BS ISO 18642:2016

BSI Standards Publication

Fertilizer and soil conditioners — Fertilizer grade urea — General requirements

bsi.

BS ISO 18642:2016

INTERNATIONAL STANDARD

ISO 18642

First edition
2016-07-15

Fertilizer and soil conditioners — Fertilizer grade urea — General requirements

Matières fertilisantes — Engrais à l'urée — Exigences générales

Reference number
ISO 18642:2016(E)

© ISO 2016

COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword iv
Introduction v
1 Scope 1
2 Normative references 1
3 Terms and definitions 1
4 Requirement 2
5 Testing methods 2
6 Sampling and preparation of test sample 3
7 Marking and labelling 3
8 Package, transport, and storage 4
Bibliography 5

© ISO 2016 – All rights reserved

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).

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).

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

For an explanation on 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 the following URL: www.iso.org/iso/foreword.html

The committee responsible for this document is ISO/TC 134, *Fertilizers and soil conditioners.*

© ISO 2016 – All rights reserved

Introduction

Urea, also known as carbamide, is the world's most widely used nitrogen fertilizer product. The production of urea globally has reached 198 million tons and the volume of global trade has reached 45 million tons in the year 2013. About 85 % of the world's production of urea is destined for use as a nitrogen-release fertilizer. Urea has the highest nitrogen content of all solid nitrogenous fertilizers in common use. The standard crop-nutrient rating of urea is 46-0-0.

For facilitating international fertilizer trade, it is necessary to have an international and general standard for fertilizer grade urea.

© ISO 2016 – All rights reserved

Fertilizer and soil conditioners — Fertilizer grade urea — General requirements

1 Scope

This International Standard specifies the general requirements regarding testing methods, sampling and preparation of test sample, marking and labelling, package, transport, and storage of fertilizer grade urea.

This International Standard is applicable to urea in solid form, e.g. granular, prilled, or pastilled, which is made by the reaction of ammonia with carbon dioxide. Urea can be classified by its intended use, industrial and/or agricultural. It is mainly used as fertilizer in the field of agriculture. This International Standard is only applicable to fertilizer grade urea in the field of agriculture.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 7410, *Fertilizers and soil conditioners — Final samples — Practical arrangements*

ISO 7742:1988, *Solid fertilizers — Reduction of samples*

ISO 8397, *Solid fertilizers and soil conditioners — Test sieving*

ISO 8633, *Solid fertilizers — Simple sampling method for small lots*

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

EN 13466-1:2001, *Fertilizers — Determination of water content — (Karl Fischer methods) — Part 1: Methanol as extracting medium*

3 Terms and definitions

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

3.1
urea
white crystalline, or granular, or prill, or pastill, solid synthesized from ammonia and carbon dioxide under high temperature and pressure by a number of processes

Note 1 to entry: The molecular formula is $CO(NH_2)_2$. The molecular weight is 60,053 according to IUPAC's 2011 report on standard atomic weights.

[SOURCE: ISO 8157:2015, 2.2.1.9, modified — In the definition, "or prill, or pastill," has been added. Note 1 to entry has been added.]

© ISO 2016 – All rights reserved

4 Requirement

4.1 Appearance: The product shall be solid, such as in granular or prilled or pastill form, generally white in colour.

4.2 Fertilizer grade urea products shall be tested to demonstrate conformance with all the requirements specified in Table 1.

Table 1 — Requirements of fertilizer grade urea

Items	Requirements (%)
Total nitrogen (N, mass fraction)	≥45,0[d]
Biuret (mass fraction)[a]	≤1,2
Moisture content (H_2O) (mass fraction)	≤1,0
Particle size[b,c]	1,00 ~ 4,75 mm ≥ 90 %

[a] Regarding the biuret content, the related requirements specified by the countries or regions shall be followed.

[b] Particle size numbers given in this table are indicative. The related parameters such as the diameter which are specified by other countries shall be followed therein. Also, size guide number (SGN), uniformity index (UI), and granulometric spread index (GSI) values can be negotiated between the buyer and seller. (For the definitions of SGN, UI, and GSI, please refer to ISO 8157:2015; definitions are available on http://www.iso.org/obp).

