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IS 1163 (1992): Chocolates [FAD 6: Stimulant Foods]

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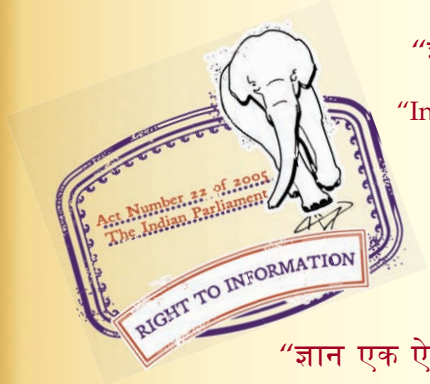

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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 1163 : 1992
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भारतीय मानक

चोकलेट — विशिष्टि

(दूसरा पुनरीक्षण)

Indian Stadnard

CHOCOLATES — SPECIFICATION

(Second Revision)

UDC 663·915/·916

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

July 1992

Price Group 6

AMENDMENT NO. 1 DECEMBER 1999
TO
IS 1163 : 1992 CHOCOLATES — SPECIFICATION

(Second Revision)

[*Page* 2, *clause* **4.1.1**(d)] — Substitute 'Spices and condiments' *for* 'Spices'.

[*Page* 2, *clause* **4.1.3.1**(b)] — Substitute '40% *m/m*' *for* '30% *m/m*'.

[*Page* 2, *clause* **6.2**(b)] — Substitute 'Name and address of manufacturer or packer' *for* 'Indication of the source of manufacture'.

(FAD 23)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 JUNE 2011
TO
IS 1163 : 1992 CHOCOLATES — SPECIFICATION

(Second Revision)

[*Page* 2, *clause* **6.2**(d)] — Substitute 'Net quantity' *for* 'Net mass'.

[*Page* 3, *Table* 1, *Sl No*. (iv), *col* 7] — Substitute '10.5' *for* '10'.

(FAD 6)

Reprography Unit, BIS, New Delhi, India

FOREWORD

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

This standard was first published in 1958, and covered requirements for chocolates manufactured for covering purposes only. In 1971 the standard was revised and other types of chocolates were incorporated. With technological advances in this field, new varieties of chocolates are being manufactured in the country. The standard is therefore being revised further to incorporate these varieties which include filled, composite and white chocolate. Further, coating chocolates based on vegetable fats are deleted from the purview of this standard and a separate standard has been formulated on these (IS 11924 : 1992). In addition, other processed food items covered under other Indian Standards are excluded from the purview of this standard and include items such as chocolate biscuits (*see* IS 1011 : 1981), chocolate wafers (*see* IS 2397 : 1978), chocolate ice cream (*see* IS 2802 : 1964), etc.

The organoleptic evaluation of the quality of chocolates is based essentially on its smoothness, taste, and flavour. To give a smooth tasting effect, a high cocoa butter content and disintegration of cocoa matter and sugars to a very fine size are essential so that the full flavour of the chocolate becomes apparent. In tropical countries, however, there is limitation to the content of cocoa butter because of its low melting point and consequent tendency to separate out. To overcome this, certain emulsifiers, such as, lecithin are added.

Various methods for determination of cocoa solids are under investigation. Till such time that a suitable method is incorporated in the standard, it is required that the manufacturer maintains records of the cocoa solids added during manufacture.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final vlaue, 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.

Indian Standard

CHOCOLATES — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard prescribes the requirements and methods of sampling and test for chocolates (*see* 3.1).

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
253 : 1985	Specification for edible common salt (*third revision*)
265 : 1987	Hydrochloric acid (*third revision*)
376 : 1986	Sodium hydroxide, analytical reagent (*third revision*)
548 (Part 1) : 1964	Methods of sampling and test for oils and fats : Part 1 Sampling, physical and chemical tests (*revised*)
1070 : 1992	Reagent grade water (*third revision*)
4905 : 1968	Methods for random sampling
5403 : 1969	Method for yeast and mould count in foodstuffs
5887	Methods for detection of bacteria responsible for food poisoning
(Part 1) : 1976	Isolation, identification and enumeration of *Escherichia coli* (*first revision*)
(Part 2) : 1976	Isolation, identification and enumeration of *Staphylococcus aureus and Faecal streptococci* (*first revision*)
(Part 3) : 1976	Isolation and identification of *Salmonella* and *Shigella* (*first revision*)
7224 : 1985	Specification for iodized salt (*first revision*)

3 TYPES

3.1 The material shall be of the following types:

a) Milk chocolate,
b) Milk covering chocolate,
c) Plain chocolate,
d) Plain covering chocolate,
e) White chocolate,
f) Filled chocolate,
g) Composite chocolate, and
h) Blended chocolate.

3.1.1 *Milk Chocolate*

Milk chocolate is the homogeneous product obtained by an adequate process of manufacture from one or more of cocoa nib, cocoa mass, cocoa press cake, cocoa powder including low-fat cocoa powder with sugar and milk solids including milk fat and cocoa butter.

3.1.2 *Milk Covering Chocolate*

Milk chocolate as defined in 3.1.1 but suitable for covering purposes.

