
Draft Tanzania Standard

Fertilizer – Urea - Specification

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TANZANIA BUREAU OF STANDARDS

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(Draft for comments only)

0 FOREWORD

Urea which is sometimes called carbamide is the solid fertilizer containing highest nitrogen contents.

This Tanzania Standard is intended to guide manufactures, importers, traders, regulatory authorities, farmers and other users of urea fertilizer to produce and select the product of desirable quality.

In the preparation of this Tanzania Standard assistance was drawn from manufacturers' specifications

In reporting the results of a test or analysis made in accordance with this Tanzania Standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with TZS 4

1 SCOPE

This Tanzania Standard prescribes the requirements and the methods of sampling and test for urea fertilizer.

2 REFERENCES

The following referenced documents are indispensable for the application 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

TZS 4 Rounding off numerical values.

TZS 156 Fertilizers and Soil Conditioners – Vocabulary

TZS 159 Fertilizers - Methods of Sampling

TZS 780 Code of Practice for Handling of Fertilizers

TZS 782: Fertilizer - Methods for Determination of Heavy Metal Contaminants.

TZS 990 Solid fertilizers – Determination of Moisture Content

TZS 1014 Solid Fertilizers and Soil Conditioners – Test sieving

TZS 1015 Fertilizers – Determination of Total Nitrogen Content – Titrimetric method after distillation

3 TERMS AND DEFINITIONS

For the purpose of this standard, terms and definitions given in TZS 156 shall apply.

4 REQUIREMENTS

4.1 Physical

Fertilizer shall be in the form of a free-flowing granules or prills, free from foreign matter and impurities. The colour of the fertilizer shall be uniform. When tested by TZS 1014, not less than 90 percent by weight of the material shall be of particles in the size range of 1 mm to 4 mm for prills and 2mm to 5mm for granules.

4.2 Chemical

The fertilizer shall comply with the requirements specified in Table 1

Table 1 - Chemical requirements for urea fertilizer

Characteristic	Requirement	Method of test
Total nitrogen, percent by mass, <i>min.</i>	46	TZS 1015
Biuret, percent by mass, <i>max</i>	1	Annex A
Moisture, percent by mass, <i>max</i>	1.0	TZS 990

5 HEAVY METAL CONTAMINANTS

Heavy metal contaminants in the fertilizers shall not exceed the limits given in Table 2 when determined by methods described in TZS 782.

Table 2 – Requirements for heavy metal contaminants

Element	Requirement
Arsenic, <i>mg/kg, max</i>	20
Cadmium, <i>mg/kg, max</i>	7
Mercury, <i>mg/kg, max</i>	0.1
Selenium, <i>mg/kg, max</i>	1
Lead, <i>mg/kg, max</i>	30
Chromium, <i>mg/kg, max</i>	500

6. STORAGE AND TRANSPORTATION

The fertilizer shall be stored and transported as prescribed in TZS 780.

7.0 SAMPLING AND TESTING

7.1 Sampling

Sampling of fertilizer shall be carried out as prescribed in TZS 159.

7.2 Testing

Testing of the fertilizer shall be done as prescribed in the methods of analysis indicated in respective standards.

8.0 PACKAGING AND LABELLING

8.1 Packaging

The fertilizer shall be packed in UV stabilized woven polypropylene (wpp) bags with 1 ply polyethylene (pe) inner lining. At the bottom of the bag, the woven fabric and the *pe* shall be hemmed then folded and secured together in lock stitches. At the top the inner lining and outer bag, shall be hemmed together. The bag shall be securely closed in lock stitches and without any opening. The stitching thread must be acid and heat resistant and of sufficient strength to hold the package secure and withstand multiple stages of handling. The outer *wpp*

fabric shall measure not less than 10 x10 mesh weave of minimum 900 denier. The inner pe lining shall be of minimum of 70 microns thickness.

It is recommended that fertilizer is packed in 50 kg, 25kg, 5kg, 2kg, 1kg or as agreed to between the purchaser and supplier without compromising packaging requirements.

8.2 Labelling

The bags shall be labeled in either Kiswahili or Kiswahili and English with the following information: -

- a) name of the fertilizer i.e. "urea fertilizer;
- b) name and address of the manufacturer and importer;
- c) nutrient content;
- d) net content by mass in kg;
- e) handling instructions – including the words “Use No hooks”;
- f) production date and expiry date;
- g) country of origin and
- h) batch number.

8.3 The containers/bags shall also be marked with the TBS Standards Mark of Quality.

NOTE – The TBS Standards Mark of Quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licences are granted, may be obtained from TBS.

Annex A

Determination of biuret

A.1 Reagents

- A.1.1 Alkaline tartarate solution** – Dissolve 40 g of NaOH in 500 ml of H₂O, add 50 g potassium sodium tartrate (NaKC₄ H₄ O₆ .4H₂ O), and dilute to 1 litre. Let the solution stand for a day before use.
- A.1.2 Copper sulphate solution (CuSO₄)** – Dissolve 15 g CuSO₄.5H₂O in carbon dioxide (CO₂) free water (H₂O), and dilute to 1 litre.
- A.1.3 Biuret** – To recrystallize, weigh approximately 10 g reagent grade biuret, transfer to 1 litre beaker, add 1l absolute alcohol, and dissolve. Concentrate by gentle heating to approximately 250 ml. Cool at 5 °C and filter through fritted glass funnel. Repeat crystallization and dry final product for 1 hour at 105 °C – 110 °C in an oven. Remove from oven, place in desiccator and cool to room temperature.
- A.1.4 Biuret standard solution** – 1 mg / ml - Dissolve 1. 0000 g recrystallized biuret in carbon dioxide (CO₂) free water and dilute to 1 litre.

A.2 Preparation of the standard curve

Transfer series of aliquots, 2 ml – 50 ml of standard biuret solution to 100 ml volumetric flasks. Adjust volume to approximately 50 ml with CO₂ free H₂O. Add 1 drop methyl red, and neutralize with 0.05 M H₂SO₄ to pink colour. Add, with swirling 20 ml alkaline tartrate solution and then 20 ml CuSO₄ solution. Dilute to volume, shake for 10 s, and place in H₂O bath for 15 minutes at 30 °C ± 5 °C. Also, prepare reagent blank. Determine the absorbance A of each solution against blank at 555 nm (instrument with 500nm to 570 nm filter is also satisfactory) with 1 cm - 5cm cell. Plot the standard curve.

A.3 Procedure

Continuously, stir approximately 10g of the sample containing 30 mg to 125 mg biuret in 150 ml of water at 50°C for 30 minutes. Filter and wash into 250 ml volumetric flask, and dilute to volume. Transfer 50 ml aliquot to 100 ml volumetric flask and proceed as in A.2 above. Calculate biuret concentration using standard curve.