

इंटरनेट

मानक

### Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 498 (2003): Grading for Vacuum Pan (Plantation White)  
Sugar [FAD 2: Sugar Industry]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



भारतीय मानक  
वैक्युम पैन चीनी (रोपित श्वेत चीनी) का वर्गीकरण  
( पाँचवा पुनरीक्षण )

*Indian Standard*  
GRADING FOR VACUUM PAN  
(PLANTATION WHITE) SUGAR  
( *Fifth Revision* )

ICS 67.180.10

© BIS 2003

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

## FOREWORD

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

This standard was first published in 1953 as a tentative standard. The standard was first revised in 1961; the tentative nature of the standard was removed and the number of grades was reduced from 34 to 16. Subsequently, the standard was given its second revision in 1963, abolishing the colour grade 27 and introducing a higher colour grade, namely, 30. However, the standard was later amended to reincorporate the colour grade 27. Subsequently, in view of the improvement in the quality of sugar produced in India, the Government of India decided to abolish colour grade 27 and grade 13 for crushed sugar thus reducing the number of grades to 15. In 1970 again, the standard was revised to abolish colour grade 28 thus reducing the number of grades to 10 only.

Subsequently, the Government of India, on the recommendations of the Development Council for Sugar Industry, decided to bring down the number of grades to 6, in two colour series, namely, 29 and 30 and for three grain sizes, namely, L, M and S. Later in 1996, keeping pace with the improvement in the quality of sugar produced by the Indian Sugar Industry, the Development Council for Sugar Industry decided to introduce a higher colour series, namely, 31 in L, M and S grain sizes.

Further from October 2002, the Development Council for Sugar Industry decided to introduce an additional grade of sugar having grain size below 600 micron in 31 colour series looking to the demand by soft drinks manufacturers. This grade is designated as SS - 31 (Super Small). Now there are ten grades of marketable sugar.

In prescribing the requirements for different grades of sugar given in this standard, reference has been made to the material standard sealed samples of sugar prepared by the National Sugar Institute, Kanpur. These sealed samples used for visual comparison in determining the grade of sugar, are indispensable in following the grading process laid down in this standard. The sets of such physical standards for visual comparison and grade determination, which will now be 10 in number for crystal sugar, will be issued by the National Sugar Institute, Kanpur, in the same manner as in the past.

In the formulation of this standard, the Director, National Sugar Institute, Kanpur and his staff provided basic information and their co-operation is gratefully acknowledged.

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.

**AMENDMENT NO. 1 JUNE 2011**  
**TO**  
**IS 498 : 2003 GRADING FOR VACUUM PAN (PLANTATION WHITE) SUGAR**

*(Fifth Revision)*

*(Foreword, para 4, last line)* — Substitute 'eight' for 'ten'.

*(Foreword, para 5, fifth line)* — Substitute '8' for '10'.

*(Page 1, clause 4.1)* — Substitute the following for the existing:

**4.1 Crystal Sugar** — For crystal sugar, there shall be 8 grades under 4 grain size groups L, M, S and SS. Each grain size group having two colours, namely, 31 and 30 except S which shall have three colours 31, 30 and 29 and SS which shall have only colour 31.

**4.1.1** The 8 grades shall be as given below:

ISS Grade L	—	31
ISS Grade L	—	30
ISS Grade M	—	31
ISS Grade M	—	30
ISS Grade S	—	31
ISS Grade S	—	30
ISS Grade S	—	29
ISS Grade SS	—	31

NOTE — The grade of sugar in terms of this standard may be designated, for example, as Crystal sugar ISS Grade L-31, ISS Grade L-30, etc. In the abbreviated form, the words 'Crystal Sugar ISS' need not be used. However, the appellation for grain size shall always precede that for colour, for example, L-31, M-31 and not 31- L, 31- M, etc.'

*[Page 2, clause 7.2(c)]* — Substitute 'Net quantity' for 'Net mass'.