3.1.3 *Plain Chocolate*

Plain chocolate is the homogeneous product obtained by an adequate process of manufacture from one or more of cocoa nibs, cocoa mass, cocoa press cake, cocoa powder including low-fat cocoa powder with sugar and cocoa butter.

3.1.4 *Plain Covering Chocolate*

Plain chocolate as defined in 3.1.3 but suitable for covering purposes.

3.1.5 *White Chocolate*

White chocolate means a homogeneous product made from cocoa butter, milk solids including milk fat and sugar.

3.1.6 *Filled Chocolate*

Filled chocolate is a product having an external coating of chocolate with a centre clearly distinct through its composition from the external coating. Filled chocolate does not include flour confectionery, pastry and biscuit products.

3.1.7 *Composite Chocolate*

Composite chocolate is a product containing at least 60 percent *m/m* of chocolate and edible wholesome substances such as fruits, nuts, etc.

3.1.8 *Blended Chocolate*

Blended chocolate is a blend of milk and plain chocolates in varying proportions.

4 INGREDIENTS

4.1 In addition to the ingredients given under 3, the chocolates may contain one or more of the substances given below.

4.1.1 *Milk Chocolates, Plain Chocolates and White Chocolates*

a) Edible salt — *See* IS 253 : 1985 or IS 7224 : 1985;

b) Permitted flavouring agents;
c) Permitted emulsifying agents; and
d) Spices.

4.1.2 *Filled Chocolate*

Ingredients used in the centre shall comply with the requirements of IS concerning them in so far as such standards exist. In addition to these ingredients, filled chocolates may contain the following additives:

a) Permitted anti-oxidants;
b) Permitted emulsifying and stabilizing agents;
c) Permitted preservatives;
d) Permitted food colours;
e) Permitted flavouring agents;
f) Permitted sequestering agents;
g) Permitted buffering agents;
h) Permitted acidulants such as citric acid, tartaric acid, malic acid (all food grade); and
j) Any other permitted food additives.

4.1.3 *Composite Chocolates*

Composite chocolates may contain one or more of the ingredients as in the case of milk, plain or white chocolates (*see* 4.1.3) and edible wholesome ingredients.

4.1.3.1 Added substances are subject to the following maximum limits:

a) Added in the form of visible and separate pieces	40% *m/m*
b) Added in a form so as to be in practice indiscernible	30% *m/m*
c) Added both in the form of visible and separate pieces and in a form so as to be in practice indiscernible.	40% *m/m*

5 REQUIREMENTS

5.1 Description

The material shall be a smooth homogeneous cocoa product obtained by the grinding of cocoa nibs from mature, sound and wholesome cocoa beans, which have been properly fermented, dried and roasted. This may also be obtained by dispersing cocoa butter in low-fat cocoa powder. The chocolate shall not contain any vegetable fat other than cocoa butter.

5.1.1 The material shall have a colour, taste and flavour characteristic of good chocolate and shall be free from rancidity or other off odour, insect and fungus infestation, filth, added colouring matter except in the case of filled chocolates, adulterants, and harmful or injurious foreign matter.

5.2 Milk Chocolates, Plain Chocolates and White Chocolates

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

5.2.1 Where soluble extract of coffee is added as a flavouring agent, the amount should be minimum 1.5 percent.

5.3 Filled Chocolate

5.3.1 In the case of filled chocolates the coating shall be made of chocolate that meets the requirements of one or more of the chocolate types listed under 3.1.1 to 3.1.5 and 3.1.8.

5.3.2 The amount of chocolate component of the coating shall not be less than 25 percent of the total mass of the finished product, when tested by the method given in Annex F.

5.4 Composite Chocolates

5.4.1 Composite chocolate shall not contain less than 60 percent (*m/m*) of chocolate which meets the requirements of one or more of the chocolate types listed under 3.1.1 to 3.1.5 and 3.1.8.

The chocolate shall contain one or more edible wholesome substances which shall not be less than 10 percent of the total mass of the finished product, when determined by the method given in Annex G.

5.5 The chocolates shall also comply with the microbiological requirements laid down in Table 2.

6 PACKING AND MARKING

6.1 Packing

The bulk chocolates shall be packed in clean, sound and odour-free containers made of tin-plate, plastic, grease-proof paper, aluminium foil, cellulose film or other suitable flexible packing material (food grade) as agreed to between the purchaser and the vendor. In case of moulded chocolates bars, each unit of chocolate shall be wrapped in aluminium foil, printed or otherwise, and may be lined with glassine or grease-proof paper. Such units may be overwrapped. These units, in turn, shall be collectively packed in clean and odour-free cartons.

