DD CEN/TS 16305:2012

BSI Standards Publication

Liming materials — Determination of the dust content of granular liming materials before and after simulated handling conditions

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee CII/37, Fertilisers and related chemicals.

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

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TECHNICAL SPECIFICATION

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English Version

Liming materials - Determination of the dust content of granular liming materials before and after simulated handling conditions

Amendements minéraux basiques - Détermination de la teneur en fines des amendements minéraux basiques granulés avant et après simulation des conditions de manipulation

Calcium-/Magnesium-Bodenverbesserungsmittel - Bestimmung des Staubanteils von granulatförmigen Calcium-/Magnesium-Bodenverbesserungsmitteln vor und nach simulierten Behandlungsbedingungen

This Technical Specification (CEN/TS) was approved by CEN on 31 October 2011 for provisional application.

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Foreword

This document (CEN/TS 16305:2012) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

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Introduction

A standard method for the determination of the dust content of granulated liming materials is required to indicate the stability and quality of the product and to simulate the dust produced during handling and storage.

A rotating device is used to simulate the abrasion caused by handling.

1 Scope

This European Standard specifies a method for the determination of the amount of dust in granulated liming materials, both before and after simulated handling conditions.

This method applies to all granulated and screened liming materials.

2 Normative references

The following referenced documents are indispensable for the application 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 1235, *Solid fertilizers — Test sieving (ISO 8397:1988, modified)*

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

EN 12944-3:2001, *Fertilizers and liming materials — Vocabulary — Part 3: Terms relating to liming materials*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-3:2001 apply.

NOTE For further definitions see EN 12944-1 and EN 12944-2.

4 Principle

Dry sieving of a granulated liming material using a mechanical sieve. Abrasion using a Mechanical Rotating Device (MRD). Dry sieving of the product from the MRD using a mechanical sieve. Determination of the content of dust (i. e. material below 1 mm) before and after abrasion.

5 Apparatus

5.1 Mechanical Rotating Device (MRD), according to Figure 1, with the following specific characteristics:

— cylinder internal diameter 250 mm, external diameter 340 mm, internal thickness 120 mm, external thickness ≈ 130 mm;

— three internal paddles: 75 mm length set at 0 °, 20 mm length set at 240 ° (clockwise), 20 mm length set at 300 ° (clockwise);

— cylinder speed rotation, 19 min^{-1}.

