Doc No. FAD 01(28713)WC
September 2025

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

भारतीय मानक मसौदा
मिथाइल ब्रोमाइड — विशिष्टि
(*IS* 1312 *का तीसरा पुनरीक्षण*)

Draft Indian Standard

METHYL BROMIDE — SPECIFICATION
(*Third Revision of IS 1312*)

ICS 65.100.10

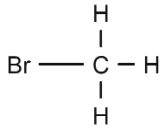
Pesticides Sectional Committee, FAD 01	**Last date of comments:** 20 October 2025

FOREWORD

(*Adoption clauses will be added later*)

Methyl bromide is used as a fumigant either as such or in admixture with other materials for control of pests of agricultural and animal husbandry products, such as, fresh fruits and vegetables, plants and plant materials, food grains, stored products like flour, dry fruits, timber, etc. and hides and skins. It is also used as a soil fumigant.

Methyl bromide is the trival name for bromomethane. The empirical and structural formulae and the molecular mass of this product are given below:

Empirical Formula	Structural Formula	Molecular Mass
CH_3Br		95

The absence of a discernible odour in methyl bromide makes it difficult to ascertain after fumigation whether all the vapours of methyl bromide have been exhausted out or not. In order, therefore, to detect the vapours of methyl bromide, two percent of chloropicrin is mixed with it. High percentage of chloropicrin are not found necessary. But some oleaginous materials should not be fumigated with such a mixture as certain chemical changes are likely to occur in them. In view of such a position, two grades of the material, one without chloropicrin and the other with chloropicrin have been specified.

This standard was first published in 1959 and revised in 1967. In the second revision issued in 1980, the latest requirements for packing, marking and sampling were incorporated.

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 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 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 : 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 method of sampling and test for methyl bromide used as a fumigant.

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 1070 : 2023	Reagent grade water — Specification (*fourth revision*)
IS 1260 (Part 1) : 1973	Pictorial markings for handling and labelling of goods: Part 1 Dangerous goods (*first revision*)
IS 8190 (Part 4) : 1988	Requirements for packing of pesticides: Part 4 Fumigants (*first revision*)
IS 10627 : 1983	Methods for sampling of pesticidal formulations

3 GRADES

3.1 The methyl bromide shall be any of the following two grades:

a) 'without choloropicrin' and

b) with 2.0 percent (*m/m*) added chloropicrin.

4 REQUIREMENTS

4.1 Description

The material shall be clear, clear, colourless or pale straw coloured liquid at 0 °C; and free from visible water and matter in suspension.

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

Table 1 Requirements for Methyl Bromide

(*Clause* 4.2)

Sl No.	Characteristic	Requirement		Method of Test, Ref to
		Without Chloropicrin	With 2 percent (*m/m*) Chloropicrin	
(1)	(2)	(3)	(4)	(5)
i)	Relative density at 0 °C/15 °C	1.710 to 1.735	1.710 to 1.735	Annex A
ii)	Distillation range at 760 mm Hg, percent by volume, *Min:* a) Between 3.5 °C and 5.0 °C b) Between 3.5 °C and 11.0 °C	 95 —	 — 93	Annex B
iii)	Residue on evaporation, percent by mass, *Max*	0.070	0.070	Annex C
iv)	Acidity (as HBr), percent by mass, *Max*	0.02	0.02	Annex D

5 PACKING

The material shall comply with the general packing requirements given in IS 8190 (Part 4).

6 MARKING

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

a) Name of the material;
b) Grade of the material (*see* **3**);
c) Indication about the source manufacture;
c) Batch number;
d) Date of manufacture;
e) Date of expiry;
f) Net mass of contents;
g) Nominal methyl bromide 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.

6.2 In addition to the above, the marking and labelling of cylinders shall be in accordance with the requirements for cylinders for liquefied gases given in the *Gas Cylinder Rules*, 2016, of the Government of India, with such modifications as may be ordered from time to time by the Chief Inspector of Explosives, Government of India, or any other duly constituted authority. Other

containers shall also be marked and labelled in accordance with the instructions issued from time to time by such an authority.

