CEN/TC 223/WG 4 "Analytical methods"
WG Secretariat: **ASI**
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Document type	Related content	Document date	Expected action
Project / Draft		2022-02-22	**INFO**

Description

Please find enclosed for your information the 1st working draft for WI 00223099, Soil improvers and growing media - Determination of organicmatter content and ash.

As agreed during the last meeting of WG 4 on 2022-02-09, the enclosed 1st working draft and the forms for the activation of the work item will be circulated to CEN/TC 223 as soon as the call for tender for the project leaders is completed and the project leaders are known.

CEN/TC 223

Date: 2022-02

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Soil improvers and growing media — Determination of organic matter content and ash

Einführendes Element — Haupt-Element — Ergänzendes Element

Élément introductif — Élément central — Élément complémentaire

ICS:

CCMC will prepare and attach the official title page.

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European foreword

This document (prEN 13039:20xx) has been prepared by Technical Committee CEN/TC 223 "Soil improvers and growing media", the secretariat of which is held by NEN.

This document is a working document.

This document will supersede EN 13039:2011.

In comparison with the previous edition, the following technical modifications have been made:

– The scope has been adapted.

– The temperature range for the drying has been expanded.

This document has been prepared under a standardisation request given to CEN by the European Commission and the European Free Trade Association. The annexes A and B are informative.

SAFETY PRECAUTIONS — Care should be taken when handling samples that may contain sharps or are of a dusty nature.

1 Scope

This European Standard specifies a routine method for determining the organic matter and the ash content of soil improvers and growing media.

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

NOTE The loss on ignition is often used as an estimate for the content of organic matter in the sample. Inorganic substances or decomposition products (e.g. H_2O, CO_2, SO_2, O_2) are released or absorbed and some inorganic substances are volatile under the reaction conditions.

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.

EN 13040-1:—[1], *Soil improvers and growing media – Sample preparation – Part 1: Sample preparation for chemical and physical tests, determination of dry matter content, moisture content and laboratory bulk density*

ISO 5725 (all parts), *Accuracy (truenesss and precision) of measurement methods and results*

3 Terms and definitions

For the purposes of this document the terms and definitions given in CEN/TS 00223137:—[2] and the following apply.

3.1

organic matter

carbon fraction of a sample which is free from water and inorganic substances

3.2

ash

residual mineral matter remaining after the destruction of organic matter/material by controlled burning

4 Principle

The test portion is dried at (105 ± 2) °C, then ashed at (550 ± 25) °C. The ash is determined as the residue on ignition. The organic matter is taken to be the loss of mass on ignition. Both are expressed as a percentage by mass of the dried sample.

NOTE 1 LOI is an empirical parameter, thus in principle there is no interference connected to the determination. However, for some purposes the determination of LOI is used for the assessment of the content of organic matter in the sample. Elemental carbon in the sample will be included in the loss on ignition value. Furthermore, any volatilisation or chemical reactions of inorganic compounds will also be included in the loss on ignition value.

NOTE 2 Chemically bound water could be released during heating, thereby contributing to the loss on ignition.

[1] Under preparation. Stage at the time of publication: EN 13040-1:20**.

[2] Under preparation. Stage at the time of publication: CEN/TS 00223137:—.

5 Apparatus

5.1 Drying oven, capable of maintaining a temperature of (105 ± 2) °C.

5.2 Electric muffle furnace, capable of maintaining temperatures of (550 ± 25) °C.

5.3 Basin, made from fused silica, quartz or platina, of shallow form with a flat bottom, capable of holding a sample of 5 g. Typical dimensions are 70 mm width and 20 mm height. Basins should be dry and free of relevant volatile substances.

5.4 Desiccator, containing an active drying agent.

5.5 Analytical balance with a scale interval 0,01 g.

6 Procedure

6.1 Test sample

Prepare the test sample in accordance with Clause 10 of EN 13040-1:—.

6.2 Determination

Spread evenly over the surface of the basin (see 5.3) approximately 5 g of the test sample (6.1) and dry in the oven (5.1) at a temperature of (105 ± 2) °C for at least 4 h.

Allow the basin and contents to cool to room temperature in the desiccator (5.4) and weigh to the nearest 0,01 g. Note the mass of the basin and dried sample m_1.

Place the basin and contents in the cool muffle furnace (5.2) and raise the temperature over approximately 1 h to (550 ± 25) °C. Maintain this temperature for 2 h. Allow the basin and contents to cool to room temperature in the desiccator (see 5.4) and weigh to the nearest 0,01 g. Place the basin and contents into the muffle furnace (5.2) maintained at (550 ± 25) °C for a further 1 h. If the difference of the two weighings is above 0,01 g, repeat the second ashing step.

Allow the basin and contents to cool to room temperature in the desiccator (see 5.4) and weigh to the nearest 0,01 g. Note the mass of the basin and sample after ignition m_2.

NOTE If the samples are incinerated for at least 4 hours at (550 ± 25) °C, the incineration can be considered as complete.

7 Calculation and expression of results

The organic matter content, expressed as a percentage by mass of the dried sample, is given by the following equation:

$$W_{\mathrm{om}} = \frac{m_1 - m_2}{m_1 - m_0} \times 100 \tag{1}$$

The ash content, expressed as a percentage by mass of the dried sample, is given by the following equation:

$$W_{\mathrm{ash}} = \frac{m_2 - m_0}{m_1 - m_0} \times 100 \tag{2}$$

where

W_{om} is the organic matter content, in % m/m;

W_{ash} is the ash content, in % m/m;

m_0 is the mass of the basin, in g;

m_1 is the mass of the basin and the sample after drying in grams;

m_2 is the mass of the basin and the sample after ignition in grams.

8 Precision

The repeatability and reproducibility of the organic matter (*ash*) of the sample measured in 2 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 is given in Annex A.

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

9 Test report

The test report shall include the following:

a) a complete identification of the sample;
b) a reference to this European Standard;
c) the results expressed in accordance with Clause 7;
d) any unusual features noticed during the determination;
e) details of any operation not specified in the European Standard or regarded as optional, as well as any factor which may have affected the results.

Annex A
(informative)

Results of an interlaboratory trial to determine the organic matter

An interlaboratory trial was organized in 1995 under the auspices of the European Committee for Standardization, to test the procedures specified in this European Standard.

In this trial the number of laboratories given in Table A.1 determined the organic matter in three types of samples.

Table A.1 — Summary of the results of the interlaboratory trial for the determination of organic matter

Sample	Unfertilized peat perlite	Composted coarse bark	Sewage sludge composted with straw
Number of laboratories retained after eliminating outliers	19	18	19
Number of outliers (laboratories)	0	1	0
Mean Value (m/m %)	79,86	76,03	44,34
Repeatability standard deviation, s_r (% m/m)	1,00	1,29	1,20
Repeatability relative standard deviation (% m/m)	1,25	1,70	2,71
Repeatability limit, r = 2,8 s_r (% m/m)	2,8	3,60	3,37
Reproducibility standard deviation, s_R (% m/m)	1,51	2,33	2,26
Reproducibility relative standard deviation (%)	1,89	3,06	5,10
Reproducibility limit, R = 2,8 s_R (% m/m)	4,23	6,51	6,33

Pre-shaped and liquid materials shall be taken into account for the next interlaboratory trial.

Bibliography

[1] CEN/TS 00223137, *Soil improvers and growing media — Terminology*