भारतीय मानक
Indian Standard

IS 7466 : 2023

प्रेशर कुकर के लिए रबर गैसकेट — विशिष्टि

(दूसरा पुनरीक्षण)

Rubber Gasket for Pressure Cooker — Specification

(Second Revision)

ICS 83.140.01

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Rubber and Rubber Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

The use of pressure cookers is very common in present day living. For proper functioning of the cookers, it is essential that the various components used should be of good quality. Rubber gasket is an essential part of the cooker and subjected to heat and moisture throughout its use. It is therefore, essential that the rubber mix used for making gasket is of good quality and they are tested for various requirements given in this standard. It is not uncommon to find often gasket contain harmful ingredients, which are likely to go into the solution/steam and contaminate the food. Further, they often impart undesirable odour, taste or discolouration.

This standard was first published in 1974 and subsequently revised in 1994. In the first revision, the EDTA method was incorporated as given in ISO/DIS 9298 'Rubber compounding ingredients — Zinc oxide — Test method' for determination of zinc oxide in place of existing potassium cyanide method because potassium cyanide is highly poisonous and hazardous chemical. Through the use of this standard, it was found that it was not essential to specify the limits for free sulphur content in the case of pressure cooker gaskets. However, low compression set and better ageing properties ensured by specifying their limits since low free sulphur content was always accompanied by improved compression set and ageing properties and these two properties were vital to the life of the gaskets. The committee, therefore, decided that since ageing properties had already been included in the standard, the free sulphur requirement was substituted by a performance requirement, compression set.

Since use of silicone rubber has been increased, the Committee responsible for formulation of this standard decided to include requirements for silicone rubber, also. The Committee also observed that the rubber gasket is mostly made of nitrile rubber, hence, decided to replace rubber compound with nitrile rubber.

In this second revision, the major changes are:

a) Requirements for silicone rubber has been included;

b) Requirements of volatile matter, discolouration, odour, taste, migration of certain elements, release of harmful ingredients such as *N*-Nitrosamines, *N*-Nitrosatable substances, extractables and polycyclic aromatic hydrocarbons (PAHs) have been included;6

c) Alternate test method for the determination of zinc oxide has been included;

d) The scope of the standard has been modified to cover the requirements of gasket used in the commercial pressure cooker (*see* IS 17870 : 2022); and

e) Amendment no. 1 has also been incorporated.

Due to the adverse effect of polycyclic aromatic hydrocarbons (PAHs) on human health and environment impact, determination of PAHs like benzo(a)pyrene (BaP) (CAS No 50-32-8), benzo(e)pyren (BeP) (CAS No 192-97-2), benzo(a)anthracene (BaA) (CAS No 56-55-3), chrysen (CHR) (CAS No 218-01-9), benzo(b)fluoranthene (BbFA) (CAS No 205-99-2), benzo(j)fluoranthene (BjFA) (CAS No 205-82-3), benzo(k)fluoranthene (BkFA) (CAS No 207-08-9) and dibenzo(a, h)anthracene (DBAhA) (CAS No 53-70-3) are therefore included.

During the second revision, assistance have been derived from:

a) IS 3565 Teats for feeding bottles;

b) US FDA 177.2600 Rubber articles intended for repeated use;

c) Directive 93/ 11/EEC concerning the release of the N-Nitrosamines and N-Nitrosatable substances; and

d) Directive 2005/69/EC relating to restrictions on the marketing and use of certain dangerous substances and preparations (polycyclic aromatic hydrocarbons in extender oils and tyres).

(*Continued on third cover*)

Indian Standard

SPECIFICATION FOR RUBBER GASKET FOR PRESSURE COOKER

(Second Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for rubber gaskets used for pressure cookers.

2 NORMATIVE REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TYPES

This standard prescribes following two types of gasket:

a) Type 1 — Gasket made of nitrile rubber; and
b) Type 2 — Gasket made of silicone rubber.

4 REQUIREMENTS

4.1 Material

The rubber gaskets shall be made from nitrile rubber or silicone rubber compound suitable for food contact applications. All the compounding ingredients used in the rubber shall be free from harmful materials liable to extraction in contact with foodstuffs or steam or which may cause the development of undesirable toxicity, odour, taste or discolouration. Inorganic pigments and organic dyestuffs used shall also satisfy the requirement stated above.

4.2 Workmanship and Finish

The gaskets, when visually examined, shall be free from blisters, pinholes, cracks, embedded foreign matters and other defects which may impair their serviceability.