*[Page 2, clause 7.2(e)]* — Add the following after SI No. (e):

**Amend No. 1 IS 498 : 2003**

- f) 'Any other requirements as given under the *Standards of Weights and Measures (Packaged Commodities) Rules, 1977* and the *Prevention of Food Adulteration Act, 1955* and the Rules framed thereunder.'

(FAD 2)

---

Reprography Unit, BIS, New Delhi, India

# Indian Standard

## GRADING FOR VACUUM PAN (PLANTATION WHITE) SUGAR

### ( Fifth Revision )

#### 1 SCOPE

This standard prescribes the requirements for various grades of sugar manufactured in the vacuum pan factories in India and the methods for grading such sugar on the basis of its grain size and colour.

#### 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:

<i>IS No.</i>	<i>Title</i>
460 (Part1):1985	Specification for test sieves: Part 1 Wire cloth test sieves ( <i>third revision</i> )
1943:1995	Textiles—A-twill Jute bags— Specification ( <i>second revision</i> )
4905:1968	Methods for random sampling
5982:2003	Plantation white sugar— Specification ( <i>first revision</i> )
11102:1984	Specification for glass bottles for sugar standards

#### 3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 **Crystal Sugar**—Sugar in crystal form which has a minimum polarization of 99.5°Z and loss on drying of not more than 0.10 percent as determined by the methods prescribed in IS 5982.

3.2 **ISS**—Indian sugar standard

3.3 **NSI**—National sugar institute, Kanpur.

3.4 **L, M, S and SS**—Large, medium, small and super small.

#### 4 GRADES

4.1 **Crystal Sugar**—For crystal sugar, there shall be 10 grades under 4 grain-size groups L, M, S and SS, each grain size group having three colours, namely, 31, 30 and 29 except SS which shall have only 31 colour.

4.1.1 The 10 grades shall be as given below:

ISS Grade L	– 31
ISS Grade L	– 30
ISS Grade L	– 29
ISS Grade M	– 31
ISS Grade M	– 30
ISS Grade M	– 29
ISS Grade S	– 31
ISS Grade S	– 30
ISS Grade S	– 29
ISS Grade SS	– 31

NOTE—The grade of sugar in terms of this standard may be designated, for example, as Crystal Sugar ISS Grade L-31, ISS Grade L-30, etc. In the abbreviated form, the words 'Crystal Sugar ISS' need not be used. However, the appellation for grain-size shall always precede that for colour, for example, L-31, M-31 and not 31-L, 31-M, etc.

#### 5 REQUIREMENTS

5.1 For various grades of crystal sugar enumerated under 4.1.1, the requirements shall be as given in Table 1 in respect of grain-size and Table 2 in respect of colour.

NOTE—Crystal sugar which is below the specified requirements of Tables 1 and 2, either in respect of grain-size or of colour, shall be designated as 'Below ISS Grade'.

5.2 Sugar produced in a particular season shall be graded in terms of ISS prepared by NSI for that particular season ( *see 7.2* ).

#### 6 MATERIAL STANDARD SEALED SAMPLES

6.1 The material standard sealed samples for visual comparison, consisting of the 10 grades enumerated under 4 shall be prepared and supplied by NSI and the period of validity for such sealed samples shall be as notified by NSI.

6.1.1 The sealed samples shall be contained in colourless square glass bottles of the design and dimensions given in IS 11102. These bottles shall be thoroughly cleaned and dried before filling. In order to prevent movement of sugar within the bottles, they shall be tightly filled up to the neck and then corked. The cork shall be covered with paraffin wax, over which a metal capsule shall be fixed with a capsuling machine. The capsule shall be covered all round the neck of the



