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*भारतीय मानक मसौदा*

**काँपर ऑक्सीक्लोराइड डस्टिंग पाउडर — विशिष्टि**

*(आइ एस 1506 का तीसरा पुनरीक्षण)*

*Draft Indian Standard*

**COPPER OXYCHLORIDE DUSTING POWDER — SPECIFICATION**

*(Third Revision of IS 1506)*

**ICS No. 65.100.30**

Pesticides Sectional Committee, FAD 01

**Last Date of Comments: 30 June 2024**

**FOREWORD**

*(Formal clauses would be added later)*

Copper oxychloride dusting powder is largely used as fungicides for the control of plant diseases. It generally manufactured to contain 4 percent (*m/m*) of copper.

This standard was first published in 1959 and first revised in 1967. The second revision was issued in 1977 to incorporate the requirements for packing, tolerances as permitted in the nominal active ingredient of the formulation and modified test method for estimation of copper content.

In this revision, the standard has been brought out in the latest style and format of the Indian Standards, and references to Indian Standards wherever applicable have been updated.

In the preparation of this standard, due consideration has been given to the provisions of the *Insecticides Act*, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022. 'Rules for rounding off numerical values (*second revision*)' This number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for copper oxychloride dusting powder formulation.

## 2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
IS 264 : 2005	Nitric acid — Specification ( <i>third revision</i> )
IS 296 : 2023	Sodium carbonate anhydrous — Specification ( <i>fourth revision</i> )
IS 460 (Part 1) : 2020	Test Sieves — Specification: Part 1 Wire cloth test sieves ( <i>fourth revision</i> )
IS 1070 : 2023	Reagent grade water — Specification ( <i>fourth revision</i> )
IS 1486 : 202X	Copper oxychloride, technical – Specification ( <i>third revision</i> ) [ <i>Under preparation Doc: FAD 01(25460)WC</i> ]
IS 6940 : 1982	Methods of test for pesticides and their formulations ( <i>first revision</i> )
IS 8190 (Part 1) : 1988	Requirements for packing of pesticides: Part 1 Solid pesticides ( <i>second revision</i> )
IS 10627 : 1983	Methods for sampling of pesticidal formulations ( <i>first revision</i> )

## 3 REQUIREMENTS

### 3.1 Description

The material shall be in the form of free flowing powder, devoid of hard lumps and of uniform colour ensuring uniform dispersal of copper oxychloride technical, in the filler used. The material when dusted from a hand rotary duster shall issue freely without clogging or bridging.

3.2 Copper oxychloride, technical, employed in the manufacture of this material shall conform to IS 1486.

### 3.3 Colour

The colour of the material shall be subject to the agreement between the purchaser and the vendor.

3.4 The material shall also comply with the requirement given in Table 1.

**Table 1 Requirements of Copper Oxychloride, Dusting Powder**  
(*Clause 3.4*)

<b>Sl. No.</b>	<b>Characteristic</b>	<b>Requirements</b>	<b>Method of Test, Ref to</b>
(1)	(2)	(3)	(4)

i)	Copper content, percent by mass, <i>Max</i>	Nominal value as declared on the container ( <i>see 3.4.1</i> )	Annex A
ii)	Material passing through 75 micron IS Sieve [ <i>see IS 460 (Part 1)</i> ], percent by mass, <i>Max</i>	90	IS 6940
iii)	Bulk density after compacting	Not to exceed the value obtained before compacting by more than 60 percent	IS 6940
iv)	Alkalinity (as Na <sub>2</sub> CO <sub>3</sub> ), percent by mass, <i>Max</i>	0.1	Annex B

### 3.4.1 Copper Content

When determined by the method prescribed in Annex A, the observed copper content, percent (*m/m*) of any of the samples shall not differ from the declared nominal value by more than tolerance limits indicated underneath: –

<i>Nominal Value, percent</i>	<i>Tolerance limit, percent</i>	
Up to 9	+10 – 5	} of the nominal value
Above 9 and below 50	±5	
50 and above	+5 – 3	

The actual value of copper content shall be calculated to two decimal places and then rounded off to one decimal place before applying the tolerance.