6.2 Marking

The following particulars shall be clearly and indelibly marked on the label of each container:

a) Name of the material, including the type;
b) Indication of the source of manufacturer;
c) Batch or code number;
d) Net mass;
e) List of ingredients in descending order of composition;
f) Declaration of:
   i) Minimum cocoa content except in case of white chocolates (optional),
   ii) Milk solids content in case of milk chocolates and white chocolates (optional),

Table 1 Requirements for Chocolates

(*Clause* 5.2)

Sl No.	Characteristics	Requirements for						Method of Test, Ref to Annex
		Milk Chocolate	Milk Covering Chocolate	Plain Chocolate	Plain Covering Chocolate	White Chocolate	Blended Chocolate	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Total fat (on dry basis), percent by mass, *Min*	25	29	25	29	25	25	A
ii)	Milk fat (on dry basis), percent by mass, *Min*	2	2	—	—	2	—	B
iii)	Cocoa solids (on moisture-free and fat-free basis), percent by mass, *Min*	2.5	2.5	12	12	—	3.0	*see* NOTE
iv)	Milk solids (on moisture-free and fat-free basis), percent by mass:							
	Min	10.5	10.5	—	—	10	1	C
	Max	—	—	—	—	—	9	
v)	Sugar (sucrose) (on dry basis), percent by mass, *Max*	55	55	60	60	55	60	D
vi)	Acid insoluble ash (on moisture, fat and sugar-free basis), percent by mass, *Max*	0.2	0.2	0.2	0.2	0.2	0.2	E

NOTE — Cocoa solid content shall be calculated from records maintained by the manufacturer (*see* Foreword).

Table 2 Microbiological Requirements of Chocolates
(Clause 5.5)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	*Staphylococcus aureus*	absent (in 10 g)	IS 5887 (Part 2) : 1976
ii)	*Salmonella*	absent (in 25 g)	IS 5887 (Part 3) : 1976
iii)	*E. Coli*	absent (in 10 g)	IS 5887 (Part 1) : 1976
iv)	*Yeast and mould count, per gram, Max*	100	IS 5403 : 1969

iii) In the case of filled chocolate, the type of chocolate of which the coating is made and the nature of centre to be specified, and

iv) Composition of blends for blended chocolates;

g) Month and year of manufacture;

h) The statement contains permitted colours and added flavours, if added;

j) The words 'Best before____' (date to be decided by the manufacturer) (optional); and

k) Any other details required under the *Standards of Weights and Measures (Packaged Commodities) Rules/Prevention of Food Adulteration Rules, 1955.*

6.2.1 Each container may also be marked with the Standard Mark.

7 SAMPLING

7.1 Representative samples of the material shall be drawn and criteria for ascertaining conformity of the material to the requirements of the specification shall be as prescribed in Annex J.

8 TESTS

8.1 Tests shall be carried out as prescribed in **5.1, 5.3, 5.4,** and appropriate Annexes and Indian Standards specified in Tables 1 and 2 respectively.

8.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070 : 1992) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemical that do not contain impurities which affect the test results.

ANNEX A

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

DETERMINATION OF TOTAL FAT

A-1 APPARATUS

A-1.1 Buchner Funnel — of 9 cm size.

A-1.2 Soxhlet Apparatus — with 250-ml flat-bottom flask.

A-2 REAGENTS

A-2.1 Hydrochloric Acid — sp gr 1.16 (*see* IS 265 : 1987).

A-2.2 Filter-Aid — a suitable brand.

A-2.3 Petroleum Ether — redistilled below 60°C.

A-2.4 Sodium Sulphate — anhydrous.

A-3 PROCEDURE

A-3.1 Preparation of Sample

Melt the product in a beaker at a temperature not exceeding 45°C. Pour the melted sample on a marble slab and mix thoroughly with a spatula till product is solidified. Use this prepared sample, in the various tests.

A-3.2 Weigh accurately about 10 to 20 g of the prepared sample into a 400-ml beaker and add 30 ml of water and 25 ml of hydrochloric acid. Heat for 30 minutes on a steam-bath, with stirring. Add 5 g of filter-aid and 50 ml of ice-cold water and chill for 30 minutes in ice-cold water. Fit a heavy piece of linen into the Buchner funnel and moisten with water. Apply gentle suction and pour over it a suspension of 3 g of filter-aid in 30 ml of water. Filter the hydrolyzed mixture by gentle suction, rinsing the beaker three times with ice-cold water, taking care to leave a layer of liquid on the filter.

Finally wash three times with ice-cold water and suck dry. Transfer the filter-cake from the funnel to the original beaker, using a small piece of filter paper to transfer any material adhering to the funnel. Wash the funnel with petroleum ether into the beaker and evaporate the ether on a steam-bath. Break up the cake with a glass rod and allow it to remain on the steam-bath until the contents are so dry as to enable pulverizing easily. Place in an oven at 100 ± 2°C for one hour. Add 15 g of powdered anhydrous sodium sulphate and mix well.

A-3.2.1 Transfer the mixture to the fat-extraction thimble of the Soxhlet apparatus. Wash the beaker with 50 ml of petroleum ether and transfer the washings to the thimble. Extract the fat with petroleum ether so that at least 300 ml have been circulated. Transfer the extract to a tared dish and evaporate the petroleum ether on a steam-bath. Dry the fat till the difference in weight between two successive weighings is not more than one milligram.

NOTE — In the case of plain covering chocolate, extract the fat in a Soxhlet apparatus as prescribed in A-3.2.1 using 10 g of the prepared sample (A-3.1).