6.3 The containers shall also be marked with the symbols for danger of non-flammable compressed gases and for danger of poisoning as specified in IS 1260 (Part 1).

6.4 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.

7 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 **4.2**.

8 TESTS

8.1 Tests shall be carried out by the appropriate methods referred to in col 5 of Table 1.

NOTE — Methyl bromide is highly poisonous. All tests shall be carried out in a fume cupboard. Contact with skin shall be avoided.

8.2 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 result of analysis.

ANNEX A
[*Table* 1, *Sl No.* (i)]
DETERMINATION OF RELATIVE DENSITY

[**Caution —** To be done in a fume cupboard. Inhalation and contact with the skin to be scrupulously avoided.]

A-1 DEFINITION

For the purpose of this standard, the *relative density* of the material shall be the ratio of the mass in air of a given volume of the material at 0 °C to that of an equal volume of water at 15 °C.

A-2. PROCEDURE

Assemble a Westphal balance equipped with a glass plummet. Level the beam with the plummet immersed in water adjusted to a temperature at 15 °C. Place the glass jar in a bath of melting ice. Transfer a suitable quantity of liquefied material and allow it to attain a temperature of 0 °C. Level the beam again and note the relative density.

A-3 CALCULATION

Calculate the apparent relative density of the material, adding a correction of 0.000 4, to allow for the contraction of the plummet.

ANNEX B
[*Table* 1, *Sl No.* (ii)]
DETERMINATION OF DISTILLATION RANGE

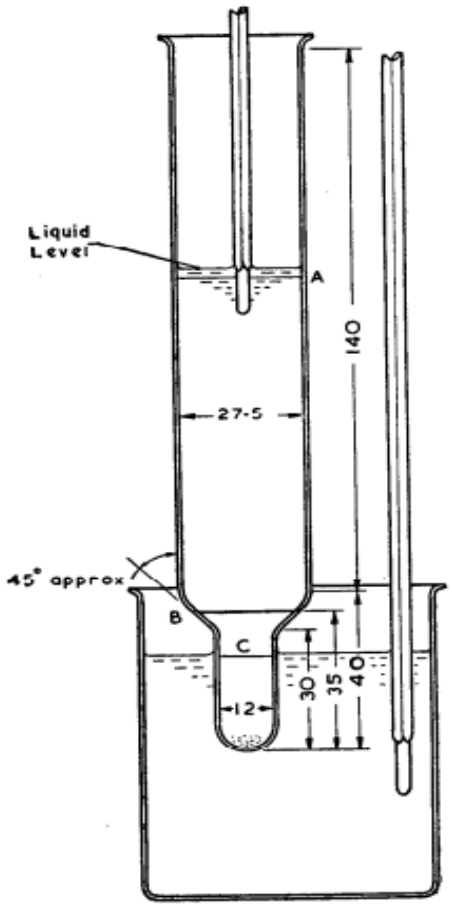
[**Caution —** To be done in a fume cupboard. Inhalation and contact with the skin to be scrupulously avoided.]

B-1 APPARATUS

B-1.1 Distillation Tube — Carrying mark *A* at 50 ml capacity, mark *B* half-way up the shoulder and 35 mm from the bottom of the vessel, and calibration mark *C* showing the level of 2.5 ml or 3.5 ml of liquid with thermometer immersed to the top of the bulb.

NOTE — As the position of calibration mark *C* depends on the volume of the bulb of the thermometer, the tube should be re-calibrated whenever different thermometer is used.

B-1.2 Beaker — 250 ml capacity.



All dimensions in millimetres.

