Doc No. FAD 01(28719)WC
September 2025

BUREAU OF INDIAN STANDARDS

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भारतीय मानक मसौदा

डीडीटी वॉटर डिस्पर्सिब्ल कॉन्सेंट्रेट— विशिष्टि

(*IS 565 का चौथा पुनरीक्षण*)

Draft Indian Standard

DDT WATER DISPERSIBLE POWDER CONCENTRATE — SPECIFICATION

(*fourth revision of IS 565*)

ICS.65 100.10

Pesticides Sectional Committee, FAD 01	**Last date of comments:** 20 October 2025

FOREWORD
(*Adoption clauses will be added later*)

DDT (Dichloro Diphenyl Trichloroethane) water dispersible powder concentrate is extensively used in the control of insect pests in public health programmes. It is generally manufactured to contain 50 percent (*m/m*) DDT.

This standard was published in 1955. Subsequently, it was revised in 1961 and 1973. In the third revision issued in 1984, the requirements were updated.

In this revision, the test method for identity test and absence of any other chlorinated products other than DDT has been included. The standard has also been brought out in the latest style and format of the Indian Standards, and references to Indian Standards wherever applicable have been updated. It also incorporates two amendments issued to the previous version of this standard.

In year 2006 vide S.O. 295 (E) dated 8 March 2006, the use of DDT was banned in agriculture except public health programmes by Government of India.

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*)' . The 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 DDT water dispersible powder concentrate.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provisions 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:

IS No.	*Title*
IS 460 (Part 1) : 2020	Test Sieves — Specification: Part 1 Wire cloth test sieves (*fourth revision*)
IS 563 : 202X	DDT, technical — Specification (*third revision*) [*Under preparation Doc No. FAD 01(28712)WC*]
IS 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 6940 : 2025	Pesticides and their formulations — Methods of test (*second revision*)
IS 8190 (Part 1) : 1988	Requirements for packing of pesticides: Part 1 Solid pesticides (*second revision*)
IS 10627 : 1983	Methods for sampling of pesticidal formulations

3 REQUIREMENTS

3.1 Description — The material shall be in the form of a homogenous powder, together with fillers and adjuvants, white to creamy in colour, and shall wet readily on mixing with water, providing a suspension suitable for use as a spray.

3.1.1 DDT, technical, employed in the manufacture of this material shall conform to IS 563.

3.1.2 *Identity* — The material shall comply with identity test as prescribed under Annex A and shall not contain any chlorinated pesticide other than DDT.

3.2 The material shall also comply with the requirements given in Table 1.

Table 1 Requirements for DDT Water Dispersible Powder Concentrate
(*Clause* 3.2)

Sl No.	**Characteristic**	**Requirement**	**Method of Test, Refer to**
(1)	(2)	(3)	(4)
i)	DDT content, percent by mass	Nominal value as declared on the container (*see* **3.2.1**)	Annex B

ii)	Sieving requirement, material passing through 75 micron IS Sieve [*see* IS 460 (Part 1)], percent by mass, *Min*	97	IS 6940
iii)	Suspensibility, percent by mass, *Min*	50	IS 6940
iv)	Acidity (as H_2SO_4), percent by mass, *Max* Or Alkalinity (as NaOH), percent by mass, *Max*	0.25 1.0	IS 6940 IS 6940

3.2.1 *DDT Content* — When determined by the method prescribed in Annex B, the observed DDT content, percent (*m/m*), of any of the samples shall not differ from the declared nominal value by more than the tolerance limits indicated below:

Nominal Value, Percent	*Tolerance Limit, Percent*	
Up to 9	+10 -5	of the nominal valve
Above 9 and below 50	±5	
50 and above	+5 -3	

3.2.1.1 The actual value of the DDT technical content in the formulation shall be calculated to the second decimal place and then rounded off to the first decimal place before applying the tolerance.

4 PACKING

The material shall be packed as per requirements given in IS 8190 (Part 1).

5 MARKING

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

a) Name of the material;
b) Name of the manufacturer;
c) Date of manufacture;
d) Batch Number;
e) Net mass of contents;
f) Nominal DDT, technical content, percent (*m/m*);
g) Cautionary notice as worded in the *Insecticides Act*, 1968, and Rules framed thereunder; and
h) 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

When freshly manufactured material in bulk quantity is offered for inspection, representative samples of the material shall be drawn and tested as prescribed in IS 10627 within 90 days of its manufacture. When the material is offered for inspection after 90 days of its manufacture, sampling shall be done as prescribed in IS 10627. However, the criteria for conformity of the material when tested, shall be the limits of tolerances, as applicable over the declared nominal value and given under **3.2.1**.