A-4 CALCULATION

A-4.1 Total fat (on moisture-free basis) $= \dfrac{10\,000\,w}{W(100 - M)}$

where

w = mass, in g, of fat;

W = mass, in g, of prepared sample taken for the test; and

M = moisture, percent by mass, in the prepared sample (*see* Annex H).

ANNEX B

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

DETERMINATION OF MILK FAT

B-1 PROCEDURE

B-1.1 Extract about 7 g of fat from the chocolate sample using Soxhlet extraction method (*see* Annex A). Determine the Reichert Meissl value of the extracted fat as given in 18 of IS 548 (Part 1) : 1964.

B-2 CALCULATIONS

B-2.1 Milk fat (on dry basis), percent by mass $= \frac{RV - 0.2}{26} \times F$

where

RV = Reichert value obtained (*see* E-1.1) ;
F = Total fat percent in sample (*see* A-4.1) ;
0.2 = Reichert value of cocoa butter; and
26 = Reichert value of milk fat.

ANNEX C

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

DETERMINATION OF MILK SOLIDS

C-0 Two methods for determination of milk solids have been given.

C-1 METHOD 1

Method 1 is to be used for determination of milk solids for products not heat treated and method 2 for products which have undergone heat treatment.

C-1.1 Reagents

C-1.1.1 *Petroleum Ether*

C-1.1.2 *Sodium Oxalate Solution* — approximately one percent (*m/v*).

C-1.1.3 *Glacial Acetic Acid*

C-1.1.4 *Tannic Acid Solution* — approximately 10 percent (*m/v*).

C-1.1.5 *Concentrated Sulphuric Acid* — sp gr 1.84.

C-1.1.6 *Catalyst Mixture* — 1.0 g of selenium and 5.0 g of mercuric oxide intimately mixed together.

C-1.1.7 *Alkali Solution* — prepared by dissolving 300 g of sodium hydroxide (*see* IS 376 : 1986) and 10 g of sodium thiosulphate in 500 ml of water.

C-1.1.8 *Standard Sulphuric Acid* — approximately 0.1 N.

C-1.1.9 *Methyl Red Indicator Solution* — Dissolve one gram of methyl red in 200 ml of rectified spirit (95 percent by volume).

C-1.1.10 *Standard Sodium Hydroxide Solution* — approximately 0.1 N.

C-1.2 Procedure

C-1.2.1 Weigh accurately about 10 g of the prepared sample (A-3.1) and extract the fat by shaking and centrifuging with two consecutive portions each of 100 ml of petroleum ether. Remove the last traces of ether from the extracted residue in an air-oven. Shake the de-fatted residue with 100 ml of water for 4 minutes and then add 100 ml of sodium oxalate solution. Stopper and shake vigorously for 3 minutes. Allow, this mixture to stand for 10 minutes, shake again for 2 minutes and then centrifuge for 15 minutes. Pipette 100 ml of the clear supernatant liquid into a 250-ml beaker and add one millilitre of glacial acetic acid. Stir gently, allow to stand for a few minutes and then add 4 ml of freshly prepared tannic acid solution and stir. Allow the precipitate to settle and filter through a Whatman filter paper No. 42 overlaid with paper pulp, in a 7-cm Buchner funnel. Wash twice with the sodium oxalate solution containing one percent (*m/v*) of the glacial acetic acid and two percent (*m/v*) of the tannic acid solution. Digest the precipitate in a Kjeldahl flask with 20 ml of sulphuric acid, 15 g of sodium sulphate and 1 g of the catalyst, for 30 minutes after the mixture has become clear. Cool the contents of the flask. Transfer quantitatively to a round-bottom flask, with water, the total quantity of water used being about 200 ml. Add with shaking a few pieces of pumice stone to prevent bumping. Add 50 ml of the alkali solution (C-1.7) carefully over the side of the flask so that it does not mix at once with the acid solution but forms a layer below the acid. Assemble the apparatus, taking care that the tip of the condenser extends below the surface of the sulphuric acid contained in the beaker. Mix the contents of the flask by shaking and distil until all ammonia has distilled over into the standard sulphuric acid. Detach the flask from the condenser and shut off the burner. Rinse the condenser

thoroughly with water into the beaker. Wash the tip carefully so that all traces of condensate are transferred to the beaker. When all the washings have drained into the beaker, add two or three drops of the methyl red indicator solution and titrate with standard sodium hydroxide solution.

C-1.2.2 Carry out a blank using all reagents in the same quantities but without the material to be tested.

C-1.3 Calculation

C-1.3.1 Non-fat milk solids, percent by mass $= \frac{3\,126.2\,(B-A)\,N}{M}$

where

B = volume, in ml, of standard sodium hydroxide solution used to neutralize the acid in the blank determination;

A = volume in ml of standard sodium hydroxide solution used to neutralize the excess of acid in the test with the material;

N = normality of the standard sodium hydroxide solution; and

M = mass, in g, of the material taken for the test.

C-2 METHOD 2

C-2.0 Principle

The method involves dissolution of the lactose and sucrose and clarification of the resulting solution, the reducing sugar content (calculated as lactose) is than determined using the Lane and Eynon's volumetric copper reduction procedure.

