इंटरनेट मानक

Disclosure to Promote the Right To Information

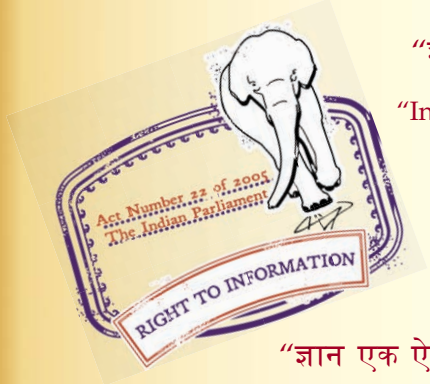
Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached 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 छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 2802 (1964): Ice-cream [FAD 19: Dairy Products and Equipment]

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

BLANK PAGE

IS : 2802 - 1964
(Reaffirmed 1989)
2009

Indian Standard

SPECIFICATION FOR ICE-CREAM

Third Reprint OCTOBER 1983
(Incorporating Amendments No. 1, 2 and 3)

UDC 663·674

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

Gr 7 *December* 1964

Indian Standard

SPECIFICATION FOR ICE-CREAM

Dairy Industry Sectional Committee, AFDC 12

Chairman	*Representing*
DR K. C. SEN	Indian Dairy Science Association, Bangalore
Members	
AGRICULTURAL MARKETING ADVISER TO THE GOVERNMENT OF INDIA	Directorate of Marketing and Inspection (Ministry of Food & Agriculture), Nagpur
SHRI R. K. MALIK (*Alternate*)	
SHRI B. R. BEDEKAR	Hindustan Milkfood Manufacturers Limited, Nabha
SHRI I. C. E. DABSON (*Alternate*)	
SHRI C. V. CHANDRA SEKHAR	T. T. (Private) Limited, Bangalore
SHRI S. S. MANI (*Alternate*)	
SHRI H. M. DALAYA	Kaira District Co-operative Milk Producers' Union Ltd, Anand
DR J. D. CONTRACTOR (*Alternate*)	
SHRI C. D. DASTOOR	Larsen & Toubro Ltd, Bombay
SHRI H. W. RAMCHANDANI (*Alternate*)	
DIRECTOR	Directorate of Military Farms, Army Headquarters
ASSISTANT DIRECTOR, MILITARY FARMS (PLANNING) (*Alternate*)	
EXECUTIVE HEALTH OFFICER	Municipal Corporation, Bombay
MUNICIPAL ANALYST (*Alternate*)	
COL A. G. FERNANDES	Food Inspection Organization, Quartermaster General's Branch, Army Headquarters
LT-COL N. G. C. IENGAR (*Alternate*)	
SHRI G. W. FULLER	Nestle's Products (India) Ltd, New Delhi
SHRI F. J. RYAN (*Alternate*)	
DR K. K. IYA	National Dairy Research Institute, Karnal
DR N. N. DASTUR (*Alternate*)	
SMRI A. R. A. KRISHNAN	Defence Production Organization [Ministry of Defence (CGDP)]
SHRI K. P. SINGH (*Alternate*)	
COL M. N. KUNZRU	Technical Standardization Committee (Foodstuffs) (Ministry of Food & Agriculture)
DR S. S. PHATAK (*Alternate*)	
SHRI A. K. MAZUMDAR	Dairy Development Commissioner, Government of Maharashtra
SHRI Y. V. SALPEKAR (*Alternate*)	

(*Continued on page 2*)

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

(*Continued from page* 1)

Members	*Representing*
SHRI V. A. MEHTA	Directorate General of Technical Development
SHRI S. RAMASWAMY (*Alternate*)	
MILK COMMISSIONER	Milk Commissioner, Madras
SHRI W. V. MITCHELL	Hindustan Lever Ltd, Bombay
DR A. P. MAHADEVAN (*Alternate*)	
SHRI S. N. MITRA	Central Food Laboratory, Calcutta
SHRI B. K. MURTHY	Indian Aluminium Co Ltd, Calcutta
SHRI N. GOPAL KRISHNAN (*Alternate*)	
SHRI J. PADMANABHAN	The A. P. V. Engineering Co Ltd, Calcutta
SHRI J. G. BROWN (*Alternate*)	
SHRI V. H. SHAH	Vulcan Trading Co (Private) Ltd, Bombay
SHRI A. JENSEN (*Alternate*)	
DR R. S. SRIVASTAVA	Central Committee for Food Standards (Ministry of Health)
SHRI P. JANARDANA AIYAR (*Alternate*)	
DR M. SWAMINATHAN	Central Food Technological Research Institute (CSIR), Mysore
SHRI M. R. CHANDRASEKHARA (*Alternate*)	
SHRI R. H. VARIAVA	Polson Limited, Bombay
SHRI B. P. PALKHIWALLA (*Alternate*)	
SHRI H. C. VERMA	Ministry of Food & Agriculture
SHRI S. N. MOHAN (*Alternate*)	
DR I. S. VERMA	Dairy Technology Division, National Dairy Research Institute, Karnal
SHRI M. R. SRINIVASAN (*Alternate*)	
SHRI JAMES N. WARNER	In personal capacity (*Allahabad Agricultural Institute, Allahabad*)
DR D. V. KARMARKAR, Deputy Director (Agri & Food)	Director, ISI (*Ex-officio Member*)

Secretary

SHRI P. H. RAMANATHAN
Assistant Director (Agri & Food), ISI

Dairy Products Subcommittee, AFDC 12 : 2

Convener	
DR N. N. DASTUR	National Dairy Research Institute, Karnal
Members	
DR C. P. ANANTAKRISHNAN	National Dairy Research Institute, Karnal
SHRI H. M. DALAYA	Kaira District Co-operative Milk Producers' Union Ltd, Anand
DR J. D. CONTRACTOR (*Alternate*)	
DIRECTOR	Directorate of Military Farms, Army Headquarters
COL A. G. FERNANDES	Food Inspection Organization, Quartermaster General's Branch, Army Headquarters
LT-COL N. G. C. IENGAR (*Alternate*)	

(*Continued on page* 27)

(*Continued from page* 2)

Members	*Representing*
GOVERNMENT ANALYST	Government of Madras
SHRI B. R. KAPUR	All India Ice-Cream Manufacturers' Association, New Delhi
SHRI K. L. SIBAL (*Alternate*)	
DR ZAL R. KOTHAVALLA	In personal capacity (*8 Ali Askar Road, Bangalore*)
SHRI W. V. MITCHELL	Hindustan Lever Ltd , Bombay
DR A. P. MAHADEVAN (*Alternate*)	
SHRI S. N. MITRA	Central Food Laboratory, Calcutta
SHRI S. RAMASWAMY	Directorate General of Technical Development
SHRI H. C. VERMA	Ministry of Food & Agriculture
SHRI S. N. MOHAN (*Alternate*)	
SHRI JAMES N. WARNER	In personal capacity (*Allahabad Agricultural Institute, Allahabad*)