Dimensions in millimetres

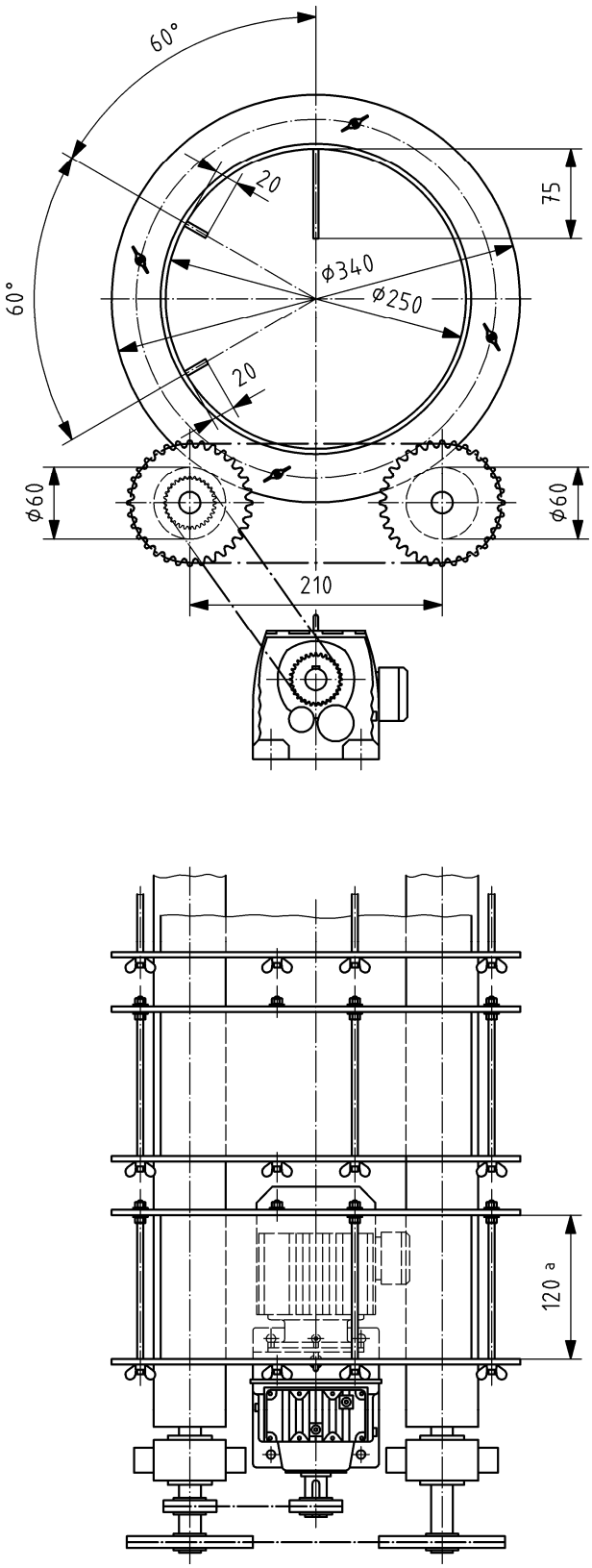

Figure 1 — Mechanical rotating device

The machine shall be capable of counting the number of revolutions. It shall be capable of stopping after a pre-determined number of revolutions.

5.2 **Balance**, capable of weighing to the nearest 0,01 g.

5.3 **Sieving machine**, capable of horizontal and vertical motion on a single or a nest of sieves.

5.4 **Sieve**, 1 mm metal wire cloth sieve according to ISO 565 and ISO 3310-1.

NOTE Additional sieve sizes may be used when determining a range of size fractions within a sample.

6 Sampling

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

Sample preparation shall be carried out in accordance with EN 1482-2.

Use 2 kg of material to determine both part 1 and part 2. Use 1 kg if either part 1 or part 2 is to be determined separately.

NOTE Handling soft materials during sample preparation can influence the dust content of the sample. Care should be taken when handling and preparing the samples.

7 Procedure

7.1 Determination of the amount of material initially passing 1 mm

7.1.1 Weigh 300 g ± 1 g to the nearest 0,01 g of the sampled material.

7.1.2 Place on the 1 mm sieve and mechanically sieve for 1 min at frequency 50 Hz to 100 Hz.

7.1.3 Weigh the residue remaining on the 1 mm sieve to the nearest 0,01 g and record the mass of material passing 1 mm. Retain the material remaining on the sieve and store for further testing (see 7.2.3).

7.1.4 Repeat the operation three times. Calculate and record the mean of the results.

7.2 Determination of the amount of material passing 1 mm after simulated handling conditions

7.2.1 General

NOTE Sometimes, the initial content of dust of the sample received is not representative of the product itself because of its possible alteration during transport. If the received product initially contains a significant amount of dust, removing existing dust before abrasion may alter the results, because lower amounts will fall down in the cylinder. It is the reason why the method includes two parts for measurement: with or without initial dust, but always with the same amount in the MRD.

If initial content of dust is considered as representative of the product, part 1 is to be preferred. If initial content of dust in the sample is suspicious, part 2 would be preferred, but the final result (A_4), may always be considered as the specific production of dust due to this conventional handling.

