
Fertilizers — Micronutrient fertilizer — Specification



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Foreword

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Fertilizer — Micronutrient fertilizer — Specification

1 Scope

This Draft African Standard specifies requirements, sampling and test methods for micronutrients fertilizers.

This standard applies to zinc sulphate, chelated zinc (as Zn-EDTA), manganese sulphate, borax (sodium tetraborate), copper sulphate, ferrous sulphate, chelated iron (Fe-EDTA) and ammonium molybdate.

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.

AOAC 929.01, *Sampling of solid fertilizers*

AOAC 929.02, *Preparation of fertilizer test sample*

AOAC 940.02, *Manganese (acid-soluble) in fertilizers — Colorimetric method*

AOAC 941.01, *Copper in fertilizers. Long volumetric method*

AOAC 942.02, *Zinc in fertilizers — Gravimetric method*

AOAC 942.03, *Zinc in fertilizers — Colorimetric method*

AOAC 945.04, *Calcium (acid soluble) in fertilizers — Atomic absorption spectrometric method*

AOAC 949.03, *Boron (water-soluble) in fertilizers — Titrimetric method*

AOAC 955.03, *Ash (acid-insoluble) of fertilizers*

AOAC 967.01, *Iron in fertilizers — Titrimetric method*

AOAC 973.01, *Zinc in fertilizers — Zincon ion exchange method*

AOAC 975.01, *Copper in fertilizers. Atomic absorption spectrometric method*

AOAC 975.02, *Zinc in fertilizers. Atomic absorption spectrometric method*

AOAC 980.02, *Sulfur in fertilizers — Gravimetric method*

AOAC 982.01, *Boron (acid- and water-soluble) in fertilizers*

AOAC 964.01, *Magnesium (acid-soluble) in fertilizers*

AOAC 2006.03, *Arsenic, cadmium, cobalt, chromium, lead, molybdenum, nickel, and selenium in fertilizers — Microwave digestion and inductively coupled plasma-optical emission spectrometry*

AOAC 980.01, *Iron in fertilizers — Atomic absorption spectrophotometric method*

ISO 2831, *Sodium fluoride for industrial use — Determination of water-insoluble matter*

ISO 8157, *Fertilizers and Soil conditioners — Vocabulary*

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

EN 13368-1, *Fertilizers, Determination of chelating agents in fertilizers by chromatography – Part 1: Determination of EDTA, HEEDTA and DTPA by ion chromatography*

EN 13368-2, *Fertilizers – Determination of chelating agents in fertilizers by chromatography – Part 2 : Determination of Fe chelated by o,o-EDDHA, o,o-EDDHMA and HBED by ion pair chromatography.*

3 Terms and definitions

For the purposes of this document, the following terms and definitions in ISO 8157 and the following 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>

— IEC Electropedia: available at: <http://www.electropedia.org/>

4 Requirements

4.1 Physical requirements

4.1.1 Micronutrient fertilizer shall be presented in free flowing granular, powder or crystalline forms.

4.1.2 Micronutrient fertilizer shall be free from extraneous matter and homogeneous in size and form.

4.2 Chemical requirements

Micronutrient fertilizer shall comply with the specific requirements given in Table 1 to Table 8 when tested in accordance with the test methods specified therein.

Table 1 — Chemical requirements for zinc sulphate

S/N	Characteristic	Requirement	Test method
i.	Zinc (as Zn), %, min	21	AOAC 942.02
ii.	Sulphur (as S) %, min	10	AOAC 980.02

iii.	Copper (as Cu) %, max	1	AOAC 941.01
iv.	Magnesium (as Mg) %, max	5	AOAC 964.01
v.	Matter insoluble in water, %, max	1	ISO 18645
vi.	pH, min	4	ISO 6353-1
vii.	Iron (as Fe), %, max	5	AOAC 980.01

Table 2 — Chemical requirements for Chelated Zinc as Zn-EDTA

S/N	Characteristic	Requirement	Test method
i.	Zinc (as Zn) in the form of Zn-EDTA, %, min	12	AOAC 975.02
ii.	pH, min	6	ISO 6353-1