Methods of Test for Dairy Products Subcommittee, AFDC 12 : 4

Convener	
DR N. N. DASTUR	National Dairy Research Institute, Karnal
Members	
DAIRY DEVELOPMENT ADVISER TO THE GOVERNMENT OF INDIA	Ministry of Food & Agriculture
DIRECTOR	Directorate of Military Farms, Army Headquarters
COL A. G. FERNANDES	Food Inspection Organization, Quartermaster General's Branch, Army Headquarters
LT-COL N. G. C. IENGAR (*Alternate*)	
GOVERNMENT ANALYST	Government of Madras
HEAD OF THE DIVISION OF MICROBIOLOGY	National Dairy Research Institute, Karnal
SHRI V. KURIEN	Kaira District Co-operative Milk Producers' Union Ltd , Anand
SHRI H. M. DALAYA (*Alternate*)	
SHRI A. K. MAJUMDAR	Dairy Development Commissioner, Government of Maharashtra
SHRI N. D. KOTNIS (*Alternate*)	
SHRI R. K. MALIK	Directorate of Marketing & Inspection (Ministry of Food & Agriculture), Nagpur
MILK COMMISSIONER	Milk Commissioner, Madras
SHRI S. N. MITRA	Central Food Laboratory, Calcutta
DR S. S. PHATAK	Technical Standardization Committee (Foodstuffs) (Ministry of Food & Agriculture)
PUBLIC ANALYST	Government of West Bengal
SHRI RAM SARUP	Indian Council of Agricultural Research, New Delhi
DR ARUN KUMAR SENGUPTA	Milk Commissioner, West Bengal
DR M. SWAMINATHAN	Central Food Technological Research Institute (CSIR), Mysore
SHRI JAMES N. WARNER	In personal capacity (*Allahabad Agricultural Institute, Allahabad*)

AMENDMENT NO. 4 JUNE 1992
TO
IS 2802 : 1964 SPECIFICATION FOR ICE-CREAM

(*Page* 8, *clause* 5.1, *line* 2) — Substitute 'IS 5839 : 1970' *for* 'IS 2491: 1963'.

(*Page* 8, *foot-note*) — Substitute the following for the existing foot-note:

'*Code for hygienic conditions for manufacture, storage and sale of ice-creams.

(FAD 18)

Reprography Unit, BIS, New Delhi, India

Indian Standard

SPECIFICATION FOR ICE-CREAM

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 22 July 1964, after the draft finalized by the Dairy Industry Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 Ice-cream is a widely consumed food and is a recognized medium to help increasing the milk intake. Ice-cream of good quality can never be produced from raw materials which are initially of poor hygienic quality irrespective of the subsequent methods of treatment or handling. It is, therefore, important to exercise utmost care in obtaining ingredients of good hygienic quality which will satisfy the physical, chemical and bacteriological standards prescribed for the finished products.

0.3 In the preparation of this standard considerable help has been derived from the following publications:

B.S. 809 : 1962 Sampling of milk and milk products. British Standards Institution.

B.S. 2472 : 1954 Methods for the chemical analysis of ice-cream. British Standards Institution.

S.A.B.S. : 510-1954 Specification for ice-cream. South African Bureau of Standards.

32-GP-163B : 1955 Ice-cream. Canadian Government Specification Board.

Standard methods for the examination of dairy products. 1960. Ed 11. American Public Health Association. New York.

Laboratory manual. 1959. Milk Industry Foundation. Washington.

0.4 While formulating this standard, necessary consideration has been given to the relevant rules prescribed by the Government of India under the Prevention of Food Adulteration Act, 1954. This standard is subject to the restrictions imposed under that Act and the Rules framed thereunder, wherever applicable.

0.5 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*. 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 test for ice-cream, with or without incorporation of fruits, nuts or chocolate either singly or in combination.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

2.1 Ice-cream, fruit ice-cream, nut ice-cream, chocolate ice-cream, mean the frozen food made from heat-treated mix (*see* 5.3.1) made out of milk, cream and/or other milk products (derived from cow and buffalo milk) and with or without sweetening ingredients, eggs, water, fruits, nuts, chocolate, permitted stabilizer/permitted emulsifier, edible common salt, permissible flavouring and colouring matter.

3. PHYSICAL REQUIREMENTS

3.1 **Odour and Flavour** — The product shall have a pleasant odour and flavour.

3.2 **Texture and Appearance** — The product shall be attractive in appearance, smooth in texture and of a uniform consistency and shall have no apparent ice or lactose crystals, and as far as possible free from butterfat granules.

3.3 **Freedom from Dirt** — The product shall be free from dirt and such other foreign material. All ingredients used shall be clean, wholesome and in every way fit for human consumption.

4. COMPOSITION

4.1 The product shall comply with the requirements given in Table 1, when tested according to the methods indicated in col 5 of Table 1.

4.2 No fat other than milk fat shall be present in the product with the exception of that derived from eggs, cocoa, nuts and emulsifiers (monoglycerides).

*Rules for rounding off numerical values (*revised*).

TABLE 1 COMPOSITION OF ICE-CREAM

(*Clause* 4.1)

Sl No.	Characteristic	Requirement		Methods of Test (Ref to Appendix)
		Ice-Cream	Fruits, Nut and Chocolate Ice-Cream	
(1)	(2)	(3)	(4)	(5)
i)	Weight in grams, per litre, *Min*	525	540	A
ii)	Total solids, percent by weight, *Min*	36·0	36·0	B
iii)	Milk fat, percent, *Min*	10·0*	8·0	C
iv)	Acidity percent (as lactic acid), *Max*	0·25	—	D
v)	Sucrose, percent by weight, *Max*	15·0	15·0	E
vi)	Total colony counts, per gram, (standard plate count), not more than	250 000	250 000	F
vii)	Coliform count, not more than	100/g	100/g	G
viii)	Phosphatase test of mix	Negative	Negative	H

*Tentative.

4.3 The sweetening agent shall be sugar conforming to IS: 1679-1960*.

4.4 Milk, cream, butter, evaporated milk, sweetened condensed milk, dried milk, skim milk, evaporated skim milk, sweetened condensed skim milk, dried skim milk may be used in the product.

4.4.1 Milk and milk products shall be of good hygienic quality. Milk and cream should be fresh and sweet, free from any off-flavours, or other defects and of low bacterial content. Condensed, evaporated and dried milk shall be free from rancidity, gassiness and off-flavours. Butter shall be fresh and free from rancidity and off-flavours.

4.4.2 Milk and milk products shall be received in clean and sterile containers, cooled immediately to a temperature not exceeding 4·5°C, and maintained at that temperature till they are required for use in preparing the mix.

*Specification for sugar used in food preservation industry.

4.4.3 Properly prepared matured fruit free from piths, seeds, skin and core, where necessary, may be used. The fruit may be fresh, frozen or canned. Currants, figs, dates, prunes or raisins in the dried form may also be used. Canned fruits shall comply with the requirements of the Fruit Products Order, 1955.

4.4.3.1 Fresh fruits shall be free from any physical damage or signs of spoilage. Fresh fruit juices shall be used immediately after preparation and if required to be kept, shall be stored in clean containers at a temperature not exceeding 4·5°C.