## 4 PACKING

The material shall be packed according to IS 8190 (Part 1).

## 5 MARKING

5.1 The containers shall be securely closed and shall bear legibly and indelibly the following information:

- Name of the material;
- Name and address of the manufacturer;
- Batch number;
- Date of manufacture;
- Date of expiry;
- Net quantity;
- Nominal copper content, percent (*m/m*);
- Cautionary notice as worded in the *Insecticides Act, 1968*, and Rules framed thereunder; and

j) Any other information required under the *Legal Metrology (Packaged Commodities) Rules, 2011*.

## **5.2 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

## **6 SAMPLING**

Representative samples of the material shall be drawn as prescribed in IS 10627.

## **7 TESTS**

Tests shall be carried out by appropriate methods as referred in col (4) of Table 1.

## **8 QUALITY OF REAGENTS**

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE – ‘Pure chemicals’ shall mean chemicals that do not contain impurities which affect the results of analysis.

**ANNEX A**  
[Table 1, Sl. No. (i)]  
**DETERMINATION OF COPPER CONTENT**

**A-1 PRINCIPLE**

Copper is determined by titration of iodine liberated on addition of potassium iodide to the weak acidic solution. Difficulties with absorption of iodine on the cuprous iodide precipitate are avoided by the addition of potassium or ammonium thiocyanate.

**A-2 REAGENTS**

**A-2.1 Dilute Nitric Acid** – sp. gr. 1.42 (*see* IS 264)

**A-2.2 Urea**

**A-2.3 Sodium Carbonate** – anhydrous (*see* IS 296)

**A-2.4 Dilute Acetic Acid** – 10 percent (v/v).

**A-2.5 Potassium Iodide**

**A-2.6 Standard Sodium Thiosulphate Solution** – 0.1 N, standardized with potassium iodate or potassium dichromate.

**A-2.7 Starch Indicator Solution** – 1 percent (m/v) (freshly prepared)

**A-2.8 Potassium or Ammonium Thiocyanate**

**A-3 PROCEDURE**

**A-3.1** Weigh accurately a quantity of the material containing 0.2 g of the active ingredient (copper) into a 500 ml conical flask. Firstly, add 25 ml of water and then 5 ml of concentrated nitric acid carefully to avoid any spurting. If necessary, shake and warm the mixture to effect complete dissolution. Heat this mixture to reduce the volume to a low bulk (about 5 ml). Add 30 ml of water to this dried material and boil for 5 min. Remove the flask from the flame, add 1 g of urea and boil the mixture again for about 10 min. Cool to room temperature and add sodium carbonate in small quantities until a faint permanent precipitate or blue colour is produced. Add dilute acetic acid dropwise until the blue colour or precipitate disappears. If necessary, filter the solution. Add 1.5 to 2.0 g of potassium iodide and titrate immediately the brown solution with the standard sodium thiosulphate solution to a pale straw colour. Add about 2 ml of starch indicator solution and 1 g of potassium or ammonium thiocyanate and continue the titration until the blue colour is just discharged.

**A-4 CALCULATION**

$$\text{Copper content, percent by mass} = \frac{6.357 \times V \times N}{M}$$

where,

$V$  = volume, in ml, of the standard sodium thiosulphate solution required for the test with the material (*see* A-3.1);

$N$  = normality of the standard sodium thiosulphate solution (*see* A-5.1 and A-5.2); and

$M$  = mass, in g, of the material taken for the test. (see A-3.1)

## A-5 STANDARDIZATION OF SODIUM-THIOSULPHATE SOLUTION

### A-5.1 General

For standardization of sodium thiosulphate solution, two methods, namely, titration against potassium iodate or potassium dichromate solution have been specified. Either of these two methods may be used for standardization of sodium thiosulphate solution, but the method employed should be stated while expressing the results of a test.