C-2.1 Reagents

C-2.1.0 All reagents shall be of analytical reagent grade.

C-2.1.1 *Neutral lead acetate,* $[(CH_3COO)_2Pb.3H_2O]$ — 100 g/l.

C-2.1.2 *Potassium Oxalate*

C-2.1.3 *Fehling's Solution (Soxhlet Modification)* — prepared by mixing immediately before use, equal volumes of solution A and solution B.

C-2.1.3.1 *Solution A* — Dissolve 34.639 g of copper sulphate ($CuSO_4.5H_2O$) in water, add 0.5 ml of concentrated sulphuric acid of sp gr 1.84 and dilute to 500 ml in a graduated flask. Filter the solution through prepared asbestos.

C-2.1.3.2 *Solution B* — Dissolve 173 g of potassium sodium tartrate ($KNaC_4H_4O_6.4H_2O$) Rochelle salt and 50 g of sodium hydroxide analytical reagents, in water. Dilute to 500 ml in a graduated flask and allow the solution to stand for two days. Filter this solution through prepared asbestos.

C-2.1.3.3 *Standardization of Fehlings solution*

Accurately pipette 5 ml each of Fehling's A and B solutions into a 250 ml Erlenmeyer flask containing anti-bumping granules. Add from a burette 15 ml of standard dextrose solution, bring the cold mixture to boil and boil for 2 minutes. Add 5 drops of methylene blue solution and continue adding increments of dextrose solution at 10-15 seconds intervals until the blue colour is discharged, the total boiling time being less than 4 minutes. Keep the contents of the flask boiling throughout the titration, the continuous emission of steam preventing reoxidation of the copper or indicator. Deduct 0.5 ml from this preliminary titration, add this volume of cold standard dextrose solution to fresh aliquots of mixed Fehling's solutions and repeat the standardization twice more. Wash the used flask with tap water, remove the cuprous oxide deposit with a small quantity of dilute nitric acid (it is not necessary to use fresh nitric acid each time) and rinse the flask well with water. Calculate the mean titration from the two accurate determinations, ignoring the preliminary titration.

Multiply the titre (obtained by direct titration) by the number of milligrams of anhydrous dextrose in 1 ml of the standard dextrose solution to obtain the dextrose factor. Compare this factor with the dextrose factor given in Table 3 and determine the correction if any to the dextrose factor derived from the table. The correction factor is obtained by substracting the dextrose factor derived from the table, from the calculated dextrose factor.

C-2.1.4 *Standard Dextrose Solution*

Dry anhydrous dextrose in a vaccum oven at 70°C. Weigh accurately about 0.5 g of dried anhydrous dextrose in a 200-ml volumetric flask. Dissolve in water and make up the volume to the mark.

C-2.1.5 *Methylene Blue Indicator Solution*

Dissolve 1 g of methylene blue in water and dilute to 100 ml.

C-2.1.6 *Petroleum Ether* — Redistilled below 60°C.

C-2.2 Procedure

C-2.2.1 *Preparation of Solution*

Weigh accurately about 10 g of a representative sample of grated chocolate, into a 150-ml beaker. Heat for a few minutes on a boiling water bath and when the fat has melted, add a few ml of water at not less than 80°C and mix, using a small round-ended glass rod, to a smooth paste. Add a few more millilitres of hot water and mix again in the same way. Continue this dilution and mixing until a thin suspension entirely free from lumps has been obtained and the volume is about 70 ml. Add 5 ml of neutral lead acetate solution, mix well and heat for a further 5 minutes on the water bath. Filter through a 150 mm Whatman No. 1 paper, collecting the filtrate in a 200-ml volumetric flask. Wash the residue on the paper 2 to 3 times with boiling water. Transfer the residue back to the original beaker, washing it from the filter into the beaker with a jet of

hot water from a wash-bottle, preferably fitted with a bunsen-valve or similar device. Suspend the residue in 50 to 60 ml of hot water. Mix well and heat for 5 minutes on a hot water bath. Filter through the same paper as before, collecting the filtrate in the same 200-ml flask. Wash the residue with hot water, allowing the residue to drain completely between washings, until the volume of the filrate and washings is about 180 ml. Cool the filtrate to room temperature. Add 0.5 g of potassium oxalate, dilute to volume, mix well and allow to stand for 15 to 20 minutes, mixing occasionally. Filter through a dry 150 mm Whatman No. 1 filter paper, collecting the filterate in a clean, dry, flask and rejecting the first few ml of filtrate. Dilute 50 ml of the filterate to 100 ml in a volumetric flask. Titrate this solution obtained with Fehling's solution using the procedure given under C-2.1.3.3 (using the above solution in place of dextrose solution). Let the reading be V_1.

C-2.3 Calculation

C-2.3.1 Refer to Table 3 and note down the mg of Lactose monohydrate corresponding to the reading V_1. Let the value be m.

C-2.3.2 Lactose, percent by mass $= \frac{(m+f)}{V_1} \times \frac{40}{M}$

M = mass in g, of chocolate sample taken,
f = correction factor (*see* C-2.1.3.3), and
m = mg of lactose monohydrate corresponding to the reading V_1 from Table 3.