4.4.3.2 Frozen fruits and canned materials after opening the pack shall be preserved in the cold store in their original containers and required quantities withdrawn periodically using sterile dippers or other utensils. Except in the case of canned and heat-sterilized materials all other fruits and fruit preparations shall be subjected to suitable bactericidal treatments (indicated below) before adding to the mix. Drastic heating or treatment with disinfectants other than dilute chlorine solution as indicated shall be avoided. In all cases, clean and sterile containers shall be used for holding the fruits during treatment and while transferring the treated materials to the freezer every care shall be taken to prevent recontamination from hands or utensils.

4.4.3.3 *Strawberries, raspberries, blackberries and cherries* — The berries shall be washed with clean water, crushed if necessary, mixed with some sugar and then pasteurized by heating at 63°C for half an hour or heated to boiling for a few minutes.

4.4.3.4 *Mangoes and peaches* — Mangoes and peaches shall be washed with chlorine solution (10 ppm of available chlorine) and washed with clean water before peeling. Peeled mangoes and peaches may be mixed with sugar and boiled gently for a few minutes or just dipped in boiling water for one minute and cooled in cold water.

4.4.3.5 *Oranges and lemons* — Oranges and lemons shall be washed in water, dipped in hypochlorite solution (100 ppm of available chlorine) for one minute, rinsed with clean cold water and then used for extracting juice. The utensils and appliances used for extracting or handling the juice shall be clean and sterile.

4.4.3.6 *Bananas* — The skin shall be peeled off with the hands, cleaned and washed in chlorine solution (10 ppm of available chlorine) and then fruit shall be crushed or cut into pieces and transferred to the mix using clean and sterile utensils and appliances throughout.

4.4.3.7 *Dried fruits* — Dried fruits are generally required to be washed with water and then cooked in boiling water for some time to soften them before use. This treatment ensures the elimination of a major portion of contamination including pathogens.

4.4.4 The fruit juices used may be fresh, canned or concentrated, and the latter two types shall, where applicable, comply with the requirements of the Fruit Products Order, 1955.

4.4.4.1 Fruit juices shall be pasteurized by heating at 63°C for 30 minutes for reducing bacterial contamination and destroying pathogens.

4.4.5 Nuts, free from rancidity and from insect and rodent contamination, may be added to the product.

4.4.5.1 Various nuts, such as walnuts, almonds, pistachio, cashew nuts, peanuts and chestnuts are added to the mix in the freezer. As they are likely to be heavily contaminated, depending on the sanitary conditions of their preparation and handling, it is necessary to subject the nuts to one of the bactericidal treatments mentioned below:

a) The nuts should be soaked for 15 seconds in boiling sugar solution (50 percent concentration) containing one percent salt and then dried for 2 to 3 minutes in an oven at 250°C. Instead of sugar solution, the nuts may be dipped in hot butter at 97°C and then dried in an oven.

b) Nuts having 12 to 21 percent moisture content may be heated in an oven at 72°C for 30 minutes maintaining the relative humidity at 70 percent. For nuts of lower moisture content the temperature shall have to be raised to abou' 84°C

c) The nuts may also be roasted gently in an oven (70 to 80°C) either dry or using a little butter.

The treated nuts shall be stored in glass bottles or tin cans at room temperature and protected from contamination during storage or handling.

4.4.6 Eggs when used shall be fresh.

4.4.7 Colouring matter and flavouring agents as permitted under the Prevention of Food Adulteration Rules, 1955 may be added. The colour and the flavour to be added shall be as desired by the purchaser. No chemical preservative other than sulphur dioxide derived from gelatin or dried fruits shall be present in the product.

4.4.7.1 Vanilla extracts and various artificial or imitation flavours shall be added to the mix after pasteurization. As most of them are prepared and maintained in the form of alcoholic solutions and used in small concentrations they are not considered to be significant sources of contamination. Aqueous flavour extracts may be sanitized by pasteurization at 63°C for 30 minutes without any serious injury to the flavour.

4.4.7.2 Colour solutions shall be added to the mix after pasteurization and aqueous solutions of colours may be heavily contaminated particularly when they are purchased from the market and are stored at room temperature. Such solutions shall be pasteurized by heating at 63°C for 30 minutes and then used. It is, however, preferable to purchase dry colours and prepare the solutions in the plant as and when required. The dry colours may be dissolved in hot water (80°C) or 45 percent sucrose solution and boiled for 2 minutes. They should be held in a sterile glass jugs provided with screw caps (corks are not suitable) and stored in the refrigerator. Old solutions should be repasteurized by heating at 63°C for 30 minutes before use.

4.4.8 Stabilizers and emulsifiers as permitted under the Prevention of Food Adulteration Rules, 1955 not exceeding 0·5 percent by weight of the ice-cream mix may be used. They shall be clean and free from any taste or odour and shall be protected from dust and contamination during storage. As the stabilizer is added to the mix in small concentrations before pasteurization, it does not contribute any significant contamination to ice-cream. Gelatin, when used, shall be soaked in cold water for 15 to 20 minutes and then heated to about 70°C for 10 minutes before adding it to the mix.

4.4.9 *Chocolate and Cocoa*

4.4.9.1 Cocoa or liquor chocolate of good quality shall be obtained and stored in a clean and cool place. If a chocolate mix is to be made separately the cocoa or chocolate shall be added to the mix prior to pasteurization and homogenization which will reduce the contamination from this source.

4.4.9.2 If, however, the chocolate is required to be added to a few batches of the mix in the freezer, a syrup containing cocoa, sugar and water in suitable proportions shall be prepared, first heated at 90 to 95°C for 15 to 20 minutes. It may then be cooled down and added to the mix in the freezer. If sterilized chocolate syrups in sealed tins are available in the market, they may be directly added to the mix. Opened tins containing the syrup shall be properly covered and held in the cold store.

5. HYGIENIC REQUIREMENTS

5.1 The products shall be processed, packed, stored and distributed under strictly hygienic conditions (*see* IS : 2491-1963*). Contamination shall be absolutely avoided.

5.2 The standard plate count and coliform count shall be as shown in Table 1 (*see* **4.1**).

*Code for sanitary conditions for food processing units.

5.3 The entire mix, excluding flavour(s), fruits, nuts and colouring shall be pasteurized at a temperature and for a period which ensures the destruction of all pathogenic organisms and gives a negative phosphatase test The mix shall be immediately cooled to a temperature not exceeding 4°C. After pasteurization of the mix, no ingredient other than fruit, fruit pulp, fruit juice, nuts, colouring and flavouring shall be added.

5.3.1 *Heat Treatment* — The terms 'Heat Treatment', 'Pasteurization' or 'Pasteurized' and similar terms shall be taken to refer to the process of heating every particle of mix to a temperature of not less than 68·5°C and holding it at such temperature continuously for at least 30 minutes, or to a temperature of not less than 80°C and holding at such temperature continuously for at least 25 seconds in approved and properly operated equipment; provided that nothing contained in this definition shall be construed as debarring any other process which has been demonstrated to be equally efficient.

5.3.2 The mix shall be cooled to 4°C within one and a half hour of heat treatment and if required to be aged shall be maintained at 4°C for a suitable period.