7.2.2 Part 1: Handling with initial dust

7.2.2.1 Weigh 250 g ± 1 g to the nearest 0,01 g of the original sample, including initial dust.

7.2.2.2 Place in the MRD cylinder and rotate for exactly 450 revolutions.

7.2.2.3 Recover all the material from the MRD.

7.2.2.4 Place on a 1 mm sieve according to EN 1235 and mechanically sieve for 1 min at frequency 50 Hz to 100 Hz.

7.2.2.5 Weigh to the nearest 0,01 g and record the mass of the material remaining on the 1 mm sieve.

7.2.2.6 Repeat the part 1 operation three times. Calculate and record the mean of the results.

7.2.3 Part 2: Handling without initial dust

7.2.3.1 Weigh 250 g ± 1 g to the nearest 0,01 g of the material retained on the 1 mm sieve during operation defined in 7.1.

7.2.3.2 Place in the MRD cylinder and rotate for exactly 450 revolutions.

7.2.3.3 Recover all the material from the MRD.

7.2.3.4 Place on a 1 mm sieve according to EN 1235 and mechanically sieve for 1 min at frequency 50 Hz to 100 Hz.

7.2.3.5 Weigh to the nearest 0,01 g and record the mass of the material remaining on the 1 mm sieve.

7.2.3.6 Repeat the part two operations three times. Calculate and record the mean of the results.

8 Expression of results

8.1 Determination of the amount of dust (material below 1 mm) in the original sample

Calculate the amount of dust (material below 1 mm) in the original sample as received, A_1, according to Equation (1):

$$A_1 = \frac{(m_1 - m_2) \times 100}{m_1} \quad (1)$$

where

A_1 is the amount of dust contained in the original test portion expressed as a mass fraction in percent;

m_1 is the mass of the test portion in grams used in 7.1;

m_2 is the mass of the material in grams retained on the 1 mm sieve (7.1.3).

8.2 Determination of the amount of dust (material below 1 mm) after the simulated handling in the MRD of the original sample

Calculate the amount of dust (material below 1 mm) after simulated handling in the MRD, A_2, according to Equation (2):

$$A_2 = \frac{(m_3 - m_4) \times 100}{m_3} \tag{2}$$

where

A_2 is the amount of dust contained in the original test portion after simulated handling in the MRD, expressed as a mass fraction in percent;

m_3 is the mass of the test portion in grams used in 7.2.2.1;

m_4 is the mass of the material in grams retained on the 1 mm sieve (7.2.2.5).

8.3 Determination of the amount of dust (material below 1 mm) after simulated handling in the MRD of material retained on the 1 mm sieve during operation 7.1.3

Calculate the amount of dust (material below 1 mm) after simulated handling in the MRD of material retained on the 1 mm sieve during operation 7.1.3, A_3, according to Equation (3):

$$A_3 = \frac{(m_5 - m_6) \times 100}{m_5} \tag{3}$$

where

A_3 is the amount of dust contained in that portion of the original sample which was retained on the 1 mm sieve and subsequently subjected to simulated handling in the MRD, expressed as a mass fraction in percent;

m_5 is the mass of the test portion in grams used in 7.2.3.1;

m_6 is the mass of the material in grams retained on the 1 mm sieve (7.2.3.5).

8.4 Determination of the amount of dust (material below 1 mm) due to the simulated handling

If part 1 (with initial dust) has been processed, calculate the amount of dust (material below 1 mm) due to the simulated handling, A_4, according to Equation (4):

$$A_4 = A_2 - A_1 \tag{4}$$

If part 2 (without initial dust) has been processed, calculate the amount of dust (material below 1 mm) due to the simulated handling, A_4, according to Equation (5):

$$A_4 = A_3 \tag{5}$$

where

A_4 is the amount of dust due to simulated handling, expressed as a mass fraction in percent;

A_3 is the amount of dust contained in that portion of the original sample which was retained on the 1 mm sieve and subsequently subjected to simulated handling in the MRD, expressed as a mass fraction in percent.

9 Test report

The test report shall contain at least the following information:

a) all data necessary for the identification of the sample;

b) a reference to this document;

c) the part(s) processed, the results and the units in which the results have been expressed;

d) any particular points observed in the course of the test, particularly if initial sieving shows a significant amount of dust;

e) any operations not specified in the method or regarded as optional which might have affected the results.

Bibliography

EN 1482-1, *Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling*

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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