



BSI Standards Publication

**Fertilizers – Determination of cold water insoluble nitrogen and hot water insoluble nitrogen in solid urea formaldehyde and methylene urea slow-release fertilizers and determination of the solubility of nutrient polymers in phosphate buffer solution with a pH of 7,5 at 100 °C**

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## National foreword

This Published Document is the UK implementation of CEN/TS 17403:2021.

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.

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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English Version

**Fertilizers - Determination of cold water insoluble nitrogen and hot water insoluble nitrogen in solid urea formaldehyde and methylene urea slow-release fertilizers and determination of the solubility of nutrient polymers in phosphate buffer solution with a pH of 7,5 at 100 °C**

Engrais - Dosage de l'azote insoluble dans l'eau froide et de l'azote insoluble dans l'eau chaude dans les engrais à libération lente urée-formaldéhyde solides et méthylène-urée, et détermination de la solubilité des polymères nutritifs dans une solution tampon phosphate avec un pH de 7,5 à 100 °C

Düngemittel - Bestimmung von kalt- und heißwasserunlöslichem Stickstoff in festen langsam freisetzenden Harnstoff-Formaldehyd- und Methyleneurea-Düngemitteln sowie Bestimmung der Löslichkeit von Nährstoffpolymeren in Phosphatpufferlösung mit einem pH-Wert von 7,5 bei 100 °C

This Technical Specification (CEN/TS) was approved by CEN on 5 November 2020 for provisional application.

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<b>Contents</b>		Page
<b>European foreword</b> .....		3
<b>Introduction</b> .....		4
<b>1</b>	<b>Scope</b> .....	5
<b>2</b>	<b>Normative references</b> .....	5
<b>3</b>	<b>Terms and definitions</b> .....	5
<b>4</b>	<b>Sampling and sample preparation</b> .....	7
<b>4.1</b>	<b>Sampling of products in bags and in bulk</b> .....	7
<b>4.2</b>	<b>Reduction of samples</b> .....	7
<b>5</b>	<b>Determination of the mass fraction of CWIN</b> .....	7
<b>5.1</b>	<b>Principle</b> .....	7
<b>5.2</b>	<b>Reagents</b> .....	7
<b>5.3</b>	<b>Apparatus</b> .....	7
<b>5.4</b>	<b>Procedure</b> .....	7
<b>5.5</b>	<b>Calculation and expression of results</b> .....	8
<b>6</b>	<b>Determination of the mass fraction of HWIN</b> .....	8
<b>6.1</b>	<b>Principle</b> .....	8
<b>6.2</b>	<b>Reagents</b> .....	8
<b>6.3</b>	<b>Apparatus</b> .....	8
<b>6.4</b>	<b>Procedure</b> .....	8
<b>6.5</b>	<b>Calculation and expression of results</b> .....	9
<b>7</b>	<b>Determination of the solubility of nutrient polymer in phosphate buffer solution with a pH of 7,5 at 100 °C</b> .....	9
<b>8</b>	<b>Test report</b> .....	9
<b>Bibliography</b> .....		11

## European foreword

This document (CEN/TS 17403:2021) 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.

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## Introduction

Solid urea formaldehyde and methylene urea slow-release fertilizers are non-coated and chemically synthesized nitrogen fertilizers with slow-release effect. In 1924, the first slow-release fertilizer patent in the world was issued to urea formaldehyde (UF) and in 1955, UF was put into commercial production as the oldest slow-release fertilizer.

**WARNING** — Users of this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety issues, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

**IMPORTANT** — It is absolutely essential that tests conducted according to this document are carried out by suitably trained staff.

## 1 Scope

This document specifies a method for the determination of the cold and hot water insoluble nitrogen content in solid urea formaldehyde and methylene urea slow-release fertilizers and for the determination of the solubility of nutrient polymers in a phosphate buffer solution with a pH of 7,5 at 100 °C.

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

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*

ISO 5315, *Fertilizers — Determination of total nitrogen content — Titrimetric method after distillation*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1 and EN 12944-2 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

### 3.1

#### **urea formaldehyde**

##### **UF**

slow-release nitrogenous fertilizer obtained by the reaction between urea and formaldehyde to produce molecular chains of general formula  $\text{NH}_2\text{-CO-NH}(\text{CH}_2\text{NHCONH})_n\text{H}$

### 3.2

#### **methylene urea**

##### **MU**

slow-release nitrogenous fertilizer obtained by the reaction between urea and formaldehyde to produce oligomers such as MDU (methylenediurea), DMTU (dimethylentriurea), TMTU (trimethylentetraurea), TMPU (tetramethylpentauraurea) and higher counterparts

### 3.3

#### **CMC nutrient polymers**

component material of EU fertilising products consisting of polymers exclusively made of monomer substances complying with the criteria set out in points 1 and 2 of CMC 1, where the purpose of the polymerisation is to control the release of nutrients from one or more of the monomer substances

Note 1 to entry: See [2], Annex II, Part I and Part II.