



DRAFT EAST AFRICAN STANDARD

Fertilizers — Calcium ammonium nitrate (CAN) — Specification

EAST AFRICAN COMMUNITY

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 020, *Agriculture and agrochemicals*.

Fertilizers — Calcium ammonium nitrate (CAN) — Specification

1 Scope

This Draft East African standard specifies requirements, sampling and test methods for calcium ammonium nitrate (CAN) fertilizer.

2 Normative 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.

AOAC 965.08, *Water (free) in fertilizers — Vacuum-desiccation*

AOAC 2006.03, *Arsenic, Cadmium, Cobalt, Chromium, Lead, Molybdenum, Nickel and Selenium in fertilizers*

.ISO 5314, *Fertilizers – Determination of ammoniacal nitrogen content – Titrimetric method after distillation*

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

ISO 8157, *Fertilizers, soil conditioners and beneficial substances — Vocabulary*

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

ISO 17318, *Fertilizers and soil conditioners — Determination of arsenic, cadmium, chromium, lead and mercury contents*

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 7409, *Fertilizers -Marking - Presentation and declarations*

3 Terms and definitions

For the purpose of this standard, terms and definitions given in ISO 8157 shall apply.

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

— ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Requirements

4.1 General requirements

4.1.1 The fertilizer shall be free flowing and shall be in prill or granular form. It shall be free from lumps and foreign matter. CAN fertilizer shall be of uniform colour.

4.1.2 When tested using ISO 8397, at least 90 % by weight of the material shall be of particles in the size range of 1 mm to 4 mm for prill or 2 mm to 4 mm for granular form.

4.2 Specific requirements

CAN fertilizer shall consist of homogeneous granules/ prills of ammonium nitrate with a limestone filler and shall comply with the requirements given in Table 1 when tested in accordance with the test methods prescribed therein.

Table 1 — Requirements for calcium ammonium nitrate fertilizer

S/N	Characteristic	Requirement	Test method
i.	Total nitrogen as N, % by mass, min.	26.0	ISO 5315
ii.	Nitrate nitrogen, % by mass of total nitrogen	50 ± 2	Annex B
iii.	Ammonical nitrogen, % by mass of total nitrogen	50 ± 2	ISO 5314
iv.	Calcium oxide equiv. % by mass, min.	9	Annex A
v.	Moisture, % by mass, max.	1.0	AOAC 965.08

5 Contaminants

Heavy metal contaminants in calcium ammonium nitrate fertilizer shall conform to the limits given in Table 2 when tested in accordance with the test methods prescribed therein.

Table 2 — Requirements for heavy metal contaminants in calcium ammonium nitrate fertilizer

S/N	Heavy metal	Requirement, mg/kg, max.	Test method
i.	Arsenic (As)	20	ISO 17318
ii.	Cadmium (Cd)	7	
iii.	Mercury (Hg)	0.1	
iv.	Lead (Pb)	30	
v.	Chromium (Cr)	500	
vi.	Selenium (Se)	1.0	AOAC 2006.03

7 Packaging

The fertilizer shall be packaged in materials that are clean and non-defective that protect the product from physical, chemical and moisture contamination and withstand multiple stages of handling (transportation and storage).

8 Labelling

Each package shall be legibly and indelibly labeled in accordance with ISO 7409 in English and/or any other official language in the destination country with the following information:

- a) name of the fertilizer; "Calcium Ammonium Nitrate (CAN) fertilizer"
- b) brand name if any;
- c) name and address of the manufacturer/importer;
- d) net content by mass, in metric units;
- e) nutrient content;
- f) country of origin;
- g) handling instructions, including the words "Use No Hooks";
- h) production date
- i) expiry date;
- j) batch number; and
- k) storage conditions.

9 Sampling

Sampling and sample preparation of calcium ammonium nitrate fertilizers shall be carried out as prescribed in ISO 14820-1 and ISO 14820-2 respectively.

Annex A (normative)

Determination of calcium oxide

A.1 Reagents

For the purpose of this Draft East African Standard, only analytical grade reagents and distilled water shall be used.