NOTE – The method is only applicable if the sample contains no reducing sugars other than lactose.

C-2.3.3 *Non-fat Milk Solids* = Lactose, percent by mass × 24/13

NOTE – The above formula is derived from Vieth's ratio, that is, lactose : protein : ash = 13 : 9 : 2.

Table 3 Total Reducing Sugar Required for Complete Reduction of 10 ml Soxhlet Solution

Titre	Invert Sugar No Sucrose	g Sucrose/100 ml Invert Sugar				Lactose	
		1	5	10	25	Anhydrous	$C_{12}H_{22}O_{11} \cdot H_2O$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
15	50.5	49.9	47.6	46.1	43.4	64.9	68.3
16	.6	50.0	.6	.1	.4	.8	.2
17	.7	.1	.6	.1	.4	.8	.2
18	.8	.1	.6	.1	.3	.7	.1
19	.8	.2	.6	.1	.3	.7	.1
20	.9	.2	.6	.1	.2	.6	.0
21	51.0	.2	.6	.1	.2	.6	.0
22	.0	.3	.6	.1	.1	.6	.0
23	.1	.3	.6	.1	.0	.5	67.9
24	.2	.3	.6	.1	.9	.5	.9
25	.2	.4	.6	.0	.8	.5	.9
26	.3	.4	.6	.0	.8	.5	.9
27	.4	.4	.6	.0	.7	.4	.8
28	.4	.5	47.7	.0	.7	.4	.8
29	.5	.5	.7	.0	.6	.4	.8
30	.5	.5	.7	.0	.5	.4	.8
31	.6	.6	.7	45.9	.5	.4	.8
32	.6	.6	.7	.9	.4	.4	.8
33	.7	.6	.7	.9	.3	.4	.8
34	.7	.6	.7	.8	.2	.4	.9
35	.8	.7	.7	.8	.2	.5	.9
36	.8	.7	.7	.8	.1	.5	.9
37	.9	.7	.7	.7	.0	.5	.9
38	.9	.7	.7	.7	.0	.5	.9
39	52.0	.8	.7	.7	41.9	.5	.9
40	.0	.8	.7	.6	.8	.5	.9
41	.1	.8	.7	.6	.8	.6	68.0
42	.1	.8	.7	.6	.7	.6	.0
43	.2	.8	.7	.5	.6	.6	.0
44	.2	.9	.7	.5	.5	.6	.0
45	.3	.9	.7	.4	.4	.7	.1
46	.3	.9	.7	.4	.4	.7	.1
47	.4	.9	.7	.3	.3	.8	.2
48	.4	.9	.7	.3	.2	.8	.2
49	.5	.0	.7	.2	.1	.8	.2
50	.5	.0	.7	.2	.0	.9	.3

ANNEX D

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

DETERMINATION OF SUGAR (SUCROSE)

D-1 REAGENTS

All reagents shall be of analytical reagent grade.

D-1.1 *Neutral Lead Acetate Solution* [$(CH_3COO)_2 Pb \cdot 3H_2O$] — 100 g/litre.

D-1.2 Citric Acid

D-1.3 *Fehling's Solutions* — as specified in C-2.1.3.

D-2 PROCEDURE

D-2.1 Weigh accurately 10 g of a representative sample of grated chocolate, into a 150-ml beaker. Heat for a few minutes on a boiling water bath and when the fat has melted, add a few ml of water at not less than 80°C and with the help of a small round-ended glass rod, mix to a smooth paste. Add a few more millilitres of hot water and mix again in the same way. Continue this dilution and mixing until a thin suspension entirely free from lumps has been obtained and the volume is about 70 ml. Add 5 ml of netural lead acetate. Mix well and heat for a further 5 minutes on the water bath. Filter through a 150 mm. Whatman No. 1 paper, collecting the filterate in a 200-ml volumetric flask. Allow the residue to drain well. Wash twice with boiling water using a wash bottle preferably fitted with a Bunsen-valve or similar device, transfer the residue and paper back to the original beaker. Suspend the residue and paper in 50 to 60 ml of hot water, breaking up the paper by stirring, and heat for 5 minute on a hot water bath. Fit a new paper to the funnel, wet with a minimum of water, and filter the suspension, collecting the filtrate in the same 200-ml flask. Wash the residue with hot water, allowing the residue to drain completely between washings, until the volume of the filtrate and washings is about 180 ml. Cool the filtrate to room temperature, add 0.5 g of potassium oxalate, dilute to volume and mix well. Allow to stand for 15 to 20 minutes, mixing occasionally. Filter through a 150-mm dry filter paper, collecting the filtrate in a clean, dry flask (A) and rejecting the first few millilitres of filtrate.

Dilute 50 ml of the filtrate collected to 100 ml in a volumetric flask. Titrate this solution with 10 ml Fehling's solution. Let the reading be 'a' ml. Pipette out 50 ml of the filtrate at A in a 150-ml conical flask containing one gram citric acid and antibumping glass beads. Mark the level of the solution in the flask with a marker. Insert a small funnel into the neck of the flask and heat it over a flame. Boil for one hour replacing the water lost by evaporation. Cool the solution after boiling and neutralize with 10 percent NaOH using phenolpthalein indicator. Dilute to 100 ml in a volumetric flask. Pipette out 20 ml of this solution and dilute to 100 ml in a volumetric flask. Titrate with 10 ml Fehling's solution. Let the reading be 'b' ml.