5.4 The ice-cream shall be hardened and stored in a room/cabinet which is maintained at a temperature of −18°C or lower. No product other than ice-cream and other frozen desserts shall be kept in the hardening and storage rooms/cabinets.

5.5 Cleaning and Sterilization of Freezer — The cleaning and sterilization of freezers pose certain special problems not encountered in other items of equipment and as far as possible the instructions furnished by the manufacturer with each freezing machine shall be followed. However, the general procedure that is normally adopted for cleaning horizontal batch freezers is given below:

a) At the end of the day's operations the main refrigeration and thermostat controls should be turned off. The freezer should be warmed up gradually to prevent any strain on the machine and in no case shall hot water be used initially. Fill the freezer (one-half to two-thirds full) with cold water, allow the blades to rotate a few turns and drain out the rinse water. This should be repeated several times using increasingly warm water up to a temperature of about 60°C until the hopper and freezer have been rinsed free from the mix and tempered.

b) Fill the hopper with the hot detergent solution (60 to 65°C). Wash the exterior of the freezer, the hopper valves and strainers using a stiff brush. Run the washing solution into the freezer drum (two-thirds full) and allow the blades to rotate a few turns. Drain the freezer. Remove the head and dasher assembly from

the freezer carefully and brush them thoroughly with the detergent solution in a sink or in the wash-up tank. The freezer door should also be removed and washed similarly. Examine the inside of the freezer to ensure that it is free from pieces of fruits and nuts, etc.

c) Re-assemble the freezer and rinse with water at 60 to 65°C to remove the detergent.

d) For sterilization, fill the hopper with hot water (85°C) so that the screen is immersed and allow it to stand for 2 minutes. Drain the water into the freezer and add more hot water so that the freezer is two-thirds full, turning the dasher 3 to 4 times and then drain out the water. If more stringent treatment is required, steam may be blown into the freezer for 5 minutes (with the gate partially open) so that the condensate that drips from the gate is at 85°C. The freezer should then be allowed to stand with the gate open for drying until ready for use. Alternatively, the washed freezer may be sterilized by filling the hopper and chamber with chlorine solution (200 ppm), agitating for one to two minutes and then draining out. Immediately after this treatment the chamber should be rinsed with chlorine water (5 to 10 ppm). It is desirable to re-sterilize the freezer by running chlorine solution (200 ppm) and then rinsing with chlorine water (5 to 10 ppm) if the machine is to be used the next day.

6. PACKING AND MARKING

6.1 Returnable Containers (not for Retail Sale) — Returnable containers shall be made of mild steel tinned, aluminium or stainless steel and shall be either seamless or smoothly welded.

6.1.1 Immediately after use the cans and other multi-service containers shall be given a pre-rinse with lukewarm water (about 40°C). The vessels may be immersed in hot detergent solution (about 55°C) for 5 minutes or may be filled (one-third full) with the detergent solution and rotated by hand. The inner and outer surfaces of the utensils shall be thoroughly scrubbed with a brush. They shall then be thoroughly rinsed with clean hot water (about 60°C). The lids shall also be cleaned similarly. The cans and other utensils shall then be kept on a rack in an inverted position for drying. If the utensils show milk stone formation, they shall be rinsed with an acid cleaner (0·1 percent phosphoric acid solution) prior to cleaning with alkaline detergent.

6.1.2 The washed utensils may be sterilized by steaming in a chest (held in an inverted position for 10 minutes), by keeping them over a steam jet on a steaming block for one or two minutes or by complete immersion in hot water (80°C) for 10 minutes and 90°C for 2 minutes. The sterilized cans shall be stored (inverted) on a rack in a clean place

and allowed to dry till required for use. As a safety measure, it is advisable to rinse them with hot water (85°C) or chlorine solution (100 ppm) just before use.

6.1.3 Alternatively the cans and other utensils may be sterilized by rinsing with chlorine solution (200 ppm) for 2 minutes just prior to use. If the treated utensils cannot be used immediately, they should be rinsed with chlorine water (5 to 10 ppm) just prior to use.

6.2 Non-returnable — All the materials used for wrapping or packaging the ice-cream shall be of such a nature as to impart no off-flavour or odour, nor in any other way contaminate the product packed under normal conditions of manufacture, storage and use.

6.2.1 Containers made from either paper-board or metallic foil shall be of adequate strength for the weight of product carried to withstand normal handling during use. The containers shall also be strong enough to withstand the operations of automatic filling and capping machines. Paper-board containers shall be made water-resistant by coating or impregnation with wax or resin. The melting point of the wax used in this process shall be not less than 49°C. Sterilized and wrapped spoons shall be supplied with small non-returnable containers.

6.2.2 If the ice-cream containers are placed in packages, the packages shall be clean, neat and unbroken.

6.2.3 Paper board ice-cream cups, caps and cartons shall be adequately paraffined to make them impervious and in this process the surfaces also get sterilized. The articles shall be purchased in sanitary tubes, wrappings and cartons and the packages shall not be opened till required for use. The packages shall be stored in clean dust-proof cabinets. After removal from the tubes or cartons, the single service articles shall be kept in clean covered containers and protected from contamination from human hands, flies and other sources during handling. The hands shall be washed with a disinfecting solution before handling the articles.

6.2.4 If ice-cream cups are suspected to be contaminated, they may be kept inverted over a wire-gauze and chlorine solution (200 ppm) sprayed into them from below so that the solution quickly drains out. Similarly chlorine solution may be sprayed over the paraffined surface of caps and spoons. Sticks may be sterilized by dipping in hot water (about 85°C) or chlorine solution (200 ppm).

6.2.5 Solutions of approved quaternary ammonium compounds (200 ppm) may also be used for the above bactericidal treatments. They

are preferable to chlorine as they do not have any odour, taste or corrosive action. The treated articles shall be kept in clean containers till required for use.

NOTE — Approved quaternary ammonium compounds include alkyl dimethyl benzalkonium chloride/alkyl dimethyl benzyl ammonium chloride/benzalkonium chloride; alkyl trimethyl ammonium chloride; lauryl dimethyl benzyl ammonium chloride.

6.3 Marking — In addition to the particulars required under the Prevention of Food Adulteration Rules, 1955 the container, wrapper or label shall be marked with the following particulars:

a) Name and type of the product with proper prefix, such as fruit, nut, chocolate;
b) Name and full address of the manufacturer;
c) Batch or code number; and
d) Volume of contents in litre/millilitre.

6.3.1 Each container may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI 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 ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

7. SAMPLING

7.1 Representative samples of the material shall be drawn as prescribed in Appendix J.

8. QUALITY OF REAGENTS

8.1 Unless otherwise specified, pure chemicals shall be employed in tests and distilled water (*see* IS : 1070-1960*) shall be used where the use of water as a reagent is intended.

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

*Specification for water, distilled quality (*revised*).

APPENDIX A

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

DETERMINATION OF WEIGHT PER LITRE AND OVER-RUN IN ICE-CREAM

A-1. GENERAL

A-1.1 The determination of over-run in frozen and hardened ice-cream is a somewhat complex problem to solve, due to the fact that the weight of mix is unknown and has to be determined before calculations can be made.

