



BSI Standards Publication

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

---

## National foreword

This Published Document is the UK implementation of CEN/TR 14539:2021.

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 committee manager.

### Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2021  
Published by BSI Standards Limited 2021

ISBN 978 0 55 15188 6

ICS 65.080

**Compliance with a Published Document cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 June 2021.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---

TECHNICAL REPORT

**CEN/TR 14539**

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

June 2021

ICS 65.080

Supersedes CR 14539:2002

English Version

## 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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

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

## 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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.

Currently in preview, click buy full version

## 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].

## 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/online>
- 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] <sup>a</sup>	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

<sup>a</sup> 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 residue 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 %.