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**Fertilizers and soil conditioners —  
Liquid methylene-urea slow release  
fertilizers — General requirements**

*Engrais et amendements — Engrais liquides à libération lente à base  
de méthylène-urée — Exigences générales*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 134, *Fertilizers, soil conditioners and beneficial substances*.

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Liquid methylene-urea slow release fertilizers are chemically synthesized nitrogen fertilizers with slow release effect.

To facilitate international fertilizer trade, it is necessary to have an international and general standard on liquid methylene-urea slow release fertilizers.

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# Fertilizers and soil conditioners — Liquid methylene-urea slow release fertilizers — General requirements

## 1 Scope

This document specifies general requirements, analytical methods, sampling and preparation of test sample, marking and labelling, packaging, transport and storage for liquid methylene-urea slow release fertilizers.

This document applies to pure liquid slow release fertilizers, i.e. methylene urea (MU).

This document does not apply to mixtures of nitrogenous fertilizers containing liquid slow release fertilizers.

## 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.

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

ISO 14820-1, *Fertilizers and liming materials — Sampling and sample preparation — Part 1: Sampling*

ISO 14820-2, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

ISO 15604, *Fertilizers — Determination of different forms of nitrogen in the same sample, containing nitrogen as nitric, ammoniacal, urea and cyanamide nitrogen*

ISO 18643, *Fertilizers and soil conditioners — Determination of biuret content of urea-based fertilizers — HPLC method*

ISO 18645, *Fertilizers and soil conditioners — Water soluble fertilizer — General requirements*

ISO 19746, *Determination of urea content in urea-based fertilizers by high performance liquid chromatography (HPLC)*

AOAC 985.19, *(Apparent) Weight per Unit Volume and Specific Gravity of Fats and Oils*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology 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/>

### 3.1

#### **liquid methylene-urea slow release fertilizer**

product of reaction between urea and formaldehyde that produces a slow release nitrogenous fertilizer in liquid form

EXAMPLE Methylene-urea (MU).

## 4 Requirements

### 4.1 Visual inspection

The product shall be in liquid form, transparent or coloured. Visually inspect for the presence of solid contaminants and foreign matter.

### 4.2 Requirements of liquid methylene-urea slow release fertilizers

Liquid slow release fertilizer shall be tested to demonstrate conformance with all requirements specified in [Table 1](#) and declared values on containers.

**Table 1 — Requirements of liquid methylene-urea slow release fertilizers**

Item		Requirements
Total nitrogen (mass fraction)	≥	24 %
Methylene-urea reaction products nitrogen (mass fraction)	≥	1/2 of total nitrogen in percentage
Ureic nitrogen (mass fraction)	≤	1/2 of total nitrogen in percentage
Ammonia nitrogen	<	0,5 %
Nitric nitrogen	<	0,1 %
Cyanamide nitrogen	<	0,1 %
Biuret content	<	total nitrogen × 0,026 %
Mass fraction of water insoluble matter	≤	0,5 %
Density at 20 °C	≤	1,35 kg/l

NOTE 1 The table is indicative as the specification of liquid slow release fertilizer is determined by the customer's specific field and ambient conditions for the selected plant, crop or vegetation.

NOTE 2 Further parameters such as salt index or electrical conductivity can be mentioned, but only as a result of specific negotiations between supplier and customer.

NOTE 3 The density requirement must be understood as the maximum achievable value of a stable product have a water insoluble matter content not exceeding mass fraction of 0,5 %.

## 5 Analytical methods

### 5.1 Visual inspection for foreign matter

It shall be determined by visual method.

### 5.2 Determination of the mass fraction of total nitrogen

It shall be determined in accordance with ISO 5315.

### 5.3 Determination of the mass fraction of ureic nitrogen

It shall be determined in accordance with ISO 19746.

### 5.4 Determination of the mass fraction of methylene-urea reaction products nitrogen

It shall be determined by subtracting the mass fractions of ureic nitrogen, ammonia nitrogen, nitric nitrogen and cyanamide nitrogen from the mass fraction of total nitrogen.



### 5.5 Determination of the ammonia nitrogen

It shall be determined in accordance with ISO 15604.

### 5.6 Determination of the nitric nitrogen

It shall be determined in accordance with ISO 15604.

### 5.7 Determination of the cyanamide nitrogen

It shall be determined in accordance with ISO 15604.

### 5.8 Determination of the biuret content

It shall be determined in accordance with ISO 18643.

### 5.9 Determination of the mass fraction of water insoluble matter

It shall be determined in accordance with ISO 18645.

### 5.10 Determination of the density

It shall be determined in accordance with AOAC 985.19.

## 6 Sampling and preparation of test sample

### 6.1 Sampling method

Carry out the sampling operation by following the procedure described in ISO 14820-1.

### 6.2 Test sample preparation

Carry out the sampling operation by following the procedure described in ISO 14820-2.

## 7 Marking and labelling

**7.1** Any labelling recommendations should conform to the United Nations “Globally Harmonized System of Classification and Labelling of Chemicals” (GHS).

Anything concerning the labels should refer to the latest version of ISO standards.

**7.2** The following information should appear on the face of the containers:

- a) mass fraction of total nitrogen content;
- b) mass fraction of nitrogen from MU;
- c) mass fraction of ureic nitrogen content;
- d) density (in kg/l);
- e) date of production;
- f) net mass;
- g) address and name of the manufacturer.

**7.3** A product's use instructions should be printed on the back of containers. The information should include: name of product, nutrient content, method of usage, storage and usage precautions.

**7.4** The single mass value of each container shall be declared (e.g. 25 kg).

**7.5** All other information required by ISO 7409 should also appear on the face of the containers.

## **8 Packaging, transport and storage**

**8.1** The applicable safety guidelines for handling and storage should be followed.

**8.2** During transportation, the packaged products should be handled with care to avoid sunlight, frost and damage to fertilizer packages.

**8.3** The products should be stored in a dry, cool place (ambient temperature) away from sunlight and too cold temperatures.

**8.4** Temperature and storage time can affect the stability of these products. Inappropriate storage conditions can cause the formation of floccules in the liquid methylene-urea slow-release fertilizers, and this can affect their efficiency.

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