A-1.1.1 The over-run in ice-cream depends upon the amount of air whipped into the mix during the freezing process. In this test, the volume of water and alcohol used corresponds with the volume of air originally contained in the ice-cream and the difference between the sum of these two and the capacity of the flask is equivalent to the volume occupied by the sample.

A-2. APPARATUS

A-2.1 Analytical Balance — weighing accurately to 0·001 g.

A-2.2 Beaker — 400 ml.

A-2.3 Volumetric Flask — 250 ml.

A-2.4 Glass Funnel

A-3. REAGENT

A-3.1 *n*-amyl Alcohol — sp gr 0·817.

A-4. PROCEDURE

A-4.1 Weigh a unit of ice-cream and from it calculate the weight of the ice-cream per litre. For example, 200 ml of a full carton of ice-cream can be obtained, the ice-cream carefully removed and the empty dry carton weighed. The difference in weights between the carton when filled and when empty is, therefore, the weight of 200 ml of frozen ice-cream. Five times this weight would then equal the weight of a litre. To determine the weight of the mix, proceed as given in **A-4.1.1**.

A-4.1.1 Weigh and record the exact weight of a clean, dry 400-ml beaker. Into the beaker weigh exactly 130 g of the frozen ice-cream. Place the beaker in water-bath warmed to 49°C and melt. Weigh and record the exact weight of a 250-ml volumetric flask. Using a glass funnel,

transfer the 130 g of melted ice-cream into the 250-ml flask. Add exactly 10 g of *n*-amyl alcohol to the flask and mix to break the surface tension of the melted ice-cream and release the incorporated air. Ten grams of *n*-amyl alcohol occupy a volume of 12·24 ml. Cool the flask with contents to 15·5°C using a cold water- or ice water-bath. Rinse the beaker containing melted mix with several small rinsings of distilled water, adding each rinse to the 250-ml flask. Again cool the flask with contents to 15·5°C and using the final rinse water, bring the volume to 250-ml mark. The bottom of the meniscus should correspond with the mark when temperature is exactly 15·5°C. Dry the outside of the flask and reweigh.

A-4.2 Calculate the weight in grams of the contents. Calculate the weight in grams of water added to the flask. Calculate the volume in millilitres occupied by the sample of ice-cream. Determine the specific gravity of the mix by dividing its weight (130 g) by the volume in millilitres which it occupied. Determine the weight in grams per litre of mix by multiplying by the specific gravity.

NOTE—After weighing the unit of ice-cream it is essential to remove the carton carefully without tearing and dry it thoroughly before reweighing. If the ice-cream has been heat-shocked, accurate results cannot be obtained.

APPENDIX B

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

DETERMINATION OF TOTAL SOLIDS

B-1. PREPARATION OF SAMPLES FOR CHEMICAL ANALYSIS

B-1.1 Plain Products — Let the sample soften at room temperature. Because melted fat tends to separate and rises to the surface, it is not advisable to soften the sample by heating on water-bath or over flame. Mix thoroughly by stirring with spoon or egg beater or by pouring back and forth between beakers.

B-1.2 Fruit Nut and Chocolate Ice-Cream Containing Insoluble Particles

B-1.2.1 Use a mixer capable of comminuting product to fine, uniform pulp. Use 100-200 g of sample to fill the cup of mixer full to about one-third. Melt the product at room temperature or in an incubator at 37°C in closed container. Transfer entire contents to the mixer cup and mix until insoluble particles are finely divided (about 3-5 minutes for fruit ices and up to 7 minutes for nut ices). Alternatively, the product may be ground in a porcelain or glass pestle and mortar.

B-1.2.2 Transfer the mixed sample to a suitable container for convenience in weighing. After weighing operations, return the remainder of the sample to the refrigerator, preferably at a temperature not exceeding −15°C.

B-2. APPARATUS

B-2.1 Flat-Bottom Dishes — of nickel or other suitable metal not affected by boiling water, 7-8 cm in diameter and not more than 2·5 cm deep, provided with short glass stirring rods having a widening flat end.

B-2.2 Sand—which passes through IS Sieve 500-micron and is retained on IS Sieve 180-micron. It shall be prepared by digestion with concentrated hydrochloric acid, followed by thorough washing with water. It shall then be dried and ignited to dull red heat.

B-2.3 Well-Ventilated Oven — capable of operating at 102°C air temperature.

B-3. PROCEDURE

B-3.1 Heat the necessary number of metal dishes, each dish containing about 20 g of prepared sand and a stirring rod, in the oven for about one hour. Allow to cool in an efficient desiccator for 30 to 40 minutes. Weigh accurately about 3 g of the prepared sample of ice-cream into a dish. Saturate the sand by careful addition of a few drops of distilled water, and thoroughly mix the wet sand with the ice-cream by stirring with the glass rod, smoothing out lumps and spreading the mixture over the bottom of the dish.

B-3.1.1 Place the dish on a boiling water-bath for 20 to 30 minutes, then wipe the bottom of the dish and transfer it, with the glass rod, to the well-ventilated oven at 102 ± 1°C. The bulb of the oven control thermometer shall be immediately above the shelf carrying the dish. Dishes shall not be placed near the walls of the oven, and should be insulated from the shelf by suitable silica or glass supports.

B-3.1.2 After four hours, remove the dish to an efficient desiccator, allow to cool as before, and weigh. Replace the dish in the oven for a further period of one hour at 102 ± 1°C, remove to the desiccator and cool and weigh again. Repeat the process of heating, cooling and weighing for one hour till consecutive weighings agree to within 0·5 mg.

B-4. CALCULATION

B-4.1 From the loss in weight observed, calculate the percent by weight of total solids for ice-cream.

APPENDIX C

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

DETERMINATION OF FAT (ROSE — GOTTLIEB METHOD)

C-1. APPARATUS

C-1.1 The apparatus shall be the same as in **5.1** of IS : 1479(Part II)-1961*

C-2. REAGENTS

C-2.1 Concentrated Ammonia Solution — approximately 35 percent *m/m* (sp gr 0·88) .

C-2.2 Ethyl Alcohol — 95 to 96 percent (v/v).

C-2.3 Diethyl Ether — sp gr 0·720, peroxide-free.

NOTE—Diethyl ether may be maintained free from peroxide by adding wet zinc foil (approximately 80 cm^2 per litre, cut in strips long enough to reach at least halfway up the container) that has been completely immersed in dilute acidified copper sulphate for one minute and subsequently washed with water.

C-2.4 Light Petroleum — boiling range 40° to 60°C.

C-2.5 Mixed Solvent — prepared by mixing equal volumes of the ether and light petroleum.

C-3. PROCEDURE

C-3.1 Weigh accurately 4-5 g of the prepared sample (**B-1**) to the fat extraction tube. Wash the sides of the tube with 2 ml of hot water and mix by gentle swirling. Add 2 ml of concentrated ammonia solution and mix thoroughly but without splashing the contents to the upper part of the tube. Heat in water-bath for 20 minutes at 60°C with occasional shaking. Add 10 ml of ethyl alcohol, mix well and proceed further as in **5.3.1** of IS : 1479(Part II)-1961*.