7 TESTS

7.1 Tests shall be carried out by the methods referred to in col 4 of Table 1.

7.2 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

(*Clause* 3.1.2)

IDENTITY TEST FOR DDT

A-1 PRINCIPLE

The method is based on the thin layer chromatographic separation of DDT from other added chlorinated pesticides, if any.

A-2 APPARATUS

A-2.1 Thin Layer Chromatography Apparatus

A-2.2 Ultraviolet Apparatus

A-3 REAGENTS

A-3.1 Adsorbent — Silica gel or aluminium oxide (G).

A-3.2 Mobile Solvents

A-3.2.1 *n-hexane*

A-3.2.2 *n-hexane* + *acetone* — (98 + 2).

A-3.2.3 *n-hexane* + *alcohol* — (98 + 2).

A-3.3 Standard Reference Solution

A-3.3.1 *Standard DDT Solution* — 1 mg/1 ml.

A-3.3.2 *Standard BHC Solution* — 1 mg/1 ml.

A-3.3.3 *Standard DDT* + *BHC Solutions* —1:1 (*see* **A-3.3.1** and **A-3.3.2**).

A-3.4 Extract of amount of sample containing 0.1 g of the active ingredient in acetone and make up the volume to 100 ml in a volumetric flask. This solution will give a concentration of 1 mg/1 ml.

A-3.5 Preparation of Plates — Dissolve 0.1 to 0.15 g of silver nitrate in 1 to 2 ml distilled water in 100 ml beaker, add 58 ml methyl alcohol and mix. Weigh 40 g adsorbent (*see* **A-3.1**) in 250 mi flask, add silver nitrate-methyl alcohol solution and shake vigorously for 20 sec. Apply slurry at 0.2 mm thick layer, to five 20 × 20 cm plates positioned on plastic mounted boards. After plates appear dry, store in desiccator over desiccant. When plates are dry, scrap 1 cm strip from side edges to ensure even solvent front. Use plates immediately after removal from desiccator.

A-3.6 Pour *n*-hexane into glass chromatograph tank to depth of 10 to 20 mm, place two paper blotter [7.5 x 22 cm] on each side of tank or large blotter covering back of tank and let in equilibrate approximately 2 h before use.

A-3.7 Detection — Spot 10 µl sample extract with a 100 µl syringe. Do not disturb adsorbent layer. Also spot standard solutions of DDT, BHC and mixture of DDT + BHC. Spot would be approximately less than 6 mm diameter and placed less than 30 mm from bottom of plate. Place in chromatographic tank and let plate develop approximately greater than 10 cm. Remove plate and expose to short-wave UV. Chlorinated organic pesticides should be visible as direct spots against white or light-grey background. Expose plate for approximately 1 h. Longer exposure will not harm plate. To confirm identification of pesticides, repeat TLC with different mobile solvents (*see* **A-3.2.2** and **A-3.2.3**).

A-4 Observations — The sample shall be considered free from added chlorinated pesticide other than DDT if the chromatogram of the standard DDT and the sample are alike.

ANNEX B

[*Table* 1, *Sl No.* (i)]

DETERMINATION OF DDT CONTENT

B-1 GENERAL

There are two methods for the determination of DDT content, namely organic chlorine method and the hydrolysable chlorine method. Whereas for routine purpose either of the two methods may be used, the latter method shall be used as a referee method in case of dispute.

B-2 TOTAL ORGANIC CHLORINE METHOD

B-2.1 Reagents

B-2.1.1 *Benzene* — free from thiophene and chlorine.

B-2.1.2 *Isopropyl Alcohol* — of two concentrations, namely, 99 percent, dry and 50 percent (*v/v*), aqueous solution.

B-2.1.3 *Metallic Sodium* — pure, in the form of ribbon or cut in small pieces.

B-2.1.4 *Phenolphthalein Indicator Solution* — one percent (*m/v*) in rectified spirit.

B-2.1.5 *Dilute Nitric Acid* — 1:1 (*v/v*).

B-2.1.*6* *Standard Silver Nitrate Solution* — 0.1 N.

B-2.1.7 *Ferric Ammoninum Sulphate Solution* — saturated, aqueous, freshly prepared.

B-2.1.8 *Standard Potassium Thiocyanate Solution* — 0.1 N.

