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Jawaharlal Nehru
“Step Out From the Old to the New”


“ज्ञान से एक नये भारत का निर्माण”
Satyanarayan Gangaram Pitroda
“Invent a New India Using Knowledge”

“ज्ञान एक ऐसा खजाना है जो कभी छूराया नहीं जा सकता है”
Bhartrhari—Nitisatakam
“Knowledge is such a treasure which cannot be stolen”
Indian Standard

FENPROPATHRIN TECHNICAL — SPECIFICATION

ICS 65.100.10

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

September 2002
FOREWORD

This Indian Standard 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.

Fenpropatrin, technical is used in insecticidal formulations.

Fenpropatrin is the common name accepted by the International Organization for Standardization (ISO) for (RS)-α-cyano-3-phenoxybenzyl 2,2,3,3-tetramethyl cyclopropane carboxylate. The empirical formula, structural formula and the molecular mass are as given below:

<table>
<thead>
<tr>
<th>Empirical Formula</th>
<th>Structural Formula</th>
<th>Molecular Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_{22}H_{23}NO_{3}</td>
<td><img src="image" alt="Structural Formula" /></td>
<td>349.4</td>
</tr>
</tbody>
</table>

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 the Act and Rules, 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 : 1960 ‘Rules for rounding off numerical values (revised)’. The 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

FENPROPARTHIN TECHNICAL — SPECIFICATION

1 SCOPE

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

2 REFERENCES

The following Indian 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:

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1070:1992</td>
<td>Reagent grade water (third revision)</td>
</tr>
<tr>
<td>6940:1982</td>
<td>Methods of test for pesticides and their formulations (first revision)</td>
</tr>
<tr>
<td>8190 (Part 1): 1988</td>
<td>Requirements for packing of pesticides: Part I Solid pesticides (second revision)</td>
</tr>
<tr>
<td>10946:1996</td>
<td>Methods of sampling for technical grade pesticides (first revision)</td>
</tr>
</tbody>
</table>

3 REQUIREMENTS

3.1 Description

The material shall be in the form of crystalline solid, yellowish brown in colour, free from extraneous matter.

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

4 PACKING

The material shall be packed in mild steel drums (see IS 1783) containers with LDPE liner of thickness not less than 0.062 mm. The container shall also comply with the general requirements as specified in IS 8190 (Part 1).

5 MARKING

The containers shall bear legibly and indelibly the following information in addition to any other information as required under the Insecticides Act and Rules framed thereunder.

- Name of the material;
- Name and address of the manufacturer;
- Date of manufacture;
- Date of expiry;
- Batch number;
- Nominal fenproparthrin content, percent (m/m);
- Net mass of contents;
- A cautionary notice as worded in the Insecticides Act, 1968 and Rules framed thereunder; and
- Any other information required under the Standards of Weights and Measures (Packaging Commodities) Rules, 1977.

Table 1 Requirements of Fenproparthin Technical (Clauses 3.2 and 7.1)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Method of Test, Ref to Annex of this Standard</th>
<th>Cl No. of IS 6940</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) Fenproparthin content percent by mass, Min</td>
<td>90.0</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(2) Acidity (as H₂SO₄) percent by mass, Max</td>
<td>1.0</td>
<td>—</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>(3) Moisture content, percent by mass, Max</td>
<td>0.50</td>
<td>—</td>
<td>4</td>
</tr>
</tbody>
</table>

6 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 10946.

7 TESTS

7.1 Tests shall be carried out by the methods referred in col 4 and 5 of Table 1.

7.2 Unless specified otherwise, pure chemicals and reagent grade 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 FENPROPATHRIN CONTENT

A-1 PRINCIPLE
Fenpropathrin content is determined by gas liquid chromatography using internal standard technique.

A-2 APPARATUS

A-2.1 Gas Chromatograph
A gas chromatograph equipped with flame ionisation detector and a printer-plotter-cum-integrator is used. The suggested operative parameters are as follows, but can be changed if necessary, provided standardization is done.

<table>
<thead>
<tr>
<th>Column</th>
<th>Stainless steel, length: 1 m, ID: 3mm, packed with 5 percent SE-30 on Chromosorb WHP, (80/100 mesh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column Temperature</td>
<td>200°C</td>
</tr>
<tr>
<td>Injector Temperature</td>
<td>250°C</td>
</tr>
<tr>
<td>Detector Temperature</td>
<td>260°C</td>
</tr>
<tr>
<td>Gas flow rates</td>
<td>Nitrogen: 30 ml/min</td>
</tr>
</tbody>
</table>

A-2.2 Microlitre Syringe — 10 μl capacity

A-2.3 Standard Glassware

A-3 RETENTION TIME (GUIDE VALUES)

A-3.1 Internal Standard (Triphenyl Phosphate) — 7.2 min.

A-3.2 Fenpropathrin (a.i.) — 10.3 min.

A-3.3 Total Run Time — 12 min.

A-4 REAGENTS

A-4.1 Internal Standard, Triphenyl Phosphate — AR or equivalent grade.

A-4.2 Fenpropathrin Reference Standard — of known purity

A-4.3 Acetone — AR grade or equivalent.

A-5 PROCEDURE

A-5.1 Preparation of Internal Standard Solution
Weigh about 1.0 g of triphenyl phosphate into a 100-ml volumetric flask and make up the volume with acetone.

A-5.2 Preparation of Standard Solution
Weigh accurately about 0.1 g of fenpropathrin standard into a 50-ml standard volumetric flask, add 10 ml of internal standard solution (A-5.1) and make up the volume with acetone.

A-5.3 Preparation of Sample Solution
Weigh accurately about a quantity of sample equivalent to 0.1 g of fenpropathrin into a 50 ml standard volumetric flask, add 10 ml of internal standard solution (A-5.1) and make up to volume with acetone.

A-5.4 Estimation
Inject 1 μl standard solution until the area quotient of internal standard/reference standard of two successive chromatograms do not deviate from each other by more than 2 percent.

Then use the following injection sequence:

\[ C S_1 S_2 S_3 C S_3 \ldots \ldots \ldots \]

where

\[ C = \text{standard solution, and} \]
\[ S = \text{sample solution (1,2, \ldots , n).} \]

From the chromatograms of the standard solution and sample solution, measure the peak areas of the active ingredient and the internal standard and calculate the percentage of the active ingredient as given in A-6.

A-6 CALCULATIONS

Fenpropathrin content percent \( \frac{M_1 \times A_1 \times I_1 \times P}{M_2 \times A_2 \times I_2} \)

where

\[ M_1 = \text{mass in g of standard fenpropathrin}, \]
\[ M_2 = \text{mass in g of sample fenpropathrin}, \]
\[ A_1 = \text{area of fenpropathrin peak in the chromatogram of standard solution}, \]
\[ A_2 = \text{area of fenpropathrin peak in the chromatogram of sample solution}, \]
\[ I_1 = \text{area of internal standard peak in the chromatogram of standard solution}, \]
\[ I_2 = \text{area of internal standard peak in the chromatogram of sample solution, and} \]
\[ P = \text{percent purity of standard fenpropathrin}. \]
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This Indian Standard has been developed from Doc : No. FAD 1 (1078)

Amendments Issued Since Publication

<table>
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<tr>
<th>Amend No.</th>
<th>Date of Issue</th>
<th>Text Affected</th>
</tr>
</thead>
</table>

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