APPENDIX D

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

DETERMINATION OF ACIDITY

D-0. The acidity of the ice-cream shall be determined before the addition of colouring matter.

D-1. APPARATUS

D-1.1 The apparatus shall be the same as in **14.1** of IS : 1479(Part I)-1960†.

*Methods of test for dairy industry : Part II Chemical analysis of milk.
†Methods of test for dairy industry : Part I Rapid examination of milk.

D-2. REAGENTS

D-2.1 The reagents shall be the same as in **14.2** of IS : 1479(Part I)-1960*

D-3. PROCEDURE

D-3.1 The procedure shall be the same as in **14.0** of IS : 1479(Part I)-1960*, but using 20 g of the prepared sample (**B-1**) being diluted with about 50 ml of recently boiled cooled water.

D-4. CALCULATION

D-4.1 Titratable acidity (as lactic acid), percent by weight $= \frac{9\ VN}{W}$

where

V = volume in ml of the standard sodium hydroxide solution required for titration,

N = normality of the standard sodium hydroxide solution used, and

W = weight in g of the product taken for the test.

APPENDIX E

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

DETERMINATION OF SUCROSE

E-1. REAGENTS

E-1.1 Fehling's Solution — Prepare by mixing equal volumes of Solution A (**E-1.2**) and Solution B (**E-1.3**) immediately before using.

20 ml = approximately 40 ml of 0·25 percent invert sugar solution

E-1.1.1 *Standardization of Fehling's Solution*—Pipette accurately 20 ml of Fehling's solution prepared as above into a 250-ml conical flask. Add from a burette a volume about one millilitre less than the expected volume of standard dilute invert sugar solution which will reduce the Fehling's solution completely (about 40·ml) and sufficient water to bring the volume to 75 ml at the commencement of boiling. Heat rapidly to boiling on asbestos gauge. Reduce the heat sufficiently to maintain slow but steady boiling, and in two minutes from the onset of boiling add one millilitre of methylene blue solution. Add small quantities of the standard invert sugar solution until the indicator is decolourized. The titration must be completed in about three minutes, excluding air by maintaining ebullition, and refraining from rotating or shaking the flask throughout. After this preliminary titration a further titration or titrations should be

*Methods of test for dairy industry : Part I Rapid examination of milk.

carried out, adding practically the whole of the invert sugar solution required before commencing the heating and continuing the titration as before.

E-1.1.2 The colour change is best judged in good north daylight or its equivalent and it is recommended that the boiling should be carried out on a clean white asbestos gauze or a thin white silica tile.

E-1.1.3 From the volume of invert sugar used, calculate the equivalent of 20 ml of Fehling's solution in terms of milligrammes (X) of invert sugar.

E-1.2 Copper Sulphate Solution (Solution A) — Dissolve 34·639 g of $CuSO_4,5H_2O$ in water, dilute to 500 ml and filter if necessary.

E-1.3 Potassium Sodium Tartrate (Rochelle Salt) Solution (Solution B) — Dissolve 173 g of potassium sodium tartrate and 50 g of sodium hydroxide in water, dilute to 500 ml and filter if necessary through asbestos.

E-1.4 Hydrochloric Acid — density 1·18 at 20°C. Approximately 12 N.

E-1.5 Hydrochloric Acid — 6·34 N.

E-1.6 Alumina Cream — To a cold saturated solution of aluminium potassium sulphate in water add sufficient aqueous ammonia (density 0·880) stirring constantly, to make the mixing alkaline to litmus paper. Wash with water, by decantation, allowing the gelatinous precipitate to settle thoroughly between each washing, until only a trace of sulphate remains in the washings.

E-1.7 Neutral Lead Acetate Solution — Prepare a concentrated solution of lead acetate in cold water, neutralize if necessary to litmus paper by adding acetic acid or sodium hydroxide, dilute to a density of approximately 1·25 at 20°C and filter. This requires the solution of about 41 g of lead acetate diluted to a final volume of 100 ml, after neutralization.

E-1.8 Sodium Oxalate Solution — saturated solution in water.

E-1.9 Methylene Blue Indicator — 0·2 percent in water.

E-1.10 Sodium Hydroxide — approximately N.

E-1.11 Standard Invert Sugar Solution

E-1.12 Stock Invert Sugar Solution — Transfer 23·75 g of sucrose, dried overnight in a vacuum desiccator, to a one-litre graduated flask with the aid of about 100 ml of water. Add 10 ml of concentrated hydrochloric acid, mix thoroughly and allow to stand for at least three days at a temperature approximating to 20°C. Dilute to one litre. This stock solution

contains 2·5 g of invert sugar per 100 ml and may be kept for up to four weeks without changing its concentration.

E-1.13 Standard Dilute Invert Sugar Solution

E-1.13.1 Transfer 50 ml of the stock solution, make just neutral to litmus paper with N sodium hydroxide solution and dilute to 500 ml immediately before use.

1 ml = 2·5 mg invert sugar

E-1.13.2 The above procedure is recommended, but where it is necessary to use a rapidly prepared solution, transfer 1·187 5 g of dried sucrose to a 500-ml flask with 75 ml of water. Add 10 ml of 6·34 N of hydrochloric acid slowly while rotating the flask. Partially immerse the flask in a water-bath adjusted to 70°C and when the temperature of the contents reaches 67°C (which should occupy $2\frac{1}{2}$ to $2\frac{3}{4}$ minutes) allow five minutes further heating by which time the temperature should have reached about 69·5°C. Remove the flask and cool immediately by immersing in a water-bath at 20°C. When the contents of the flask have nearly reached 20°C, make just neutral to litmus with N sodium hydroxide solution and dilute to 500 ml at 20°C.

1 ml = 2·5 mg invert sugar

E-2. PROCEDURE

E-2.1 Determination of Original Reducing Sugars — Place about 10 g of the prepared sample of ice-cream (**B-1**) accurately weighed (it is convenient to weigh by difference) into a 250-ml conical flask and dilute with 150 ml of water. Mix thoroughly the contents of the flask. Add neutral lead acetate drop by drop, mixing by rotating the flask until no further precipitate is formed. Add one drop of alumina cream, again mix and allow to stand for a few minutes. Rotate the flask at intervals to ensure complete precipitation of protein. Add just sufficient sodium oxalate solution to precipitate any excess lead. Filter through a fluted 18 cm No. 1 filter paper into a 250-ml graduated flask. Wash the precipitate and the paper thoroughly, with hot water collecting the washings in the flask. Cool the flask and contents and make up to the mark (Solution C). Carry out titrations against Fehling's solution prepared and standardized as above.

E-2.1.1 If the weight of sample taken is W/g and the volume of sugar solution used in the titration is S ml, then the percentage of original reducing sugar in the ice-cream

$$= \frac{25X}{S.W}$$

E-2.1.2 The concentration of reducing sugar in the filtered solution may be such that more than 55 ml are required to reduce 20 ml mixed Fehling's solution. In this case employ the following modification.

