भारतीय मानक
Indian Standard

IS 8293 : 2024

फेन्थोएट, तकनीकी — विशिष्टि

(पहला पुनरीक्षण)

Phenthoate, Technical — Specification

(First Revision)

ICS 65.100.10

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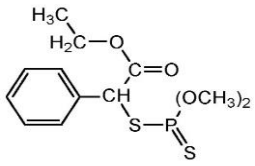
Pesticides Sectional Committee, FAD 01

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pesticides Sectional Committee had been approved by the Food and Agriculture Division Council.

Phenthoate is a non-systemic insecticide with contact and stomach action and is used against a broad range of insect pests of agricultural importance.

Phenthoate is the accepted common name by the International Organization for Standardization for S-α-ethoxycarbonylbenzyl 0, 0 – dimethyl phosphorodirhioate. The empirical and structural formulae and the molecular mass of phenthoate are as indicated below:

Empirical formula	*Structural formula*	*Molecular mass*
$C_{12}H_{17}O_4PS_2$		320

This standard was first published in 1976. In this revision, the TLC method used for determination of active ingredient has been removed. Also, the standard has been brought out in the latest style and format of the Indian Standards, as well as references to Indian Standards wherever applicable have been updated. It also incorporates one amendment issued to the previous version of this standard.

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.

Indian Standard

PHENTHOATE, TECHNICAL — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for phenthoate, technical.

2 REFERENCES

The standards given below 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 edition of these standards:

IS No.	*Title*
IS 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 6940 : 1982	Methods of test for pesticides and their formulations (*first revision*)
IS 8190 (Part 2) : 1988	Requirements for packing of pesticides: Part 2 Liquid pesticides (*second revision*)
IS 10946 : 1996	Methods of sampling for technical grade pesticides (*first revision*)

3 REQUIREMENTS

3.1 Description

The material shall be in the form of an oily brownish-yellow liquid with an aromatic odour, free from extraneous impurities or added modifying agents.

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

4 PACKING

The material shall be packed in clean and dry container made of mild steel suitably and properly lacquered from inside. The container shall also comply with general requirements as stipulated in IS 8190 (Part 2).

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 and address of the manufacturer;

c) Batch number;

d) Date of manufacture;

e) Date of expiry;

f) Net quantity;

g) Nominal phenthoate content, percent (*m*/*m*);

h) 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 10946.

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.

Table 1 Requirements of Phenthoate, Technical

(*Clauses* 3.2 *and* 7)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	Phenthoate content, percent by mass, *Min*	90	Annex A
ii)	Material insoluble in acetone, percent by mass, *Max*	0.5	IS 6940
iii)	Moisture, percent by mass, *Max*	0.5	IS 6940
iv)	Acidity (as H_2SO_4), percent by mass, *Max*	1.0	IS 6940
v)	Specific gravity at 27 °C	1.22 to 1.23	IS 6940

ANNEX A

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

DETERMINATION OF PHENTHOATE CONTENT BY GAS CHROMATOGRAPHIC METHOD

A-1 PRINCIPLE

A GLC unit fitted with a flame ionization detector is used for this determination. Using solutions containing known amounts of phenthoate standard and internal standard, the response factor, *RF*, for phenthoate and internal standard is arrived at. A solution containing a known mass of sample and internal standard is injected subsequently into the GLC unit. The percentage of phenthoate is then calculated by standard relationship.

A-2 APPARATUS

A-2.1 Gas Liquid Chromatograph

Equipped with flame ionization detector (FID). The GLC unit may be fitted with a printer-plotter cum integrator. The suggested operative parameters are given below but can be changed in any other equipment, provided standardization is done:

Column	180 cm length — 3 mm internal diameter (i.d) glass/stainless steel packed with 3 percent SE — 30 on chromosorb W.HP, 100 to 120 mesh	
Carrier gas	Nitrogen, 34 ml to 40 ml per min flow rate	
Temperature	Column	220 °C
	Injection Port	230 °C
	Detector	240 °C

A-2.2 Microlitre Syringe — 10 µl capacity

A-3 REAGENTS

A-3.1 Methanol — analytical reagent or spectroscopy grade

A-3.2 Internal Standard — dibutyl phthalate

A-3.3 Dichloromethane —spectroscopy grade

A-3.4 Phenthoate Standard — of known purity

A-4 PREPARATION OF SOLUTIONS

A-4.1 Calibration Solution

Weigh accurately to the nearest 0.1 mg, 0.180 g of internal standard and 0.250 g of phenthoate standard into a 25 ml volumetric flask, dissolve in methanol and make up to the mark. Mix well.

A-4.2 Sample Solution

A-4.2.1 *For Phenthoate, Technical*

Weigh accurately to the nearest 0.1 ml, 0.180 g of internal standard and 0.250 g of phenthoate technical into a 25 ml volumetric flask, dissolve in dichloromethane and make up the volume. Mix well.

A-4.2.2 *For Phenthoate, EC*

Weigh accurately to the nearest 0.1 mg, 0.180 g of internal standard and 0.490 g of EC, dissolve in dichloromethane and make up the volume. Mix well.

A-4.3 Estimation

Inject 2 µl of the calibration (A-4.1) and the sample (A-4.2.1 or A-4.2.2) solutions in a proper sequence. Proceed with the next injection only 2 min to 3 min after the emergence of the phenthoate peak. From the injections of the calibration solution, calculate the response factor, *RF*.

A-5 CALCULATION

$$RF = \frac{W_1 \times A_1 \times P_1}{W_2 \times A_2 \times P_2}$$

$$\text{Phenthoate content, percent by mass} = \frac{A_3 \times W_1 \times P_1}{A_2 \times W_3 \times RF}$$

where

W_1 = mass, in g, of internal standard;

A_1 = area of phenthoate standard;

P_1 = percent purity of internal standard;

W_2 = mass, in g, of phenthoate standard;

A_2 = area of internal standard;

P_2 = percent purity of phenthoate standard;

A_3 = area of sample; and

W_3 = mass, in g, of sample.

Bureau of Indian Standards

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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