**Table 1 Requirements for Grain-Size Group of Crystal Sugar**  
(Clause 5.1)

SI No.	Grain-Size Group Designation	Retained on		Percent Retained by Mass, Min
		IS Sieve	Tyler Sieve	
(1)	(2)	(3)	(4)	(5)
i)	L	1.70 mm	10	70
		850 micron	20	95
		600 micron	28	99
ii)	M	1.18 mm	14	70
		600 micron	28	95
		425 micron	35	99
iii)	S	600 micron	28	70
		300 micron	48	95
		212 micron	65	99
iv)	SS	212 micron	65	70
		175 micron	80	95
		147 micron	100	99

**Table 2 Requirements for Colour of Crystal Sugar**  
(Clause 5.1)

SI No.	Colour Designation	Colour
(1)	(2)	(3)
i)	31	Equal to or whiter than the sealed samples ( see 6 ) of Colour 31
ii)	30	Equal to or whiter than the sealed samples ( see 6 ) of Colour 30 but inferior to Colour 31
iii)	29	Equal to or whiter than the sealed samples ( see 6 ) of Colour 29 but inferior to Colour 30

bottle with a paper band. Over the joint of the paper band, a seal bearing the mark 'ISS, NSI' shall be pasted. The paper band shall also bear the signature of the Director, NSI.

**6.1.2** The finished sugar standard bottle together with the metal capsule, paper band with the seal and label indicating the grade number, season, etc, shall appear as given in IS 11102.

**6.1.3** The sealed samples for each grade of crystal sugar shall contain only the grains specified in Table 1, namely, 100 percent of the crystals conforming to the requirements specified in Table 3.

**6.1.4** Along with the 10 sealed samples, an empty bottle of the same quality of glass and of the same dimensions, together with a cork, shall be supplied.

**6.1.5** All the sealed samples together with the empty bottle shall be kept in a wooden box. The box, when not in use, shall be kept closed in a cool and dry place.

## 7 PACKING AND MARKING

### 7.1 Packing

Crystal sugar shall be packed in clean, sound and new

A-twill jute bags (see IS 1943). The bags may be lined with polyethylene film. The mouth of each bag shall be either machine-stitched or rolled over and hand-stitched. If hand-stitched, the stitches shall be in two rows with at least 14 stitches in each row.

### 7.2 Marking

Each bag shall be suitably marked so as to give the following information:

- Name of the place where the producer of sugar carries on the business of manufacture of sugar by the vacuum pan;
- Grade of sugar at the time of packing in terms of Indian Sugar Standards in force at the time of manufacture, ensuring the quality of sugar at the time of delivery;
- Net mass of sugar in the bag;
- Year of packing (year being the period beginning on the 1st of October and ending on 30th day of September of the following year); and
- In the case of sugar obtained from the re-processing of : (1) Damaged or defective or

**Table 3 Grain-Size Requirements for Crystals in Sealed Samples***(Clause 6.1.3)*

Sl No.	Grade Designation	Passing Through		Retained on	
		IS Sieve mm	Tyler Sieve	IS Sieve mm	Tyler Sieve
(1)	(2)	(3)	(4)	(5)	(6)
i)	L - 31 L - 30 L - 29	2.36	8	1.70	10
ii)	M - 31 M - 30 M - 29	1.70	10	1.18	14
iii)	S - 31 S - 30 S - 29	1.18	14	0.60	28
iv)	SS - 31	0.60	28	0.212	65

rori or brown sugar of any previous season, or (2) Sugar-house products left in process at the end of any previous year and not already included in the production of that year, the marking on the bag shall indicate the year in which it was re-processed.

## 8 SAMPLING

Representative samples of crystal sugar shall be drawn and the criteria for conformity to this standard shall be established, according to the method prescribed in Annex A.

## 9 TESTS

**9.1** The tests for the determination of grain-size group shall be carried out as given in Annex B.

**9.2** In case of demand from either the purchaser or the vendor for more accurate determination of grain-size group than is possible by the method prescribed in Annex B, the composite sample shall be subjected to sieve test by the method prescribed in Annex C.

