the potassium chloride solutions, in millisiemens per metre;
- $G$  is the measured electrical conductance of the same potassium chloride solution, in millisiemens per metre. [SIST EN 13038:2001](https://standards.iteh.ai/catalog/standards/sist/e0209d9-9f6f-4c22-928c-1a55620f5340/en-13038-2001)

The calculated cell constant shall not differ by more than 5 % from the value given by the manufacturer.

8.5.3 Adjust the cell constant on the conductivity meter.

### 8.6 Measurement of the specific electrical conductivity of the filtrates

Measure within one hour of extraction the specific electrical conductivity of the filtrates in millisiemens per metre (mS/m) according to the instructions given by the manufacturer of the conductivity meter (6.1). Carry out the measurements with the temperature correction set at 25 °C. Note the results to one decimal place

If the blank exceeds twice the detection limit of the conductivity metre, all the results from this batch are void. All the apparatus and equipment used in the extraction shall be checked and cleaned as required. No results shall be reported until the blank is less than twice the detection limit of the conductivity metre.

NOTE 1 The measured values of the electrical conductivity can be influenced by contamination of the electrodes.

This type of interference is very difficult to recognise. Pollution of the electrodes may change the cell constant, which can be perceived by measuring the electrical conductance of the standard potassium chloride solutions.

NOTE 2 Air bubbles on the electrodes, developed during warming up of solutions disturb the measurements.



## 9 Precision

The repeatability and reproducibility of the specific electrical conductivity in separately prepared samples should be in accordance with Table A 1.

A summary of the results of an interlaboratory trial to determine the precision of the method in accordance with ISO 5725 are given in Annex A.

NOTE The values derived from the interlaboratory trial may not be applicable to concentrations and matrices other than those given.

## 10 Test report

The test report shall contain the following information:

- a) a reference to this European Standard;
- b) all information necessary for complete identification of the sample;
- c) the results of the determination as whole numbers, expressed in millisiemens per metre;
- d) details of any operations not specified in the European Standard or regarded as optional, as well as any factor which may have affected the results;
- e) compacted laboratory bulk density.

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

SIST EN 13038:2001

<https://standards.iteh.ai/catalog/standards/sist/e0209df9-9f6f-4c22-928c-c9255f5be27a/sist-en-13038-2001>