BS EN 16087-2:2011

BSI Standards Publication

Soil improvers and growing media — Determination of the aerobic biological activity

Part 2: Self heating test for compost

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National foreword

This British Standard is the UK implementation of EN 16087-2:2011.

BSI, as a member of CEN, is obliged to publish EN 16087-2 as a British Standard. However, attention is drawn to the fact that during the development of this European Standard, the UK committee voted against its approval as a European Standard.

The UK committee voted against the publication of this standard because there is no control to measure the differential compared with the ambient temperature. The committee also considered that both of the samples of composted material used in the inter-laboratory evaluation were so stable that neither generated enough heat to raise the temperature sufficiently above the ambient temperature under which the test was conducted. The measurements were conducted at 22 ± 2 °C and the mean maximum temperatures of the two samples were 22.26 °C and 25.30 °C respectively. The purpose of the self-heating test is to assess the degree of stability of the composted material but because stable material was used for the validation there is no information about the precision of this method. Stability is a very important parameter when selecting composted material to use as a growing medium constituent. Until the method has been validated with immature composts, the precision of the method is undefined.

The UK participation in its preparation was entrusted to Technical Committee AW/20, Top soil and other growing media.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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Soil improvers and growing media - Determination of the aerobic biological activity - Part 2: Self heating test for compost

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Bodenverbesserungsmittel und Kultursubstrate - Bestimmung der aeroben biologischen Aktivität - Teil 2: Selbsterhitzungstest für Kompost

This European Standard was approved by CEN on 17 September 2011.

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Foreword

This document (EN 16087-2:2011) has been prepared by Technical Committee CEN/TC 223 “Soil improvers and growing media”, the secretariat of which is held by ASI.

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 May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

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1 Scope

This European Standard describes a method to determine the aerobic biological activity using a self-heating test. This method is only applicable to composted material.

2 Principle

Measurement of self-heating in a Dewar vessel and measurement of the maximum temperature, where the temperature is an indicator of the state of aerobic biological activity.

3 Apparatus

3.1 Dewar vessel

Volume 1,5 l, internal diameter (100 ± 3) mm.

3.2 Temperature measurement device

Capable of recording a maximum temperature.

3.3 Sieve

10 mm mesh size.

3.4 Temperature controlled room or climate cabinet

4 Procedure

4.1 General

The self-heating test shall be carried out as soon as possible after sampling. If a delay to the start of testing cannot be avoided, cool storage ((5 ± 3) °C for up to three days) of the samples is then necessary. Ensure that the temperature of the sample material corresponds to a temperature of (22 ± 2) °C at the beginning of the test.

Record the ambient temperature during the trial to ensure that the required temperature is maintained.

4.2 Sample preparation

4.2.1 General

The fresh test sample is sieved < 10 mm (see 3.3). If more than 30 % of the material is retained on the sieve, the method is not appropriate. The moisture content is adjusted according to the results of a fist test (see 4.2.2).

4.2.2 Fist test

The fist test shall be carried out wearing protective gloves.

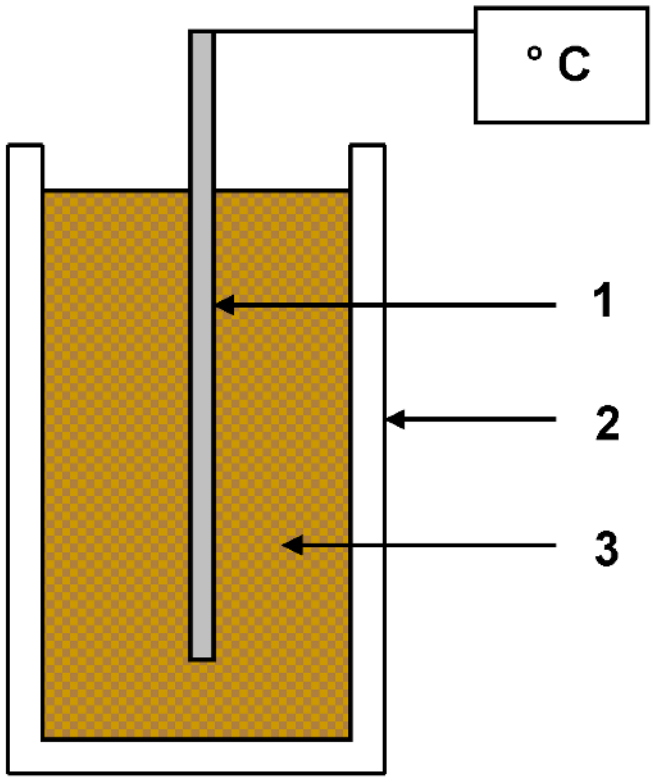
The material to be tested shall be adjusted to a moisture content that is optimal for microbial processes prior to testing.

The compost sample is pressed in the fist. If water beads escape between the fingers, the sample is too wet. If the sample crumbles in the hand when the fist is opened, without further action, the sample is too dry. Suitable moisture content is present if the pressed sample forms an aggregate which crumbles under mild pressure, after the fist has been opened; if, on the contrary, it only deforms, it is too wet. The optimal moisture content is that which may be described as "moist as a well-squeezed sponge". When moistening excessively dry sample material the water shall be mixed into the sample material in such a manner that it is evenly absorbed. In the case of very dry samples, this process requires thorough mixing at intervals. This procedure shall last no more than 8 h. Excessively moist samples shall be carefully air-dried (< 30 ºC) and thoroughly mixed thereafter. The maximum time from sampling to the start of the test shall not exceed five days.

4.3 Determination of self-heating

After optimisation of the moisture content, the Dewar vessels (see 3.1) are filled up to the rim with loosely poured compost, tapping the test containers on a base, and the sensor of the temperature measurement device (see 3.2) is placed approximately 3 cm above the inside bottom of the vessel. The vessels shall be set up without covering (see Figure 1). The room temperature shall be maintained at (22 ± 2) °C for the entire duration. As a rule the temperature maximum (T_{max}) in the sample is reached after two to five days.

NOTE If a high precision for the monitoring of the temperature rise is required (for example for materials low in biological activity like "mature" composts), the test should be carried out under temperature controlled conditions.



Key

1 temperature measurement device

2 open Dewar vessel

3 sample

Figure 1 — Setup of the measurement

The test ends after the temperature maximum has been reached and the temperature is dropping, but after ten days at the latest.

The measurement shall be performed in duplicate.

5 Expression of results

The result T_{max} is expressed as the mean from both measurements in °C with an accuracy of one decimal place.

6 Test report

The test report shall contain at least the following:

a) a reference to this standard;

b) all data required for a complete identification of the sample;

c) the maximum temperature in °C, rounded to one decimal place;

d) if required, the temperature profile of the sample during analysis;

e) details of all work cycles not contained in this standard or that were considered optional, as well as all factors that may have influenced the results.

Annex A
(informative)

Validation

In Table A.1, the results of the interlaboratory trial are shown.

Table A.1 — Summary of the results of the self heating test – T_{max}

°C

Sample	**compost 1**	**compost 2**
	°C	
Number of laboratories retained after eliminating outliers	14	14
Number of outliers (laboratories)	0	0
Mean value	22,26	25,30
Repeatability standard deviation, s_r	1,16	1,14
Repeatability relative standard deviation	0,05	0,05
Repeatability limit, r = 2,8 s_r	3,25	3,19
Reproducibility standard deviation, s_R	2,19	2,59
Reproducibility relative standard deviation	0,10	0,10
Reproducibility limit, r = 2,8 s_R	6,13	7,25

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