Table 3 — Chemical requirements for manganese sulphate

S/N	Characteristic	Requirement	Test method
i.	Manganese (as Mn), min, %	30.5	AOAC 940.02
ii.	Sulphur (as S) min, %	17	AOAC 980.02
iii.	Calcium max, %	0.2	AOAC 945.04
iv.	Zinc max, %	0.05	AOAC 975.02
v.	Iron max, %	0.005	AOAC 980.01
vi.	Copper (as Cu) max, %	01	AOAC 941.01
vii.	Magnesium (as Mg) max, %	2	AOAC 964.01
viii.	Matter insoluble in water max, %	1	ISO 18645
ix.	pH, min	3.75	ISO 6353-1

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Table 4 — Chemical requirements for borax

S/N	Characteristic	Requirements	Test method
i.	Boron (as B) min, %	10.5	AOAC 982.01
ii.	Matter insoluble in water max, %	1	ISO 18645
iii.	pH	9 - 9.5	ISO 6353-1

Table 5 — Chemical requirements for copper sulphate

S/N	Characteristic	Limit	Test method
i.	Copper (as Cu) min, %	24	AOAC 941.01
ii.	Sulphur (as S) min, %	12	AOAC 980.02

iii.	Soluble iron and aluminium compounds (expressed as Fe) max, %	0.5	—
vi.	Matter insoluble in water max, %	1	ISO 18645
vii.	pH, min	3	ISO 6353-1

Table 6 — Chemical requirements for ferrous sulphate

S/N	Characteristic	Limit	Test method
i.	Ferrous iron (as Fe) min, %	19	AOAC 980.01
ii.	Sulphur (as S) min, %	10.5	AOAC 980.02
iii.	Free acid (as H ₂ SO ₄) max, %	1	—
iv.	Ferric iron (as Fe), max, %	0.5	—
v.	Matter insoluble in water max, %	1	ISO 18645
vi.	pH, min	3.5	ISO 6353-1

Table 7 — Chemical requirements for chelated iron, as Fe EDTA

S/N	Characteristic	Limit	Test method
i.	Iron content (expressed as Fe) in the form of Fe-EDTA complex, min, %	12	EN 13368 – 1 EN 13368-2
ii.	Lead (as Pb) max, %	0.003	AOAC 2006.03
iii.	pH	5.5 – 6.5	ISO 6353-1

Table 8 — Chemical requirements for ammonium molybdate

S/N	Characteristic	Limit	Test method
i.	Molybdenum (as Mo), min, %	52	AOAC 2006.03
ii.	Matter insoluble in water, max, %	1	ISO 18645
iii.	pH	5 – 5.5	ISO 6353-1

4.3 Heavy metal contaminants

The heavy metal contaminant, if present, shall not exceed the limits given in table 9 when tested in accordance with the test methods specified therein. ISO 17318

Table 9—Maximum limits of heavy metals for micronutrient fertilizer

S/N	Heavy metal	Micronutrient %								Test method
		Zinc sulphate	Chelated Zinc as Zn-EDTA	Manganese sulphate	Borax (Sodium tetraborate)	Copper sulphate	Ferrous sulphate	Chelated iron, as Fe-EDTA	Ammonium molybdate	
i.	Lead, Pb	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	AOAC 2006.03
ii.	Cadmium	0.0025	-	-	-	-	-	-	-	AOAC 2006.03
iii.	Arsenic	0.01	-	0.0005	-	0.0005	-	-	-	AOAC 2006.03

5 Packaging

The Micronutrient fertilizer shall be packed in clean, non-defective and appropriate containers that will protect its integrity during handling, transportation and storage.

NOTE The product may be also supplied in bulk containers.

6 Labelling

In addition to the labelling requirements of ISO 7409, each container of micronutrient fertilizer shall be legibly and indelibly labelled with the following particulars in accordance with Globally Harmonized System (GHS)

- name of the product as micronutrient fertilizers;
- type of the micronutrient fertilizers as per the scope;
- name and address of the manufacturer/packer/repacker;
- main micronutrient content (%);
- the manufacture and expiry dates;
- Net weight (SI unit)
- Lot or batch number;
- Handling instructions.

7 Sampling

Sampling and sample preparation shall be carried out in accordance with ISO 14820-1 and ISO 14820-2, respectively.

Bibliography

DRS 334:2016, *Micronutrient fertilizer — Specification*