[c] If the product is intended for use in a blended fertilizer, then a UI range should be specified.

[d] Total N in some countries/regions is 44 %.

5 Testing methods

5.1 Appearance

Visually inspect for the presence of contaminant and foreign matter.

5.2 Determination of total nitrogen contents

Nitrogen contents shall be determined in accordance to ISO 5315.

NOTE EN 15478:2009 and AOAC 993.13:1996 are similar in principle to ISO 5315.

5.3 Determination of biuret content

Biuret content shall be determined according to ISO 18643.

5.4 Determination of moisture (H_2O) content

Moisture (H_2O) content shall be determined according to EN 13466-1:2001.

5.5 Determination of particle sizes

Particle sizes shall be determined according to ISO 8397.

© ISO 2016 – All rights reserved

6 Sampling and preparation of test sample

6.1 Sampling method

6.1.1 Products in bags

Carry out sampling operation by following the procedure described in ISO 8633. Care should be taken to avoid damage to the particles.

6.1.2 Products in bulk

Carry out sampling operation by following the procedure described in ISO 8633.

6.2 Reduction of samples

Mix all the increments (collected as in 6.1) uniformly and promptly to form a single aggregate sample using a device or by hand. The aggregate sample is reduced to about 1 kg by the riffle sample divider method (see ISO 7742:1988, A.2) or the quartering method (see ISO 7742:1988, A.3). Next, divide into two parts for final laboratory samples. The two laboratory samples are put into two clean and dry glass or plastic containers or any other inert material of adequate resistance capable of maintaining the sample in its original condition. The containers shall be fitted with airtight closures. Carry out all the operations described earlier as rapidly as possible to avoid loss or gain of moisture. Each container shall be secured and sealed following the instruction given in ISO 7410. Each laboratory sample shall be labelled following the instructions given in ISO 7410. The label shall, at minimum, carry the following information:

a) the name of manufacturer;

b) the name of product and type;

c) the manufacturer's reference and batch number or production date (if available);

d) the lot size;

e) the date of sampling;

f) the place of sampling;

g) the signature of the sampler;

h) the signature and name of the person or his representative on whose premises the sample was taken.

One of the containers is used for quality analysis, while the other is kept for potential re-analyses on a later date.

6.3 Test sample preparation

Select one of the laboratory samples from the two containers obtained in 6.2. Mix the content within the container according to the procedure in ISO 7742:1988, reduce the sample to 100 g as one of the test samples used for determination of all the content indexes required in Table 1. All test samples are to be put into clean dry bottles to be used for further analysis.

7 Marking and labelling

Marking and labelling should comply with the applicable national or regional regulations, ISO 7409 and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

© ISO 2016 – All rights reserved

6 Sampling and preparation of test sample

6.1 Sampling method

6.1.1 Products in bags

Carry out sampling operation by following the procedure described in ISO 8633. Care should be taken to avoid damage to the particles.

6.1.2 Products in bulk

Carry out sampling operation by following the procedure described in ISO 8633.

6.2 Reduction of samples

Mix all the increments (collected as in 6.1) uniformly and promptly to form a single aggregate sample using a device or by hand. The aggregate sample is reduced to about 1 kg by the riffle sample divider method (see ISO 7742:1988, A.2) or the quartering method (see ISO 7742:1988, A.3). Next, divide into two parts for final laboratory samples. The two laboratory samples are put into two clean and dry glass or plastic containers or any other inert material of adequate resistance capable of maintaining the sample in its original condition. The containers shall be fitted with airtight closures. Carry out all the operations described earlier as rapidly as possible to avoid loss or gain of moisture. Each container shall be secured and sealed following the instruction given in ISO 7410. Each laboratory sample shall be labelled following the instructions given in ISO 7410. The label shall, at minimum, carry the following information:

a) the name of manufacturer;

b) the name of product and type;

c) the manufacturer's reference and batch number or production date (if available);

d) the lot size;

e) the date of sampling;

f) the place of sampling;

g) the signature of the sampler;

h) the signature and name of the person or his representative on whose premises the sample was taken.