D-2.2 Calculation

D-2.2.1 Free reducing sugar, percent by mass (X) = $\dfrac{(m_1 + f)}{a} \times 4$

where

m_1 = mg of invert sugar from Table 3 corresponding to the reading 'a' ml;

f = Correction factor (*see* C-2.1.3.3) ml; and

'a' = titre reading obtained before inversion.

D-2.2.2 Reducing sugar, as invert sugar percent by mass (Y) = $\dfrac{(m_2 + f)}{b} \times 20$

where

m_2 = mg of invert sugar from Table 3 coresponding to the reading 'b';

f = correction factor (*see* C-2.1.3.3); and

b = titre reading obtained after inversion.

D-2.2.3 Sucrose, percent by mass = $(Y - X) \times 0.95$

ANNEX E

[*Table* 1, *Item* (v)]

DETERMINATION OF ACID INSOLUBLE ASH

E-1 REAGENT

E-1.1 Dilute Hydrochloric Acid — approximately 5 N, prepared from concentrated hydrochloric acid (*see* IS 265 : 1962).

E-2 PROCEDURE

E-2.1 Weigh accurately about 10 grams of the material in a porcelain dish. Heat at 100°C until water is expelled and then heat slowly over a flame until swelling ceases. Ignite in a muffle furnace at 550°C until grey ash results. Remove the dish from the furnace and allow to cool to room temperature. Add 25 ml of dilute hydrochloric acid, to the dish, cover with a watch-glass and heat on a water-bath for 10 minutes. Allow to cool and filter the contents of the dish through Whatman filter paper No. 42 or its equivalent. Wash the filter paper until the washings are free from the acid. Return the filter paper and residue to the dish. Keep it in an electric air-oven maintained at 135 ± 2°C for about 3 hours. Ignite in a muffle furnace at 550°C for one hour. Cool the dish in a desiccator and weigh. Repeat the process of igniting in a muffle furnace, cooling and weighing at half-hour intervals until the difference in mass between two succesive weighings is less than one milligram. Note the lowest mass.

E-3 CALCULATION

E-3.1 Acid insoluble ash (on moisture-, fat- and sugar-free basis),

$$\text{percent by mass} = \frac{10\,000\,w}{W[\,100 - (M + F + S)\,]}$$

where

w = mass, in g, of the acid insoluble ash;
W = mass, in g, of the prepared sample taken for the test;
M = moisture, percent, by mass, in the prepared sample (*see* Annex G);
F = fat (on as is basis), percent by mass, in the prepared sample (A-4.1); and
S = sugar (on as is basis), percent by mass, in the prepared sample (D-2.2.3).

ANNEX F

(*Clause* 5.3.2)

DETERMINATION OF CHOCOLATE COMPONENT OF FILLED CHOCOLATE

F-1 PROCEDURE

F-1.1 Weigh to the nearest 0.1 g, 500 g of the filled chocolate. Scrape the chocolate coating and separate the filling. Weigh the filling to the nearest 0.1 g.

F-2 CALCULATION

$$\text{Chocolate component, percent by mass} = \frac{M_1 - M_2}{M_1} \times 100$$

where

M_1 = mass, in g, of the filled chocolate taken for the test; and

M_2 = mass, in g, of the filling.

ANNEX G
(*Clause* 5.4.1)

DETERMINATION OF EDIBLE WHOLESOME SUBSTANCES

G-1 PROCEDURE

G-1.1 Weigh to the nearest 1.0 g, 500 g of the product containing fruits, nuts, etc. Break the sample into small pieces and place them in a 1-litre glass/metal container. Cover the sample with melted cocoa butter and place container in a warm oven until the added ingredients can be separated upon stirring. Sieve contents through a 20-mesh sieve and allow the liquid to drain completely. Next soak the sieve containing ingredients in trichloroethylene and stir gently for a minute or two. Remove cleaned nuts, fruits, etc, onto a tray and let the solvent evaporate. Weigh to the nearest 0.1 g.

G-2 CALCULATION

$$\text{Wholesome ingredients, percent by mass} = \frac{M}{X} \times 100$$

where

M = mass, in gram, of residue; and

X = mass, in gram, of sample taken for test.

ANNEX H
(*Clause* A-4.1)

DETERMINATION OF MOISTURE

H-1.1 Weigh accurately about 10 gram of the prepared sample in a tared weighing bottle having a diameter of about 40 mm and a height of about 25 mm. Distribute the material as evenly as possible over the bottom of the bottle by gentle tapping. Place the bottle in a vacuum oven, remove the cover of the bottle and dry the material for six hours at 80 ± 1°C at a pressure not exceeding 5 mm of mercury. Allow the bottle to cool to room temperature and weigh.