E-2.1.3 Pipette 10 ml each of Fehling's solution prepared and standardized as above into the flask, add an accurately known volume of the standard dilute invert sugar solution, and complete the titration with the prepared sugar filtrate as described under standardization of Fehling's solution. Subtract from the number of milligrammes of invert sugar found, the amount contained in the known volume of standard invert sugar solution added.

E-2.2 Determination of Reducing Sugars After Inversion—Transfer 50 ml of the filtered solution (Solution C) to a 200-ml graduated flask, add 25 ml of water and 10 ml of 6·34 N hydrochloric acid. Invert as described in the preparation of standard dilute invert sugar solution. Determine the total invert sugar as described in the determination of reducing sugars.

E-3. CALCULATION

E-3.1 Sucrose = [(reducing sugars after inversion) − (original reducing sugars)] × 0·95.

APPENDIX F

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

ESTIMATION OF TOTAL COLONY COUNT (STANDARD PLATE COUNT)

F-1. PREPARATION OF SAMPLE

F-1.1 To avoid any difficulties in obtaining representative test portions only melted samples may be used. For the purpose of melting, the frozen sample may be kept at room temperature or, if required, in a water-bath at a temperature not exceeding 45°C for not more than 15 minutes. Thoroughly mix the samples before removal of test portion.

F-1.2 Measurement of Test Portion — For greater accuracy, in view of variable over-runs and differences in density of mixes, it is preferable to use only gravimetric measurement in preference to the volumetric method. Using sterile pipette, aseptically transfer 11·0 g (using a balance

sensitive to 30 mg) of test portion directly into dilution bottles containing 99 ml of buffered distilled water or Ringers solution [*see* **5.2.6** of IS : 1479(Part III)-1962*].

F-1.3 Procedure — The procedure shall be the same as in **5** of IS : 1479(Part III)-1962*.

F-1.4 In such cases where constantly low standard plate counts are obtained, it may be desirable to occasionally incubate the plates at 5-7°C for 7 days instead of 37°C to determine the presence of psychrophillic organisms.

APPENDIX G

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

DETERMINATION OF COLIFORM COUNTS

G-1. GENERAL

G-1.0 Presence of coliform organism in frozen dairy products usually signifies improper processing, subsequent contamination from equipment, flies, personnel, etc, or addition of ingredients to mixes after pasteurization and generally insanitary conditions of handling. The coliform numbers can be measured by either of the two procedures employing solid media or liquid media. Many workers, however, prefer to use the solid media because of higher reproducibility. The solid media also permit prompt confirmation of any doubtful colonies. In case of frozen products where fermentable carbohydrates other than lactose are present, positive coliform results must be confirmed to obviate false positive results due to the action of non-lactose fermenting non-coliform organisms.

G-2. APPARATUS AND MATERIALS

G-2.1 The apparatus and the materials shall be the same as in **8.2** of IS: 1479(Part III)-1962*. In addition, the following will be required:

a) Balance, sensitive to 30 mg, with suitable weights.

b) Sterile stainless steel spatula, suitable length.

G-3. PREPARATION OF THE SAMPLE AND MEASUREMENT OF TEST PORTION

G-3.1 The methods of preparation of the sample and measurement of test portion shall be the same as prescribed under Appendix F.

*Methods of test for dairy industry : Part III Bacteriological analysis of milk.

G-4. PROCEDURE

G-4.1 Coliform Test with Solid Media — Transfer appropriate volume (0·1 to 1·0 ml) of suitable dilution into sterile plates. Add 10-15 ml of violet red bile agar or desoxycholate agar [8.3 of IS : 1479(Part III)-1962*]. With a view to increasing the sensitivity of tests, larger test-portions (up to 4·0 ml) may be used with 15-20 ml of the medium. Quite often 10 ml of 1 : 10 dilution is distributed in 2-4 plates using 15-20 ml of the medium per plate. Mix the contents thoroughly and allow to solidify (within 5-10 minutes); add 3-4 ml of the same melted medium in each plate as an overlay to completely cover the surface to inhibit formation of surface colonies. Invert and incubate for 18-24 hours at 37 ±0·5°C.

G-4.1.1 Dark red colonies measuring 0·5 mm or more on uncrowded plates are considered to be coliform bacteria. Count such colonies and report as 'coliform colonies per g' using two significant figures and substituting decimals for whole number where necessary.

G-4.1.2 If no coliforms appear on plate(s) report as 'coliform colonies less than—per g' inserting the number that would be reported. If only one coliform colony had been found from the total quantity plated, for example, if 2 g had been plated report as 'coliform colonies less than 0·5/g'.

G-5. COMPLETED TEST WITH SOLID MEDIA

G-5.1 In case of doubt, for example, in case of crowded plates, where coliform colonies may not have typical appearance as also to confirm presence of lactose-fermenting coliform bacteria, promptly transfer typical colonies to lactose-broth or to brilliant-green bile-broth tubes. Production of acid and gas within 48 hours confirms the presence of coliform organisms.

G-5.1.1 In such cases where typical, clearly isolated colonies are not present, streak growth on surface of violet red bile agar or desoxycholate agar for isolation and transfer typical colonies to lactose-broth or to brilliant-green bile-broth as above. Production of acid and gas within 48 hours confirms the presence of coliform organisms.

G-6. INTERPRETATION

G-6.1 In properly operated plants, coliform counts of not more than 100 g may be expected.

*Methods of test for dairy industry: Part III Bacteriological analysis of milk.

APPENDIX H

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

PHOSPHATASE TEST

H-1. APPARATUS

H-1.1 The apparatus shall be the same as in **26.1** of IS : 1479(Part II)-1961*.

H-2. REAGENTS

H-2.1 The reagents shall be the same as in **26.2** of IS : 1479(Part II)-1961*.

H-3. PROCEDURE

H-3.1 Use mix sample before nuts, fruits, or flavouring and colouring materials have been added. While testing finished ice-cream, strain out any nuts or fruits before testing. Run an extra control with each individual sample to evaluate colour causes by flavouring materials. Proceed as in **26.3** of IS : 1479(Part II)-1961* and interpret the result as in **26.4**.

NOTE—Another condition responsible for false positive tests in frozen dairy foods is related to whether the flavouring, primarily vanilla type, is added to mixes before or after pasteurization. When vanillin is added to mixes consisting in whole or in part of unpasteurized products and the mixes are then commercially pasteurized before testing, blue colour develops under conditions of the phosphatase test. However, when vanillin is added to milk products which previously have been heated to 80°C and the mixture is commercially pasteurized, the products are negative to phosphatase test. This difference is attributed to activity of residual enzymes on vanillin and may vary with the time interval allowed for enzyme activity, amount and nature of substrate, and ease of liberating phenol from it. Obviously the intensity of blue colour is greater when vanillin is added before pasteurization instead of after, and may increase as the time interval is extended between its addition and the time of testing after pasteurization of milk or mix. By the same token, use of value obtained on a properly pasteurized vanillin-free milk or mix to which vanillin is added after pasteurization and before applying the test may cause erroneously high phosphatase value which, if used for comparison with the result on a vanillin-free under-pasteurized product, would give rise to a false negative interpretation that the later product had been properly pasteurised. Since the presence of vanillin in mixes not previously heated to over 80°C ordinarily may lead to false positive interpretations, it is essential that either a laboratory-pasteurized sample of the mix be run as a control or that a control test substituting buffered water for buffered substrate be used on all samples giving a positive test. Blue colour developed by this control would be attributable to interference. If this colour is just equal in intensity to that of sample tube, the sample is judged pasteurized. If colour in sample tube is distinctly greater than that of control, under-pasteurization is indicated.