Fig 1. Distillation Apparatus

B-1.3 Thermometer — Having dimensions, tolerances and graduations as follows:

Range	- 20 °C to + 60 °C
Graduation	0.2 °C
Longer lines at each	1 °C
Fully figured at each	10 °C
Fractional figuring at each	2 °C
Immersion	100 mm
Thickness of graduation lines, *Max*	0.10 mm
Overall length, *Max*	405 mm
Length of main scale, *Min*	200 mm
Bulb length	10 to 15 mm
Stem diameter	5.5 to 7.0 mm
Distance from the bottom of the bulb to the bottom of main scale, *Min*	130 mm
Maximum error	0.4 °C
Maximum error in an interval	0.4 °C/10 °C

B-1.3.1 The thermometer shall bear a certificate of the National Physical Laboratory of India, New Delhi, or any other institution authorized by the Government of India to issue such a certificate.

B-2 PROCEDURE

B-2.1 Cool the distillation tube to a temperature below 0 °C and fill it to mark *A* with the material. Add a few grains of clean dry sand and assemble the apparatus as shown in Fig. 1. Note whether ebullition begins below 3.5 °C. Fill the beaker with water at (30 ± 2) °C until the distillation tube is immersed to the lowest mark *C*. As distillation proceeds, lower the thermometer gradually so that the top of the bulb always remains just immersed in the material. When the level of the material reaches mark *B*, remove the beaker of water and allow the distillation to proceed spontaneously. Note whether the level of the material reaches the lowest mark *C* before the temperature exceeds 5.O °C or 11.0 °C indicating thereby that 95 percent or 93 percent by volume of the material has been distilled.

B-3 CORRECTION OF THERMOMETER READING

The following corrections shall be applied before starting distillation:

B-3.1 Error of Scale

In all thermometer readings, make the corrections as indicated on the certificate of the instrument.

B-3.2 Correction for Barometric Pressure

If the barometric pressure prevailing during the determination is normal, namely, 760 mmHg, no correction need to be applied to the specified temperature and the thermometer scale as corrected under **B-3.1** shall be used as such.

B-3.3 If the prevailing pressure *p* deviates from the normal, add the correction 0.035 (*p* – 760) °C to the specified distillation temperatures.

NOTE — This correction shall be applied for any prevailing barometric pressure and is valid to a pressure of 700 mmHg.

ANNEX C
[*Table* 1, *Sl No.* (iii)]
DETERMINATION OF RESIDUE ON EVAPORATION

[**Caution —** To be done in a fume cupboard. Inhalation and contact with the skin to be scrupulously avoided.]

C-1 PROCEDURE

Evaporate 10 ml of the material to dryness in a tared narrow-mouthed glass flask by warming gently on a water-bath. Dry the residue for one hour in an oven at (100 ± 2) °C. Cool in a desiccator and weigh.

C-2 CALCULATION

C-2.1 Residue on evaporation, percent by mass = $\frac{10\ M}{D}$

where,

M = mass, in g, of the residue; and

D = density of the material at 0 °C.

ANNEX D
[*Table* 1, *Sl No.* (iv)]
DETERMINATION OF ACIDITY

[**Caution —** To be done in a fume cupboard. Inhalation and contact with the skin to be scrupulously avoided.]

D-1 REAGENTS

D-1.1 Standard Sodium Hydroxide Solution — 0.1 N

D-1.2 Bromophenol Blue Indicator — Dissolve 0.2 g of bromophenol blue in 3.0 ml of the sodium hydroxide solution and dilute to 10 ml with ethyl alcohol (95 percent by volume), or rectified spirit.

D-2 PROCEDURE

Add 50 ml of the material to 500 ml of ice-cold (below 4 °C) distilled water in an unstoppered flask of 750 ml capacity. Shake gently until the formation of crystalline hydrate is complete. Titrate the mixture with the standard sodium hydroxide solution using 0.5 ml of bromophenol blue indicator.

D-3 CALCULATION

D-3.1 Acidity (as HBr), percent by mass = $\frac{0.162\ NV}{S}$

where,

N = normality of standard sodium hydroxide solution (*see* **D-1.1**);
V = volume, in ml, of standard sodium hydroxide solution required for the titration (*see* **D-2.1**); and
S = density of the material at 0 °C