A.1.1 Concentrated hydrochloric acid

A.1.2 Concentrated nitric acid

A.1.3 Hydrofluoric acid – 40 %

A.1.4 Sodium carbonate – solid

A.1.5 Dilute hydrochloric acid – 1:1 (v/v)

A.1.6 Ammonium chloride – solid

A.1.7 Dilute acetic acid – 1:1 (v/v)

A.1.8 Ammonium oxalate – solid

A.1.9 Oxalic acid solution – 1 g/L (m/v)

A.1.10 Dilute sulphuric acid – 1:4 (v/v)

A.1.11 Standard potassium permanganate solution (0.1 N) – Dissolve 3.2 g of potassium permanganate in 1 l of water. Let stand in the dark overnight. Filter, without washing, through glass wool. Avoid contact with rubber or other organic material. Store in a dark-coloured glass-stoppered bottle. Standardized against standard sodium oxalate.

A.2 Procedure

For cases where preparation of reagents should be needed; the following procedures should be followed:

A.2.1 Transfer 0.5 g of sample that has been dried at 105 °C to a 400-ml tall from beaker. Dissolve, by boiling gently with 20 ml of concentrated hydrochloric acid and 10 ml of concentrated nitric acid, until the volume is reduced to about 10 ml. Covering the beaker by watch-glass throughout the process of dissolution, add 20 ml of concentrated nitric acid and then evaporate to a small volume. Wash the lower surface of the watch-glass into beaker with hot water, filter and wash collecting the filtrate and washings in a 250-ml measuring or volumetric flask. Preserve the filter and washings.

A.2.2 Dry the residue and burn off the filter paper by ignition in a platinum crucible. Moisten the cooled residue with a few drops of a concentrated nitric acid and add about 10 ml of hydrofluoric acid. Evaporate continuously just to dryness, ignite and fuse the residue with about 2 g to 3 g of sodium carbonate. Extract the melt in about 25 ml - 30 ml of dilute hydrochloric acid in a beaker, evaporate to dryness and bake. Extract the baked mass with about 10 ml of concentrated hydrochloric acid, dilute, filter and wash collecting the filtrate and washings in the same volumetric flask where in the first filtrate along with washings has been preserved under A.2.1. Cool the combined filtrates and make up to the mark.

A.2.3 Pipette out exactly 100 ml from the solution in the volumetric flask under A.2.2 into a 400-ml beaker. Add sufficient ammonium chloride (about 15 ml) to hold magnesium in solution in presence of ammonium oxalate. Add 20 ml of dilute acetic acid, heat to boiling point and add about 2 g of ammonium oxalate while stirring. Boil and allow the precipitate to settle for 1 h to 2 h, cool and filter the solution through a close filter paper. Wash the precipitate with hot water until free from oxalate.

A.2.4 Dissolve the precipitate on the filter in about 50 ml of hot dilute hydrochloric acid. Wash the filter thoroughly with hot water until the filter is free from acid and collect the washings also in the same beaker in which calcium was first precipitated. Reduce the bulk to about 100 ml by evaporation and re-precipitate calcium as oxalate under A.2.3.

A.2.5 Wash the precipitate of calcium oxalate into same beaker in which precipitation was first carried out and treat the filter with about 25 ml of warm (70 °C – 80 °C) dilute sulphuric acid for dissolving adhering precipitate of calcium oxalate. Wash the filter free from acid by means of hot water. Collect the washings also in the same beaker into which the precipitate was transferred. Add about 25 ml more of dilute sulphuric acid and raise the temperature of contents to about 70 °C. When the precipitate has dissolved, titrate with standard potassium permanganate solution until a permanent pale pink colour persists in solution.

A.3 Calculation

The calcium oxide content, expressed as percent by mass, shall be calculated as follows:

$$= \frac{A \times B \times F (0.028) \times 100}{C}$$

where

A is the volume, in millilitres, of standard potassium permanganate solution;

B is the normality of the standard potassium permanganate solution;

C is the mass, in grams of the sample represented by the aliquot taken; and

F is the dilution factor.

Annex B
(normative)

Determination of nitrate nitrogen

B.1 Determination of total nitrogen

Total nitrogen shall be determined in accordance with ISO 5315.

B.2 Determination of ammoniacal nitrogen

Ammoniacal nitrogen shall be determined in accordance with ISO 5314.

B.3 Calculation of nitrate nitrogen

Nitrate Nitrogen (%) = Total nitrogen (TN) – Ammoniacal nitrogen (N)

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