### A-5.2 Standardization with Potassium Iodate

#### A-5.2.1 Reagents

**A-5.2.1.1 Potassium iodate** – to be ground and dried at 105 °C for 2 h immediately before using.

**A-5.2.1.2 Potassium iodide** – iodate free.

**A-5.2.1.3 Starch indicator solution** – 1 percent ( $m/v$ ) (freshly prepared).

**A-5.2.1.4 Standard hydrochloric acid solution** – approximately 2 N (chlorine free).

#### A-5.2.2 Procedure

Weigh accurately about 0.15 g of potassium iodate and dissolve it in 40 ml water in a conical flask. Stopper securely, shake to dissolve and add 2 g potassium iodide and about 6 ml of standard hydrochloric acid solution. Titrate the liberated iodine with the thiosulphate solution with constant shaking. When reaction is nearly complete, as indicated by pale yellow colour of the solution, dilute with distilled water to about 200 ml. Add 2 ml starch indicator solution and continue titration until the solution becomes colourless.

#### A-5.2.3 Calculation

$$\text{Normality (N) of sodium thiosulphate} = \frac{28.04 \times m}{v}$$

where,

$m$  = mass, in g, of potassium iodate; and

$v$  = volume, in ml, of sodium thiosulphate solution required.

### A-5.3 Standardization with Potassium Dichromate

#### A-5.3.1 Reagents

**A-5.3.1.1 Potassium dichromate** – dried at 105 °C for 2 h immediately before using.

**A-5.3.1.2 Standard hydrochloric acid solution** – approximately 2 N (chlorine free).

**A-5.3.1.3 Potassium iodide** – free from iodate.

**A-5.3.1.4 Starch indicator solution** – 1 percent ( $m/v$ ) (freshly prepared).

#### A-5.3.2 Procedure

Weigh accurately between 0.20 g and 0.23 g of potassium dichromate and transfer to a 500 ml conical flask fitted with a ground glass stopper. Add 100 ml water and 2 g potassium iodide and shake until the salt dissolves. Add with swirling 10 ml standard hydrochloric acid solution, stopper the flask and immediately place in a dark place for 10 min. Titrate the solution with sodium thiosulphate solution. When the solution turns yellowish-green in colour, add 1 ml of starch indicator solution. Continue the addition of sodium thiosulphate solution dropwise until the blue black colour formed on the addition of starch indicator solution changes to pale green.

**A-5.3.2.1** Carry out a blank determination, using distilled water instead of the potassium dichromate solution, by the same method (**A-5.3.2**). If the potassium iodide is iodate free, the volume of sodium thiosulphate solution used shall be 0.05 ml or less.

**A-5.3.2.2** Normality ( $N$ ) of sodium thiosulphate solution =  $\frac{20.4 \times m}{v_1 - v_2}$

where,

$m$  = mass, in g, of potassium dichromate;

$v_1$  = volume, in ml, of sodium thiosulphate solution consumed; and

$v_2$  = volume, in ml, of sodium thiosulphate solution consumed in the blank.

## ANNEX B

[Table 1, Sl. No. (iv)]

### DETERMINATION OF ALKALINITY

#### B-1 REAGENTS

**B-1.1 Standard Sulphuric Acid – 0.1 N.**

**B-1.2 Methyl Orange Indicator Solution – 0.1 percent.**

Dissolve 0.5 g of the indicator in 100 ml of alcohol and make up the volume to 500 ml with distilled water.

#### B-2 PROCEDURE

**B-2.1** Weigh accurately about 10 to 25 g of the material into a 400 ml beaker. Add 100 ml of distilled water (freshly boiled and cooled, carbon dioxide free), Stir the mixture for 30 min. Filter and then titrate the filtrate against the standard sulphuric acid using methyl orange as an indicator.

**B-2.2** Carry out a blank determination using 100 ml of distilled water (freshly boiled and cooled, carbon dioxide free).

#### B-2.3 Calculation

$$\text{Alkalinity (as Na}_2\text{CO}_3\text{), percent by mass} = \frac{5.3 (V-v) N}{M}$$

where,

$V$  = volume, in ml, of the standard sulphuric acid required for test with the material (*see* **B-2.1**);

$v$  = volume, in ml, of the standard sulphuric acid required in blank determination (*see* **B-2.2**);

$N$  = normality of the standard sulphuric acid; and

$M$  = mass, in g, of the material taken for the test (*see* **B-2.1**).