H-2 CALCULATION

H-2.1 Moisture, percent by mass = $\frac{100\,(M - M_1)}{M}$

where

M = mass, in g, of the prepared sample taken for the test; and

M_1 = mass, in g, of the material after drying.

ANNEX J
(*Clause* 7.1)

SAMPLING OF CHOCOLATE

J-1 GENERAL REQUIREMENTS OF SAMPLING

J-1.0 In drawing, preparing, storing and handling samples, the following precautions and directions given shall be observed.

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

J-1.2 The sampling instrument; preferably a spoon or spatula, shall be clean and dry when used. When taking samples for microbiological examination, it shall be sterile.

J-1.3 The samples, the material being sampled, the sampling instrument and the containers for samples, shall be protected from adventitious contamination.

J-1.4 The samples shall be placed in clean and dry glass or tin containers. The sample containers shall be of such a size that they are almost completely filled by the sample. The sample containers shall, in addition, being sterile when they are used for samples for microbiological examination.

J-1.5 Each container shall be sealed air-tight after filling and marked with full details of sampling, batch or code number, name of the manufacturer, sub-group number and other important particulars of the consignment and lot.

J-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature and that they protected from light.

J-2 SCALE OF SAMPLING

J-2.1 Lot

All the containers of the same size in a single consignment of material drawn from a single batch of manufacture shall constitute a lot.

J-2.2 Samples shall be tested for each lot separately for ascertaining conformity of the materials to the requirements of this specification. The total number of containers to be selected from the lot shall depend on the size of the lot and shall be in accordance with Table 4.

Table 4 Sampling of Containers of Net Content 500 g or More
(Clause J-2.2)

Number of Containers in Lot	Sample Size (For Test Other Than Micro-biological	Sub-Sample Size (For Microbio-logical Tests)
(1)	(2)	(3)
Up to 50	2	2
51 to 300	3	2
301 to 500	4	2
501 to 1 000	5	3
1 001 and above	6	3

J-2.2.1 These containers shall be chosen at random from the lot. In order to ensure randomness of selection, procedures given in IS 4905 : 1968 may be followed.

J-3 TEST SAMPLES AND REFEREE SAMPLES

J-3.1 Each sample container of net content 500 g or more selected according to J-2.2 and col 1 and 2 of Table 4 shall be treated as one group.

J-3.2 Preparation of Individual Samples

Melt the contents of containers at 55°C and mix thoroughly. Withdraw not less than 500 g of the melted material while mixing representative portion. About 250 g of the material shall be taken from this and divided into three equal parts. Each part, so obtained, shall be transferred to a sample container which shall be sealed air-tight and labelled with the particulars given in J-1.5. The samples so obtained shall be divided into three sets in such a way that each set has a sample representing each group. One of these sets shall be marked for the purchaser, one for the vendor and the third for the referee.

J-3.3 Preparation of a Composite Sample

From the mixed material of each group remaining after taking the sample in J-3.2 or from the containers choosen in Table 3, equal quantities of material shall be taken and mixed up together so as to form a composite sample representing the lot as a whole and weighing not less than 200 g. This composite sample shall be divided into three equal parts and transferred to clean, dry sample containers and labelled with all the particulars given in J-1.5. One of these composite samples representing the lot as a whole shall be for the purchaser, another for the vendor and the third for the referee.

J-3.4 From the containers selected according to Table 4, the number of containers given in Table 4 shall be randomly selected. Draw with a suitable sampling instrument which is sterile, the representative quantity of material under aseptic conditions to form a sample of container for microbiological examination. Divide the sample (taking care not to bring a microbiological contamination in the material) into three equal parts. Each part so obtained shall constitute a test sample representing the container and shall be transferred to sterile containers, sealed air-tight and labelled with full identification particulars given in J-1.5. These shall be marked, in addition, with the words. 'For Microbiological Examination'. The sample so obtained shall be divided into three sets in such a way that each set has a sample representing each selected containers. One of these sets shall be marked for the purchaser, another for the vendor and the third for the referee.

J-3.5 Referee Sample

Referee samples for a lot shall consist of a set of individual samples, the composite sample and a set of samples for microbiological examination marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place and under conditions agreed to between the purchaser and the vendor to be used in case of a dispute between the two.

J-4 NUMBER OF TESTS

J-4.1 The tests for determination of the requirements given in Table 1 and 5.3 and 5.4 shall be conducted on the individual samples as obtained in J-3.2.

J-4.2 The tests for the description shall be made on the composite sample as prepared under J-3.3.

J-4.3 Test for *Staphylococcus, salmonella, E. coli* and yeast and mould count shall be conducted on each of the samples constituting a set of test samples labelled with the words 'For Microbiological Examination'.

J-5 CRITERIA FOR CONFORMITY

J-5.1 For Individual Samples

The lot shall be declared to satisfy the requirements given in Table 1 and 5.3 and 5.4 if each of the test results satisfies the corresponding requirements given in Table 1, 5.3 and 5.4.

J-5.2 For Composite Samples

The composite sample shall meet corresponding requirements as given in 5.1.

J-5.3 For Samples for Microbiological Examination

The test results on the sample for microbiological examination shall meet the corresponding requirements specified in Table 2.

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The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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