One of the containers is used for quality analysis, while the other is kept for potential re-analyses on a later date.

6.3 Test sample preparation

Select one of the laboratory samples from the two containers obtained in 6.2. Mix the content within the container according to the procedure in ISO 7742:1988, reduce the sample to 100 g as one of the test samples used for determination of all the content indexes required in Table 1. All test samples are to be put into clean dry bottles to be used for further analysis.

7 Marking and labelling

Marking and labelling should comply with the applicable national or regional regulations, ISO 7409 and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

© ISO 2016 – All rights reserved

6 Sampling and preparation of test sample

6.1 Sampling method

6.1.1 Products in bags

Carry out sampling operation by following the procedure described in ISO 8633. Care should be taken to avoid damage to the particles.

6.1.2 Products in bulk

Carry out sampling operation by following the procedure described in ISO 8633.

6.2 Reduction of samples

Mix all the increments (collected as in 6.1) uniformly and promptly to form a single aggregate sample using a device or by hand. The aggregate sample is reduced to about 1 kg by the riffle sample divider method (see ISO 7742:1988, A.2) or the quartering method (see ISO 7742:1988, A.3). Next, divide into two parts for final laboratory samples. The two laboratory samples are put into two clean and dry glass or plastic containers or any other inert material of adequate resistance capable of maintaining the sample in its original condition. The containers shall be fitted with airtight closures. Carry out all the operations described earlier as rapidly as possible to avoid loss or gain of moisture. Each container shall be secured and sealed following the instruction given in ISO 7410. Each laboratory sample shall be labelled following the instructions given in ISO 7410. The label shall, at minimum, carry the following information:

a) the name of manufacturer;

b) the name of product and type;

c) the manufacturer's reference and batch number or production date (if available);

d) the lot size;

e) the date of sampling;

f) the place of sampling;

g) the signature of the sampler;

h) the signature and name of the person or his representative on whose premises the sample was taken.

One of the containers is used for quality analysis, while the other is kept for potential re-analyses on a later date.

6.3 Test sample preparation

Select one of the laboratory samples from the two containers obtained in 6.2. Mix the content within the container according to the procedure in ISO 7742:1988, reduce the sample to 100 g as one of the test samples used for determination of all the content indexes required in Table 1. All test samples are to be put into clean dry bottles to be used for further analysis.

7 Marking and labelling

Marking and labelling should comply with the applicable national or regional regulations, ISO 7409 and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

© ISO 2016 – All rights reserved

6 Sampling and preparation of test sample

6.1 Sampling method

6.1.1 Products in bags

Carry out sampling operation by following the procedure described in ISO 8633. Care should be taken to avoid damage to the particles.

6.1.2 Products in bulk

Carry out sampling operation by following the procedure described in ISO 8633.

6.2 Reduction of samples

Mix all the increments (collected as in 6.1) uniformly and promptly to form a single aggregate sample using a device or by hand. The aggregate sample is reduced to about 1 kg by the riffle sample divider method (see ISO 7742:1988, A.2) or the quartering method (see ISO 7742:1988, A.3). Next, divide into two parts for final laboratory samples. The two laboratory samples are put into two clean and dry glass or plastic containers or any other inert material of adequate resistance capable of maintaining the sample in its original condition. The containers shall be fitted with airtight closures. Carry out all the operations described earlier as rapidly as possible to avoid loss or gain of moisture. Each container shall be secured and sealed following the instruction given in ISO 7410. Each laboratory sample shall be labelled following the instructions given in ISO 7410. The label shall, at minimum, carry the following information:

a) the name of manufacturer;

b) the name of product and type;

c) the manufacturer's reference and batch number or production date (if available);

d) the lot size;

e) the date of sampling;

f) the place of sampling;

g) the signature of the sampler;

h) the signature and name of the person or his representative on whose premises the sample was taken.

One of the containers is used for quality analysis, while the other is kept for potential re-analyses on a later date.

6.3 Test sample preparation

Select one of the laboratory samples from the two containers obtained in 6.2. Mix the content within the container according to the procedure in ISO 7742:1988, reduce the sample to 100 g as one of the test samples used for determination of all the content indexes required in Table 1. All test samples are to be put into clean dry bottles to be used for further analysis.