**9.3** In case of dispute, the specific issue in dispute shall be referred to NSI. The decision of NSI shall be final.

## ANNEX A

(Clause 8)

## SAMPLING OF GRADED SUGAR

## A-1 GENERAL REQUIREMENTS OF SAMPLING

**A-1.0** In drawing, preparing, storing and handling of samples, the following precautions and directions shall be observed.

**A-1.1** Samples shall be taken in a protected place not exposed to damp air, dust or soot.

**A-1.2** The sampling instruments shall be clean and dry when used.

**A-1.3** Precautions shall be taken to protect the samples, the material being sampled, the sampling instruments and the containers for samples from adventitious contamination.

**A-1.4** The samples shall be placed in clean, dry, and moisture-proof containers.

**A-1.5** The sample containers shall be sealed airtight after filling, and marked with full details of sampling, the date of sampling, grade of sugar, season of manufacture, name and place of factory and other important particulars of the consignment.

**A-1.6** Samples shall be protected from light as far as possible.

## A-2 SCALE OF SAMPLING

## A-2.1 Lot

All the bags in a single consignment declared to contain sugar of grade one shall constitute a lot. If a consignment is declared to consist of different grades, the bags belonging to the same grade shall be grouped together and each such group shall constitute a separate lot.

**A-2.1.1** Samples shall be tested separately for each lot for ascertaining the conformity of the graded sugar.

**A-2.2** The number of bags to be selected from the lot shall depend on the size ( $N$ ) of the lot and shall be in accordance with col 1 and 2 of Table 4.

**A-2.2.1** These bags shall be selected at random from the lot to ensure the randomness of selection, a random number table ( *see* IS 4905 ) as agreed to between the purchaser and the supplier shall be used. In case such a table is not available, the following procedure shall be

used. Starting from any bag, count all the bags as 1, 2, 3 . . . . . up to  $r$  and so on in one order, where  $r$  is equal to the integral part of  $N/n$  [  $N$  being the total number of bags in the lot and  $n$  the number of bags to be selected ( *see* Table 4 ). Every  $r$ th bag thus counted shall be withdrawn.

**A-2.2.2** In case the bags are arranged in stacks in a godown, the bags ( *see* Table 4 ) may be taken for sampling purposes from all exposed sides of the stack.

**Table 4 Number of Bags to be Selected from the Lot for Sampling**

( Clauses A-2.2, A-2.2.1 and A-2.2.2 )

Sl No.	Lot Size	No. of Bags to be Sampled
	$N$	$n$
(1)	(2)	(3)
i)	8 to 25	8
ii)	26 to 100	13
iii)	101 to 500	32
iv)	501 to 1 000	50
v)	1 001 and above	80

## A-3 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

**A-3.1** From each selected bag about 30 g in all of the material from the top, middle and bottom parts shall be drawn. The material thus collected shall be mixed thoroughly to constitute a composite sample of the lot. Cone and quarter this quantity repeatedly till about 600 g of the material is left. If the number of bags is too small to obtain about 600 g of sample before sampling, more material shall be drawn in such a manner that all the bags are equally represented. This composite sample shall be divided into three equal parts; one for the purchaser, one for the supplier and the third for the referee; and sealed air-tight with the particulars as given in **A-1.5**.

**A-3.2** The composite sample prepared as under **A-3.1** shall be tested for determination of its grade in the manner as prescribed in Annex B. The lot shall be declared as conforming to that grade as obtained from **B-2.2.1** or **B-2.2.3**.

## ANNEX B

( Clauses 9.1, 9.2 and A-3.2 )

### METHOD FOR DETERMINATION OF GRADE

#### B-1 GENERAL

**B-1.1** The tests for the determination of grade shall be carried out by visual comparison of the sample under examination with the sealed samples prepared and supplied by NSI ( *see* 5 ). In cases where visual comparison is inadequate, the grain-size group shall be determined by sieve test ( *see* Annex C ).

**B-1.2** Visual comparison shall be made in diffused daylight and not in direct sunlight. In the absence of natural illumination, white artificial light produced by daylight bulbs and diffused by means of frosted glass may be used.

