FOREWORD

(*Formal clause would be added later)*

Imazethapyr + Imazamox water dispersible granule is used as a herbicide in Agriculture.

Imazethapyr + Imazamox water dispersible granule is generally manufactured to contain Imazethapyr 35% and Imazamox 35%.

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

1.1 This standard prescribes the requirements and the methods of sampling and test method for Imazethapyr + Imazamox water dispersible granule.

2 REFERENCES

The standards, given below 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.

IS No.	*Title*
8190 (Part 1) : 1988	Requirements for packing of pesticides Part 1 solid pesticides (*second revision*)
1070 : 1992	Reagent grade water - Specification (*third Revision*)
6940 : 1982	Methods of test for pesticide and their formulations (*first Revision*)
10627 : 1983	Methods for sampling of pesticidal formulations
9754 : 1981	Specification for high density polyethylene containers for packing of liquid pesticides (Up To 1 Litre Capacity)

3 REQUIREMENTS

3.1 Physical

3.1.1 *Description* **—** The material shall be Homogenous light brown free flowing granules.

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

Table 1 REQUIREMENTS FOR IMAZAMOX 35% + IMAZETHAPYR 35% WG
(*Clauses* **3.1.1** and **7.1)**

Sl.No.	**Characteristic**	**Requirement**	**Method of test, refer to**
(1)	(2)	(3)	(4)
i.	Imazamox content, percent by mass	33.25 – 36.75	A
ii.	Imazethapyr content, percent by mass	33.25 – 36.75	A
iii.	Suspensibility per cent by mass, *min.*	80	IS 6940
iv.	Persistent foam, ml *max* after 1 minute	10 ml	IS 6940
v.	Wettability, *max* in Sec	120	IS 6940
vi.	Dispersibility, per cent by mass in 1 min.	80	IS 6940
vii.	Sieve test, material passing through 75 μm sieve, percent by mass	90.9	IS 6940
viii.	Dustiness, mg	Dust free	IS 6940
ix.	Acidity (as H_2SO_4) percent by mass, *Max*	0.5	IS 6940

3.2 Chemical

The material shall comply with the chemical requirements specified in **3.2.1.**

3.2.1 *Imazethapyr and Imazamox content*

When determined by the method prescribed in annexure – A, the observed Imazethapyr and Imazamox content (w/w), of any of the sample shall not differ from the declared nominal value by more than the percent tolerance limits indicated below:

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

3.2.2 The actual value of Imazethapyr and Imazamox contents in the formulations shall be calculated to the second decimal place and then rounded off to the first decimal place before applying the tolerance given in **3.2.1**.

3.2.3 The average Imazethapyr and Imazamox content of all samples taken shall not be less than the declared nominal content.

4 PACKING

4.1 Retail packs up to 500 g:

4.1.1 The material shall be packed in HDPE containers conforming to IS 9754. The specifications for the containers shall be as agreed between the supplier and the manufacturer

5 MARKING

5.1 The containers shall be securely closed and shall be bear legibly and indelibly the following information in addition to any other information as required under the *Insecticides Act,* 1968 and Rules framed thereunder:

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 mass of content, percent (*m/m*);

g) Nominal Imazethapyr and Imazamox 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

6.1 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 he the limits of tolerances, as applicable over the declared nominal value and given under clause **3.3.1** of the standard.

7 TESTS

7.1 Tests shall be carried out by the appropriate methods referred to Table **1**

7.2 Quality of Reagent

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.

IMAZETHAPYR 35% + IMAZAMOX 35% WG

Physico-chemical Properties

Physical state	Free flowing granules
Colour	Light brown
Odour	Odourless
Bulk density	529 - 609 kg/m3
Melting point	164 – 165^0 C
*p*H	2.9
Vapour pressure	Negligible

ANNEX A

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

DETERMINATION OF IMAZETHAPYR AND IMAZAMOX CONTENT

A-1 PRINCIPLE

To determine Imazethapyr and Imazamox contents in Imazethapyr + Imazamox 70% WG sample by using Shimadzu High Performance Liquid Chromatographic. The identity of the active ingredient is established by comparison with the equivalent authentic standard.

A-2 APPARATUS

A-2.1 Syringe – 25 µl Capacity

A-2.2 HPLC parameters for imazethapyr and imazamox analysis

Instrument		High Performance Liquid Chromatographic system equipped with LC-20 AT, and SPD-20A, CTO 20A UV-VIS detector interfaced with CLASS LC-software system
Column used		C_{18} (25 cm x 4.6 mm i.d.)
Mobile Phase		Acetonitrile : Water (30: 70) (pH adjusted to 3.0 using orthophosphoric acid)
Wave Length		254 nm
Sensistivity (A.U.F.S)		0.1
Injection Volume		5 µL
Flow rate		1.0 ml/min
Retention time (approximately)	Imazethapyr	9.9 min
	Imazamox	6.1 min
	Hydroquinone	3.4 min

A-3 REAGENTS

A-3.1 Acetonitrile

A-3.2 Hydroquinone – Internal Standard

A-3.3 Imazethapyr - Analytical Standard

A-3.4 Imazamox - Analytical Standard

A-4 PROCEDURE

A-4.1. Outline

Imazethapyr and Imazamox content in Imazethapyr 35% + Imazamox 35% WG samples was determined by a HPLC method. The identity of the active ingredient was established by comparison with the equivalent authentic standard.

A-4.2. Preparation of standard solution

Weigh about 10 mg of Imazethapyr and Imazamox reference standards (C2) into a 100 ml volumetric flask. Dissolve the content using acetonitrile and make upto the mark.

A-4.3 Preparation of internal standard solution

Weigh about 130 mg of hydroquinone in a 100 ml volumetric flask. Dissolve the content using acetonitrile and make upto the mark.

A-4.4. Preparation of sample solution

Weigh about 30 mg of Imazethapyr + Imazamox 70% WG in a 100 ml volumetric flask and add 10 ml of the internal standard and dissolve the content using acetonitrile and make upto the mark.

A-4.5 Determination

Injected in the sequence C2, S1R1, S1R2, C2, S2R1, S2R2 and analysed for Imazethapyr and Imazamox content.

A-5 CALCULATION

A-5.1 Imazethapyr content, percent by mass = $\frac{H_{WA} \times M_A \times P_A \times I_r}{H_{SA} \times w \times I_q}$

Where,

H_{SA} = Peak area of Imazethapyr in the calibration solution (µv-sec)

H_{wA} = Peak area of Imazethapyr in the sample solution (µv-sec)

M_A = Mass of Imazethapyr in the calibration solution (mg)

w = Mass of sample taken (mg)

P_A = Purity of Imazethapyr reference standard (%)

I_r = Peak area of internal standard in the calibration solution (µV-sec)

I_q = Peak area of internal standard in the sample solution (µV-sec)

A-5.2 Imazamox content, percent by mass = $\frac{H_{WB} \times M_B \times P_B \times I_r}{H_{SB} \times w \times I_q}$

Where,

H_{SB} = Peak area of Imazamox in the calibration solution (µv-sec)

H_{wB} = Peak area of Imazamox in the sample solution (µv-sec)

M_B = Mass of Imazamox in the calibration solution (mg)

w = Mass of sample taken (mg)

P_B = Purity of Imazamox reference standard (%)

I_r = Peak area of internal standard in the calibration solution (µV-sec)

I_q = Peak area of internal standard in the sample solution (µV-sec)