7 Marking and labelling

Marking and labelling should comply with the applicable national or regional regulations, ISO 7409 and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

© ISO 2016 – All rights reserved

6 Sampling and preparation of test sample

6.1 Sampling method

6.1.1 Products in bags

Carry out sampling operation by following the procedure described in ISO 8633. Care should be taken to avoid damage to the particles.

6.1.2 Products in bulk

Carry out sampling operation by following the procedure described in ISO 8633.

6.2 Reduction of samples

Mix all the increments (collected as in 6.1) uniformly and promptly to form a single aggregate sample using a device or by hand. The aggregate sample is reduced to about 1 kg by the riffle sample divider method (see ISO 7742:1988, A.2) or the quartering method (see ISO 7742:1988, A.3). Next, divide into two parts for final laboratory samples. The two laboratory samples are put into two clean and dry glass or plastic containers or any other inert material of adequate resistance capable of maintaining the sample in its original condition. The containers shall be fitted with airtight closures. Carry out all the operations described earlier as rapidly as possible to avoid loss or gain of moisture. Each container shall be secured and sealed following the instruction given in ISO 7410. Each laboratory sample shall be labelled following the instructions given in ISO 7410. The label shall, at minimum, carry the following information:

a) the name of manufacturer;

b) the name of product and type;

c) the manufacturer's reference and batch number or production date (if available);

d) the lot size;

e) the date of sampling;

f) the place of sampling;

g) the signature of the sampler;

h) the signature and name of the person or his representative on whose premises the sample was taken.

One of the containers is used for quality analysis, while the other is kept for potential re-analyses on a later date.

6.3 Test sample preparation

Select one of the laboratory samples from the two containers obtained in 6.2. Mix the content within the container according to the procedure in ISO 7742:1988, reduce the sample to 100 g as one of the test samples used for determination of all the content indexes required in Table 1. All test samples are to be put into clean dry bottles to be used for further analysis.

7 Marking and labelling

Marking and labelling should comply with the applicable national or regional regulations, ISO 7409 and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

© ISO 2016 – All rights reserved

6 Sampling and preparation of test sample

6.1 Sampling method

6.1.1 Products in bags

Carry out sampling operation by following the procedure described in ISO 8633. Care should be taken to avoid damage to the particles.

6.1.2 Products in bulk

Carry out sampling operation by following the procedure described in ISO 8633.

6.2 Reduction of samples

Mix all the increments (collected as in 6.1) uniformly and promptly to form a single aggregate sample using a device or by hand. The aggregate sample is reduced to about 1 kg by the riffle sample divider method (see ISO 7742:1988, A.2) or the quartering method (see ISO 7742:1988, A.3). Next, divide into two parts for final laboratory samples. The two laboratory samples are put into two clean and dry glass or plastic containers or any other inert material of adequate resistance capable of maintaining the sample in its original condition. The containers shall be fitted with airtight closures. Carry out all the operations described earlier as rapidly as possible to avoid loss or gain of moisture. Each container shall be secured and sealed following the instruction given in ISO 7410. Each laboratory sample shall be labelled following the instructions given in ISO 7410. The label shall, at minimum, carry the following information:

a) the name of manufacturer;

b) the name of product and type;

c) the manufacturer's reference and batch number or production date (if available);

d) the lot size;

e) the date of sampling;

f) the place of sampling;

g) the signature of the sampler;

h) the signature and name of the person or his representative on whose premises the sample was taken.

One of the containers is used for quality analysis, while the other is kept for potential re-analyses on a later date.

6.3 Test sample preparation

Select one of the laboratory samples from the two containers obtained in 6.2. Mix the content within the container according to the procedure in ISO 7742:1988, reduce the sample to 100 g as one of the test samples used for determination of all the content indexes required in Table 1. All test samples are to be put into clean dry bottles to be used for further analysis.

7 Marking and labelling

Marking and labelling should comply with the applicable national or regional regulations, ISO 7409 and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

© ISO 2016 – All rights reserved