भारतीय मानक **IS 5406 : 2024**

Indian Standard

यूरिया, उर्वरक ग्रेड — विशिष्टि

(दूसरा पुनरीक्षण)

Urea, Fertilizer Grade — Specification

(Second Revision)

ICS 65.080

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

June 2024 **Price Group 3**

Soil Quality and Fertilizers Sectional Committee, FAD 07

FOREWORD

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

This standard was first published in 1969. In the first revision issued in 1979, the limit of biuret content was incorporated.

In this revision, the following major changes have been made:

a) The different grades of urea namely, urea super granulated, urea (granular), *neem* coated urea, *neem* coated urea (granular) and urea briquettes have been incorporated; and

b) The test method for determination of oil in *neem* coated urea has been incorporated.

In the preparation of this standard, consideration has been given to the need for maintaining co-ordination with the specifications of the *Fertilizer* (*Control*) *Order*, 1985. However, this standard is subject to the provisions imposed under this order 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 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.

Indian Standard

UREA, FERTILIZER GRADE — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for urea, fertilizer grade.

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 conditions indicated were valid. All standard 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 460 (Part 1) : 2020	Test sieves — Specification: Part 1 Wire cloth test sieves (*fourth revision*)
IS 6092	Methods of sampling and test for fertilizers:
(Part 1) : 1985	Sampling (*first revision*)
(Part 2) : 1985	Determination of nitrogen (*first revision*)
(Part 6) : 1985	Determination of moisture and impurities (*first revision*)

3 REQUIREMENTS

3.1 Description

The material shall be free from visible impurities and dust.

3.2 Types

Urea shall be of the following types:

a) Urea (46 percent N);

b) Urea super granulated;

c) Urea (granular);

d) *Neem* coated urea;

e) *Neem* coated urea (granular); and

f) Urea briquettes.

3.3 Particle Size

3.3.1 *Urea* (46 *percent N*)

Minimum 80 percent of the material shall be retained between 1 mm and 2.8 mm IS sieve [*see* IS 460 (Part 1)].

3.3.2 *Urea Super Granulated*

Minimum 80 percent of the material shall be retained between 13.2 mm and 9.5 mm IS sieve [*see* IS 460 (Part 1)].

3.3.3 *Urea* (*Granular*)

Minimum 90 percent of the material shall be retained between 4 mm and 2 mm IS sieve [*see* IS 460 (Part 1)].

3.3.4 *Neem Coated Urea*

Minimum 80 percent of the material shall be retained between 1 mm and 2.8 mm IS sieve [*see* IS 460 (Part 1)].

3.3.5 *Neem Coated Urea* (*Granular*)

Minimum 90 percent of the material shall be retained between 2 mm and 4 mm IS sieve [*see* IS 460 (Part 1)].

3.3.6 *Urea Briquettes*

Minimum 90 percent of the material shall be retained between 5.7 mm and 3.8 mm IS sieve [*see* IS 460 (Part 1)].

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

4 PACKING

The material shall be packed in moisture proof bags as agreed to between the purchaser and the supplier. Each bag shall be securely closed.

5 MARKING

5.1 Each bag shall bear legibly and indelibly following information:

a) Name and type of the fertilizer;

b) Name of the manufacturer and recognized trade mark and or brand name, if any;

c) Percentage of total nitrogen by mass; and

d) Gross and net quantity in kg;

e) Month and year of manufacture; and

f) Any other requirements as specified under the *Fertilizer* (*Control*) *Order*, 1985 and 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 Representative samples of the material shall be drawn as prescribed in IS 6092 (Part 1).

6.2 Number of Tests

Tests for all the requirements given in Table 1 shall be conducted on the composite test sample.

6.3 Criteria for Conformity

For declaring the conformity of the lot to the requirements of this specification, the test results on the composite test sample shall satisfy all the requirements specified in Table 1.

7 TESTS

Tests for the requirements given under Table 1 shall be carried out according to methods prescribed in IS 6092 (Part 2) and (Part 6).

Table 1 Requirements for Urea, Fertilizer Grade

(*Clauses* 3.4, 6.2, 6.3 *and* 7)

Sl No.	Characteristic	Requirements for		Method of Test, Ref to
		Urea (46 % N)/Urea Super Granulated/Urea (Granular)/Urea Briquettes	*Neem* Coated Urea/*Neem* Coated Urea (Granular)	
(1)	(2)	(3)	(4)	(5)
i)	Total nitrogen, percent by mass, on dry basis, *Min*	46.0	46.0	IS 6092 (Part 2)
ii)	Moisture, percent by mass, *Max*	1.0	1.0	IS 6092 (Part 6)
iii)	Biuret, percent by mass, *Max*	1.5	1.5	IS 6092 (Part 6)
iv)	Oil content, percent by mass, *Min*	–	0.035	Annex A

ANNEX A

[*Table* 1, *Sl No* (iv)]

DETERMINATION OF OIL IN *NEEM* COATED UREA

A-1 PRINCIPLE

Oil present in *neem* coated urea is extracted with binary mixture of n-hexane and acetone and separated from the aqueous phase. The solvent layer is then evaporated and the residue is weighed as oil.

A-2 REAGENTS

A-2.1 Binary Mixture of n-Hexane and Acetone — AR/GR grade

A-2.2 Dilute HCl — Prepare 1 : 1 HCl by adding 100 ml concentrated HCl to 100 ml distilled water

A-3 PROCEDURE

A-3.1 Weigh accurately about 200 g *neem* coated urea and transfer it to a 1 000 ml separating funnel.

A-3.2 Add about 250 ml to 300 ml warm distilled water and shake gently to dissolve urea.

A-3.3 Add 50 ml binary mixture of n-hexane and acetone and acidify with 5 ml dilute HCl. Mix well and separate the oily layer.

A-3.4 Repeat the extraction of oil from the aqueous-layer, with-fresh 50 ml binary mixture of n-hexane and acetone and mix the oily binary mixture of n-hexane and acetone layer with that obtained in **A-3.3**.

A-3.5 Give washings to this oily binary mixture of n-hexane and acetone with warm distilled water till it is completely free from urea.

A-3.6 Transfer the binary mixture of n-hexane and acetone layer to an oil free 100 ml beaker. Give 2 to 3 washings to the separating funnel with about 10 ml binary mixture of n-hexane and acetone each time to transfer completely the oil from the separating funnel to the beaker.

A-3.7 Heat the contents in the beaker on a water bath to break any emulsion formed. Filter this oily-layer into another previously weighed 100 ml beaker. Give two to three, 10 ml binary mixture of n-hexane and acetone washings to the filter-paper to transfer the oil completely into the weighed beaker.

A-3.8 Evaporate binary mixture of n-hexane and acetone by keeping beaker on a water bath at 105 °C for about two hours. Cool in a desiccator and weigh the contents to a constant weight. Find out the weight of this oil in the beaker.

A-3.9 Carry out a blank test with binary mixture of n-hexane and acetone (with equivalent amount consumed in the test) for oily content present, if any, and subtract the same from the test results.

A-4 CALCULATION

$$\text{Oil content, percent by mass} = \frac{(W - W_b)}{10\,W}$$

where

W = mass, in mg, of the oil in the beaker;

W_b = mass, in mg, of oil in the blank; and

W = mass, in g, of the sample taken in.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: FAD 07 (19985).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Manakalya, 4th Floor, NTH Complex (W Sector), F-10, MIDC, Andheri (East), Mumbai 400093	283 25838

Branches : AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYNA, HUBLI, HYDERABAD, JAIPUR, JAMMU & KASHMIR, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.

Published by BIS, New Delhi