B-2.2 Procedure

B-2.2.1 Weigh accurately a quantity of the material containing about 1 g of DDT and extract it quantitatively with benzene in a Soxhlet extractor, taking care to ensure that extraction is complete and channelling does not occur. Concentrate the extract to a small volume using a steam-bath, transfer it quantitatively to a 100 ml volumetric flask and make up the volume to the mark with benzene.

B-2.2.2 Transfer a 10 ml aliquot to a 250 ml ground glass joint. Erlenmeyer flask, add 25 ml of isopropyl alcohol (99 percent) and shake the flask to mix the contents. Add 2.5 g of metallic sodium, connect the flask to a reflux condenser and boil the contents gently for at least 2 h, shaking the flask occasionally. Dissolve the excess metallic sodium by cautiously adding 10 ml of isopropyl alcohol (50 percent) through the condenser at the rate of one to two drops per second. Boil for another 10 min and then add 60 ml of water.

B-2.2.3 Cool, add 2 drops to 3 drops of phenolphthalein indicator solution. Neutralize by adding dilute nitric acid dropwise and then add 10 ml excess. If necessary, cool the flask to room temperature; add a known volume of the standard silver nitrate solution in slight excess and coagulate the precipitated silver chloride by digesting on a steam-bath for half an hour, with frequent stirring. Cool the flask and, if necessary, filter the contents of the flask through a fast quantitative filter paper collecting the filtrate quantitatively in a conical flask. Add 5 ml of ferric ammonium sulphate solution either to the cooled unfiltered mixture or to the filtrate, as the case may be, and titrate the excess of the silver nitrate with the standard potassium thiocyanate solution. (The end point is the appearance of red ferric thiocyanate colour.)

B-2.2.4 Carry out a blank determination using the method given under **B-2.2.1** to **B-2.2.3**.

B-2.3 Calculation

$$\text{DDT content, percent by mass} = \frac{70.92\,(V-v)N}{M}$$

where,

V = volume, in ml, of the standard potassium thiocyanate solution used for the blank determination (*see* **B-2.2.4**);

v = volume, in ml, of the standard potassium thiocyanate solution used for the test with the material (*see* **B-2.2.3**);

N = normality of the standard potassium thiocyanate solution; and

M = mass, in g, of the material taken for test (*see* **B-2.2.1**).

B-3 HYDROLYSABLE CHLORINE METHOD

B-3.1 Reagents

B-3.1.1 *Acetone*

B-3.1.2 *Alcoholic Potassium Hydroxide Solution* — 1 N.

B-3.1.3 *Dilute Nitric Acid* — 2 N.

B-3.1.4 *Standard Silver Nitrate Solution* — 0.1 N.

B-3.1.5 *Ferric Ammonium Sulphate Solution* — Saturated, aqueous, freshly prepared.

B-3.1.6 *Standard Potassium Thiocyanate Solution* — 0.1 N.

B-3.2 Procedure

B-3.2.1 Weigh accurately a quantity of the material containing about 0.5 g of DDT and extract it quantitatively with acetone in a Soxhlet extractor, taking care to ensure that the extraction is complete and channelling does not occur. Quantitatively transfer the extract to an Erlenmeyer flask and concentrate the extract on a water-bath to a volume of about 50 ml.

B-3.2.2 To the whole of the extract (*see* **B-3.2.1**), add 20 ml of alcoholic potassium hydroxide solution, keep it at 20 °C to 25 °C for 15 min and then add 50 ml of water. Add 20 ml of dilute nitric acid and exactly 25 ml of the standard silver nitrate solution. Coagulate the precipitate of silver chloride by digesting on a steam-bath for half an hour, with frequent stirring. Cool the flask and, if necessary, filter the contents of the flask through a fast qualitative filter paper collecting the filtrate quantitatively in a conical flask. Add 5 ml of ferric ammonium sulphate solution either to the cooled unfiltered mixture or to the filtrate, as the case may be, and titrate the excess of the silver nitrate with the standard potassium thiocyanate solution.

B-3.2.3 Carry out a blank determination using the method given under **B-3.2.1** and **B-3.2.2** except to the extent that 20 ml of alcoholic potassium hydroxide be added after adding 20 ml of dilute nitric acid first.

B-3.3 Calculation

$$\text{DDT content, percent by mass} = \frac{35.46\,(V-v)N}{M}$$

where,

V = volume, in ml, of the standard potassium thiocyanate solution used for the blank determination (*see* **B-3.2.3**);

v = volume, in ml, of the standard potassium thiocyanate solution used for the test with the material (*see* **B-3.2.2**);

N = normality of the standard potassium thiocyanate solution; and

M = mass, in g, of the material taken for the test (*see* **B-3.2.1**).