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Straight ammonium nitrate fertilizers — Comparative study on the determination of porosity (oil retention)

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Straight ammonium nitrate fertilizers - Comparative study on the determination of porosity (oil retention)

Engrais simples à base de nitrate d'ammonium - Etude comparative de méthodes de détermination de la porosité (rétention fuel)

Reine Ammoniumnitratdünger - Bestimmung der Porosität (Ölretention)

This Technical Report was approved by CEN on 23 May 2021. It has been drawn up by the Technical Committee CEN/TC 260.

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Contents

Page

European foreword 3
Introduction 4
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Test procedure 5
4.1 Methods for measuring porosity 5
4.2 Products 5
4.2.1 Test samples: straight ammonium nitrate 5
4.2.2 Gas oils 6
4.3 Ring test procedure 6
5 Results and statistical interpretation 6
5.1 General 6
5.2 Mean value 6
5.3 Repeatability 7
5.4 Reproducibility 7
5.5 Interpretation of the results 7
6 Conclusions 7
Annex A (informative) Characteristics of and limits for straight ammonium nitrate fertilizers of high nitrogen content as given in EC Directive 80/876/EEC 8
Annex B (informative) Determination of oil retention — EC method as given in EC Directive 87/94/EEC 9
Annex C (informative) Centrifuge method — Non-standardized alternative method 12
Annex D (informative) Roller drum method — Non-standardized alternative method 15
Bibliography 18

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European foreword

This document (CEN/TR 14539:2021) 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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This document supersedes CR 14539:2002.

Significant changes between this document and CR 14539:2002 are as follows:

a) updated Normative references and Bibliography;

b) adaption to current principles and rules for structure and drafting.

This document is published for information only and does not have the status of a European Standard.

The Annexes A to D are informative.

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Introduction

Straight ammonium nitrate fertilizers of high nitrogen content (> 28 %), following Directive 80/876/EEC [1] and Directive 87/94/EEC [2], are subject to the particular regulatory requirement of a maximum porosity limit of 4 %. The currently used official EC method is demanding with respect to time and skilled laboratory manpower.

Therefore, this document presents a comparison of non-standardized alternative methods for measuring porosity with the official one, through ring testing.

In parallel, oil retention can also be determined using ISO 5313 [4].

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1 Scope

This document gives the results of inter-laboratory testing to compare the accuracy and convenience of the official EC method for porosity measurement (given in Annex B) with two non-standardized alternative methods (given in Annexes C and D) already used in some participating laboratories.

Three products, with a porosity between 1 % and 7 %, have been used in the inter-laboratory trials.

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 1235, *Solid fertilizers - Test sieving (ISO 8397)*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Test procedure

4.1 Methods for measuring porosity

All the methods tested for measurement of ammonium nitrate porosity are based on immersion of the test sample in gas oil, removing the excess oil, and finally determining the absorbed amount of oil through weighing. The methods differ in the way of removing the excess oil.

Table 1 — Methods for measuring porosity

Method	Removal of oil	Protocol
Method 1: EC Method [2][a]	Hand-rubbing between sheets of filter paper	see Annex B
Method 2: Centrifuge method	Draining and centrifuging	see Annex C
Method 3: Roller drum method	Draining and roller drum with filter thimble	see Annex D
[a] This method is based on ISO 5313 [4], with some minor but significant differences.		

WARNING — Appropriate safety rules and procedures should be followed while handling samples and residues of Ammonium nitrate impregnated with gas oil.

4.2 Products

4.2.1 Test samples: straight ammonium nitrate

Three different ammonium nitrate samples have been provided to all the participants. Two samples were fertilizer ammonium nitrates of the 33,5 % N type, the third was a special ammonium nitrate, with a higher porosity well over 4 %.

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