*Methods of test for dairy industry: Part II Chemical analysis of milk.

APPENDIX J
(*Clause* 7.1)

SAMPLING OF ICE-CREAM

J-0. GENERAL

J-0.1 General observations given for sampling of milk under 3 of IS:1479(Part I)-1960* should be borne in mind while sampling ice-cream.

J-1. SELECTION OF SAMPLE

J-1.1 If the product is supplied in bulk units, the number of units to be selected for sampling shall normally be as follows:

Total Number of Units	*Number of Units to be Selected*
1	1
2 to 5	2
6 ,, 20	3
21 ,, 60	4
61 ,, 100	5
Over 100	5 plus one for each additional 100 units or fraction thereof

J-1.1.1 When there is a possibility of wide variations between different units, every unit shall be sampled.

J-1.2 When sampling retail units, it is advisable to vary the incidence of samples according to circumstances. For example, the determination of the quality of a consignment may require treatment differing from that designed to detect isolated failure to reach a known standard. Sampling will also vary according to knowledge, if any, of the division of the consignment into manufacturing 'batches'.

J-1.2.1 For consignments or parts of consignments expected to be of uniform quality, the following minimum numbers of units shall be selected at random from separate crates, cases or packages:

Total Number of Units	*Number of Units to be Selected*
1 to 100	1
101 ,, 1 000	2
1 001 ,, 10 000	4
Over 10 000	4 plus one for each additional 2 500 units or fraction thereof

The samples shall consist of the unopened retail unit(s) selected.

*Methods of test for dairy industry: Part I Rapid examination of milk.

J-2. SAMPLE CONTAINERS

J-2.1 Wide-mouth jars (dimension of mouth about 4·5 cm, capacity 100 to 200 g) shall be made of glass, metal or other suitable material which can be sterilized easily. The jars shall be closed by means of a screw cap or suitable closure made of fat-proof, non-absorbent, insoluble material, which will not impart any foreign odour or taste to the contents. If desired, the sample jars may be sand-blasted over a suitable area for inscription.

J-3. STORAGE AND TRANSPORT OF SAMPLES

J-3.1 The samples shall be stored at a temperature not higher than −15°C. Samples shall be protected from light during storage. During transit the samples shall be maintained at a temperature not exceeding −15°C.

J-4. SAMPLING FOR CHEMICAL ANALYSIS

J-4.1 Containers — The sterile jars used for collecting the sample shall be placed in a thermally insulated transport container not less than 30 minutes before use.

J-4.2 Size of Sample — Any sample of ice-cream shall not be less than 100 g. If necessary several packages of smaller size shall be taken to make up the required size of sample. When the resulting sample is to be divided into two or more parts a correspondingly larger amount shall be taken to enable each part to be of the specified sample size.

J-4.3 Sub-division of Sample — Where it is required that a sample is to be sub-divided the following methods, observing the maximum possible hygiene, are recommended:

a) *Packages of Ice-Cream* — Expose the ice-cream. With the help of a suitable sterile implement, for example, a sharp knife or spoon, sub-divide the ice-cream into the required number of approximately equal parts and place one part from each package into a separate sample jar. Repeat this operation until each jar contains the required amount of ice-cream.

b) *Multi-Layered Ice-Cream* — In the case of multi-layered ice-cream the sample shall be such as to contain the same proportion of each layer as is present in the original ice-cream. Different layers shall not be separated at the time of sampling and a complete sample of all layers shall be placed in the sample jar.

c) *Bulk Containers of Ice-Cream*—First remove the surface layer with a sterile spoon or other suitable sterile implement. With a second sterile implement, remove the required number of portions from each of several different sites to make up a sample representative of the bulk.

J-5. SAMPLING FOR BACTERIOLOGICAL EXAMINATION

J-5.1 For bacteriological purposes, all equipment including sample bottles, spoons, knives, etc, shall be clean and sterile. Equipment shall be sterilized by one of the following methods:

a) Hot air-oven for 2 hours at 160°-170°C,

b) Autoclave for 15 minutes at 120°C,

c) Steam for 1 hour at 100°C (equipment treated by this method shall be used within 24 hours),

d) Immersion for at least 5 minutes in boiling water (equipment treated by this method shall be used immediately).

J-5.2 Packages — One or more unopened packages shall constitute the sample, which shall be delivered intact to the laboratory in a sterile sample jar.

J-5.3 Multi-Layered Ice-Cream — In the case of multi-layered ice-cream the sample shall be such as to contain the same proportions of each layer as are present in the original ice-cream. Different layers shall not be separated at the time of sampling and a complete sample of not less than 25 g and containing all the layers shall be placed in the sample jar.

J-5.4 Bulk Containers — First remove the surface layer with a sterile spoon or other suitable implement. With a second sterile implement take a sample of not less than 25 g from the freshly exposed surface of the bulk and transfer to a sterile sample jar with the usual aseptic precautions.

J-5.4.1 When it is desired to obtain information about the hygienic condition of the surfaces of the bulk ice-cream, take a sample from the surface layer for examination, with a sterile spoon as described above. When information is required regarding the ice-cream as served to the consumer, the server normally used for dispensing the ice-cream should be employed.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N=1 kg.m/s^2
Energy	joule	J	1 J=1 N.m
Power	watt	Wl	1 W=1 J/s
Flux	weber	Wb	1 Wb=1 V.s
Flux density	tesla	T	1 T=1 Wb/m^2
Frequency	hertz	Hz	1 Hz=1 c/s (s^{-1})
Electric conductance	siemens	S	1 S=1 A/V
Electromotive force	volt	V	1 V=I W/A
Pressure, stress	Pascal	Pa	1 Pa=1 N/m^2

INDIAN STANDARDS INSTITUTION

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

Telephones : 26 60 21, 27 01 31 **Telegr a s : Manaksanstha**

Regional Offices :		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	89 65 28
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	27 50 90
Southern : C.I.T. Campus	MADRAS 600020	41 24 42
Northern : B 69, Phase VII	S. A. S. NAGAR (MOHALI) 160051	8 78 26
Branch Offices		
'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 91
'F' Block, Unity Bldg. Narasimharaja Square	BANGALORE 560002	22 48 05
Gangotri Complex, Bhadbhada Road, T.T. Nagar	BHOPAL 462003	6 27 16
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
5-8-56C L.N. Gupta Marg	HYDERABAD 500001	22 10 83
R 14 Yudhister Marg, C Scheme	JAIPUR 302005	6 98 32
117/418 B Sarvodaya Nagar	KANPUR 208005	4 72 92
Patliputra Industrial Estate	PATNA 800013	6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at Today & Tomorrow's Printers & Publishers New Delhi India