#### B-2 PROCEDURE

**B-2.1** Place all the 6 bottles of the sealed samples for crystal sugar in separate grain-size groups on a large sheet of white paper. In each grain-size group, arrange the two colour grade bottles in the descending order of colour.

**B-2.2** Fill the empty bottle supplied with the sealed samples to the neck with the composite sample of sugar under examination ( *see* A-3.1 ). Cork the bottle and by placing it alongside the sealed samples, determine by visual comparison to which grain-size group the

majority of crystals in the sample under examination correspond to. Then, similarly find out again by visual comparison, the sealed sample for colour in that particular grain-size group to which the sample under examination corresponds.

**B-2.2.1** The grade of this sealed sample shall be the grade of the sample under examination.

**B-2.2.2** In case the grain-size or colour or both do not correspond with any one of the sealed samples, one of the following situations may arise:

- a) Matching may be obtained in respect of grain-size but not in respect of colour;
- b) Colour may match, but not the grain-size; and
- c) Neither the grain-size nor the colour may match.

**B-2.2.3** The sample under examination would, in such situations, fail either between two grain-size groups or two colours or both. In all these cases, the grade of the sample shall be that of the grade of the next lower sealed sample. To illustrate — if the grain-size is bigger than Group S but smaller than M and if the colour is better than 29 but inferior to 30, the grade for sugar under examination shall be S 29.

## ANNEX C

( Clauses 9.2 and B-1.1 )

### SIEVE TEST FOR DETERMINING GRAIN-SIZE GROUP OF CRYSTAL SUGAR

#### C-1 GENERAL

For referee purposes and when visual comparison of grain-size group as given in Annex B is considered inadequate, the grain-size group shall be determined by this method ( *see also* 9.2 ).

#### C-2 TEST SIEVES

Test sieves conforming to IS 460 ( Part 1 ) and of diameter 200 mm shall be used.

#### C-3 PROCEDURE

**C-3.1** Determine approximately, by visual comparison, the highest grain-size group in which the sample of sugar under examination is likely to fall. Select three test sieves corresponding to that grade ( *see* Table 1 ) and nest them together in the descending order of the mesh size, with the coarsest sieve at the top and with a receptacle at the bottom. Weigh accurately 100 g of sugar out of the composite sample ( *see* A-3.1 ) of sugar

under examination and transfer this quantity on to the top sieve. Cover the top sieve, place the nest of sieves and the receptacle in a suitable mechanically driven sieve-shaker and shake it continuously for 5 min. Brush the fractions of sugar from each sieve separately into weighing dishes and weigh the fractions accurately. The weight of each fraction in grams shall be the percentage of sugar retained on different sieves from which cumulative percentages may be calculated and compared with figures given in col 4 of Table 1 for the corresponding group. If the figures do not comply with the limits prescribed for the grade in Table 1, repeat the above process of sieving by using a fresh quantity of 100 g of the composite sample and another set of three sieves of a lower or higher grade as need be. The grain-size group thus determined shall be the grain-size group of the sample under examination.

**C-3.1.1** If the sample under examination is found below grain-size Group S, the sugar shall be considered as 'Below ISS Grade'.

## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publication), BIS.

### 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 latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. FAD 2 (1372).

### 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

Telegrams: Manaksanstha  
(Common to all offices)

#### Regional Offices:

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg  
NEW DELHI 110002

Telephone

{ 2323 7617  
{ 2323 3841

Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi  
KOLKATA 700054

{ 2337 8499, 2337 8561  
{ 2337 8626, 2337 9120

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

{ 60 3843  
{ 60 9285

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113

{ 2254 1216, 2254 1442  
{ 2254 2519, 2254 2315

Western : Manakalaya, E9 MIDC, Marol, Andheri (East)  
MUMBAI 400093

{ 2832 9295, 2832 7858  
{ 2832 7891, 2832 7892

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD.  
GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR.  
NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.