International Standard 5313

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High nitrogen content, straight ammonium nitrate fertilizers — Determination of oil retention

Engrais simples à base de nitrate d'ammonium et à forte teneur en azote — Détermination de la rétention d'huile

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Foreword

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INTERNATIONAL STANDARD ISO 5313-1986 (E)

High nitrogen content, straight ammonium nitrate fertilizers — Determination of oil retention

0 Introduction

The porosity of a high nitrogen content, straight ammonium nitrate fertilizer can be measured by means of the determination of the gas oil retention, called by convention oil retention.

The method specified in this International Standard is an empirical method, requiring the minimum of apparatus, and gives results with an acceptable level of reproducibility.

1 Scope and field of application

This International Standard specifies a method for the determination of the gas oil retention of solid, high nitrogen content, straight ammonium nitrate fertilizers.

The method is applicable to fertilizers which do not contain materials soluble in gas oil and which are prilled or granular.

2 References

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

ISO 8358, *Fertilizers — Preparation of samples for analysis.* [1)]

3 Definition

oil retention of a high nitrogen content, straight ammonium nitrate fertilizer: The quantity of gas oil retained by the fertilizer determined under the conditions specified.

It is expressed as a percentage by mass.

4 Principle

Total immersion of a test portion in gas oil for a specified period, followed by the draining away and the removal of surplus gas oil under specified conditions. Measurement of the increase in mass of the test portion.

5 Reagent

Gas oil

Viscosity: 1,3 to 5,0 mPa·s (1,6 to 6,0 cSt) at 40 °C

Density: 0,82 to 0,86 g/ml at 15 °C

Sulfur content $\leqslant$ 1,0 % (m/m)

Ash $\leqslant$ 0,1 % (m/m)

The density of the gas oil shall be mentioned in the test report.

6 Apparatus

Ordinary laboratory apparatus, and

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

6.2 Beaker, of capacity 500 ml.

6.3 Funnel, of plastics material, preferably with a cylindrical wall at the upper end, diameter approximately 200 mm.

6.4 Test sieve, complying with ISO 3310/1, aperture size 0,5 mm, fitting into the funnel (6.3).

6.5 Filter paper, rapid filtering grade, crêped, soft, of surface density 150 g/m^2.

7 Preparation of test sample

Prepare the test sample in accordance with ISO 8358.

8 Procedure

8.1 Sieve the test sample using the test sieve (6.4) to remove particles less than 0,5 mm. Weigh, to the nearest 0,01 g, approximately 50 g of the sieved test sample into the beaker (6.2).

1) At present at the stage of draft.

Add sufficient of the gas oil (clause 5) to cover the test portion completely and agitate very gently to ensure that all surfaces are covered. Allow the beaker to stand at a temperature of 25 ± 2 °C for 1 h.

8.2 Fit the test sieve (6.4) into the funnel (6.3). Transfer the contents of the beaker quantitatively onto the test sieve. Distribute the fertilizer on the surface of the sieve. Incline the funnel with the test sieve and allow to drain for 1 h to remove the majority of the excess gas oil.

8.3 Spread the test portion quantitatively on a double sheet of filter paper (6.5) and cover with a similar double sheet. Remove any excess surface gas oil by gently rolling flat the test portion between the sheets of filter paper. Repeat this operation with fresh sheets of filter paper until there are no visible traces of gas oil on them.

NOTE — The treatment with filter paper should be performed carefully in order to prevent crushing of granules.

8.4 Weigh the test portion and the gas oil retained by the granules to the nearest 0,01 g immediately after rolling.

8.5 Carry out two determinations in rapid succession on separate test portions taken from the same test sample.

9 Expression of results

9.1 Method of calculation and formula

The oil retention, expressed as a percentage by mass of fertilizer, is given by the formula

$$\frac{m_2 - m_1}{m_1} \times 100$$

where

m_1 is the mass, in grams, of the sieved test portion (8.1);

m_2 is the mass, in grams, of the test portion and the retained gas oil (8.4).

Take as the result the arithmetic mean of the two determinations if the requirement concerning repeatability (see 9.2) is satisfied. Otherwise, carry out two further determinations.

9.2 Repeatability

The difference between the results of two determinations, obtained simultaneously or in rapid succession by the same analyst, using the same apparatus, on identical test material, under the same operating conditions, should not exceed $0{,}3\sqrt{\bar{x}}$, where $\bar{x}$ is the arithmetic mean of two determinations, at a confidence level of 95 %.

9.3 Reproducibility

The difference between the results of two determinations, obtained by different analysts in different laboratories, on identical test material, should not exceed $0{,}8\sqrt{\bar{x}}$, where $\bar{x}$ is the arithmetic mean of two determinations, at a confidence level of 95 %.

10 Test report

The test report shall include the following particulars:

a) the reference to the method used;

b) the identification of the test sample;

c) the density of the gas oil;

d) the result and the method of expression;

e) any unusual features noted during the determination;

f) any operation not included in this International Standard or regarded as optional.