

**BUREAU OF INDIAN STANDARDS****DRAFT FOR COMMENTS ONLY***(Not to be reproduced without the permission of BIS or used as an Indian Standard)**भारतीय मानक मसौदा***ब्यूटाक्लॉर, तकनीकी — विशिष्टि***(आइ एस 9355 का पहला पुनरीक्षण)**Draft Indian Standard***BUTACHLOR, TECHNICAL — SPECIFICATION***(First Revision of IS 9355)***ICS No. 65.100.20**

Pesticides Sectional Committee, FAD 01

**Last Date of Comments: 3 July 2024**

## FOREWORD

*(Formal clauses would be added later)*

Butachlor is a herbicide used in the formulations meant for agriculture.

Butachlor is the proposed common name by the International Organization for Standardization (ISO) for 2-chloro-2', 6'-diethyl-N butoxymethyl acetanilide. The empirical and the structural formulae and the molecular mass of butachlor are indicated below:

<i>Empirical Formula</i>	<i>Structural Formula</i>	<i>Molecular Mass</i>
$C_{17}H_{26}ClNO_2$		311.85

This standard was published in 1980. 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. It also incorporates three amendments 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.

## 1 SCOPE

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

## 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 1070 : 2023	Reagent grade water — Specification ( <i>fourth revision</i> )
IS 6940 : 1982	Methods of test for pesticides and their formulations ( <i>first revision</i> )
IS 8190 (Part 2) : 1988	Requirements for packing of pesticides: Part 2 Liquid pesticides ( <i>second revision</i> )
IS 10946 : 1996	Methods of sampling for technical grade pesticides ( <i>first revision</i> )

## 3 REQUIREMENTS

### 3.1 Description

The material shall be in the form of a clear, yellow to orange aromatic liquid. On storage, the colour of the material may be changed to pink or purple. It shall be free from extraneous matter.

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

**Table 1 Requirements of Butachlor, Technical**  
(Clause 3.2)

<b>SI No.</b>	<b>Characteristic</b>	<b>Requirements</b>	<b>Method of Test, Ref to</b>
(1)	(2)	(3)	(4)
i)	Butachlor content, percent by mass, <i>Min</i>	85	Annex A
ii)	Moisture content, percent by mass, <i>Max</i>	0.3	IS 6940
iii)	Acidity (as H <sub>2</sub> SO <sub>4</sub> ), percent by mass, <i>Max</i>	0.2	IS 6940
iv)	Material insoluble in acetone, percent by mass, <i>Max</i>	0.15	IS 6940

## 4 PACKING

The material shall be packed as per requirements given 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 butachlor 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.

## ANNEX A

[Table 1, Sl No. (i)]

### DETERMINATION OF BUTACHLOR CONTENT BY GAS CHROMATOGRAPHIC METHOD

#### A-1 PRINCIPLE

The method consists of injecting a sample with an internal standard in a known proportion into a gas chromatograph and determining the area under each peak. The area under the peak is proportional to the mass of the sample. By comparison of this area with that of the standard, the percentage purity of the sample is determined.

#### A-2 APPARATUS

##### A-2.1 Gas Liquid Chromatograph

Equipped with a recorder and a disc integrator (optional) operating, on following suggestive parameters. These parameters can be varied depending upon instrument, provided standardization is done.

Detector	Flame Ionization Detector (FID)	
Column	Stainless steel 2 m × 3 mm internal diameter (i.d.), packed with 10 percent DC-200 OD chromosorb W-HP, 80-100 mesh.	
Temperature	Column	240 °C
	Injection	270 °C
	Detector	240 °C
Carrier Gas	Nitrogen	
Flow Rate	40 ml/min	

NOTE - Operating parameter as well as attenuation and chart speed shall be adjusted to obtain optimum response and reproducibility.

**A-2.2 Micro Syringe** – 2.0 µl capacity.

#### A-3 REAGENTS

**A-3.1 Standard Reference Butachlor** – of known purity.

**A-3.2 Acetone**

**A-3.3 Internal Standard** – bis (2 ethyl-hexyl) adipate.

#### A-4 PROCEDURE

##### A-4.1 Preparation of Standard Solution

Weigh accurately 1.0 g of standard reference butachlor into a 100 ml volumetric flask and dilute it with acetone up to the mark.

##### A-4.2 Preparation of Internal Standard

Weigh accurately 1.0 g of internal standard adipate into a 100 ml volumetric flask and dilute it with acetone up to the mark.

### A-4.3 Preparation of Test Solution

Weigh accurately the quantity of sample containing about 1.0 g of butachlor into a 100 ml volumetric flask and dilute it with acetone up to the mark.

### A-4.4 Analysis of Sample

Check the chromatograph for thermal and flow equilibrium. Inject alternatively 2 µl of solution prepared by mixing 1 ml of standard solution (*see A-4.1*) and 1 ml of internal standard (*see A-4.2*) and 1 ml of test solution (*see A-4.3*) and 1 ml of internal standard (*see A-4.2*) at least thrice.

**A-4.5** Measure the peak heights of areas of butachlor and internal standard solution. Determine the  $R_f$  value for each injected standard internal standard solution.

### A-4.5 CALCULATION

$$\text{Butachlor content, percent by mass} = \frac{M_1 \times A_2 \times 100}{M_2 \times A_1} \times \text{ACF}$$

where,

$M_1$  = corrected mass, in g, of the internal standard taken for the test,

$A_2$  = peak height or area corresponding the butachlor;

$M_2$  = mass of sample, in g, taken for the test; and

$A_1$  = peak height or area corresponding to the internal standard.

$$\text{and ACF} = \frac{M_3 \times P_1 \times H_1}{M_4 \times H_2 \times P_2}$$

where,

$M_3$  = mass, in g, of butachlor standard;

$P_1$  = percent purity of butachlor standard;

$H_1$  = peak height or area corresponding to the internal standard;

$M_4$  = mass, in g, of the internal standard taken for the test;

$H_2$  = peak height or area corresponding to butachlor standard; and

$P_2$  = percent purity of the internal standard.