4.3 Dimensions

The dimensions of the gasket shall be as agreed to between the purchaser and the supplier.

4.4 The rubber used for gaskets shall comply with the requirements given in Table 1 when tested as prescribed in col 5 and 6 of Table 1.

4.5 Migration of certain elements from gasket shall comply to the limits given in Table 2 when tested as prescribed in col (5) of Table 2.

4.6 The gasket shall also pass the performance test as given in Annex F.

4.7 Quality of Reagent

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

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

5 PACKING AND MARKING

5.1 Packing

The gasket shall be packed as agreed to between the purchaser and the supplier.

5.2 Marking

5.2.1 Each package of gasket shall be marked with the following:

a) Name of the material;
b) Indication of source of manufacture;
c) Capacity of the cooker to which the gasket will fit;
d) Number of gaskets;
e) Lot or batch number; and
f) Month and year of the manufacture.

5.2.2 Each gasket shall be marked with the following:

a) Capacity of the cooker to which the gasket will fit.

NOTE — Printing inks, if used, shall conform to IS 15495.

5.3 Cleaning instructions for silicone rubber to be provided with user instructions. Use chlorinated bleaching solution (being used in washing machine) or lime or tamarind or vinegar in warm water (less than 60 °C) for cleaning of silicone rubber.

5.4 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

6 SAMPLING

6.1 Representative samples shall be drawn as prescribed in Annex G.

Table 1 Requirements of Rubber Used for Gaskets
(*Clause* 4.4)

Sl No.	Characteristic	Requirement		Methods of Test Refer To,	
		Type 1	Type 2	Annex	Indian Standard/Other Publication
(1)	(2)	(3)	(4)	(5)	(6)
i)	Hardness, IRHD/ Shore A	70 ± 5	70 ± 5	-	IS 3400 (Part 2/ Sec 2)/IS 3400 (Part 2/ Sec 4)
ii)	Tensile strength, MPa, *Min*	10	7.5	-	IS 3400 (Part 1)
iii)	Elongation at break, percent, *Min*	200	200	-	-do-
iv)	After ageing for 3 days at 100°C in air-oven, change from the original value in:			-	IS 3400 (Part 4)
	Hardness, IRHD/Shore A	+ 8 – 2	± 5		
	Tensile strength, percent*	+ 10 – 20	± 10		
	Elongation at break percent *	+ 10 – 35	± 10		
v)	After ageing in an autoclave for 8 h under a direct steam pressure of 1 kgf/cm^2 and 120 °C temperature, change from the original value in:			-	IS 3400 (Part 4)
	Hardness, IRHD/ Shore A	+ 5 – 0	+ 5 – 0		
	Tensile strength, percent *	± 10	± 10		
	Elongation at break,percent*	+ 10 – 25	± 10		
vi)	Change in volume, percent*	+ 5 – 0	+ 2 – 0	-	IS 3400 (Part 6) **Immersion Temperature:** (120 ± 2) °C **Duration of Immersion:** 72^{+0}_{-2} h **Test Liquid:** Distilled water (*see* IS 1070)

Table 1(*Concluded*)

Sl No.	Characteristic	Requirement		Methods of Test Refer To,	
		Type 1	Type 2	Annex	Indian Standard/Other Publication
(1)	(2)	(3)	(4)	(5)	(6)
vii)	Compression set, at (125 ± 2) °C for 21^{+0}_{-2} h percent, *Max*	25	10	-	IS 3400 (Part 10/Sec 1)
viii)	Discolouration	To pass the test	----	Annex B	-
ix)	Odour and taste	To pass the test	----	Annex C	-
x)	Volatile matter, percent, *Max*	0.1	0.1		Annex E of IS 3565
xi)	Total zinc oxide, percent by mass, *Max*	3.0	---	Annex D	ISO 19050[1)]
xii)	N-Nitrosamines, mg/kg, *Max*	0.01	0.01	-	Annex G of IS 3565
xiii)	N-Nitrosatables, mg/kg, *Max*	0.1	0.1	-	Annex G of IS 3565
xiv)	Extractables			Annex E	
	a) in water, mg/cm^2 (mg/inch^2), *Max*				
	1) First 7 h	129 (20)	129 (20)		
	2) Successive 2 h	6.45 (1)	6.45 (1)		
	b) in hexane, mg/cm^2 (mg/inch^2), *Max*				
	1) First 7 h	1129 (175)	1129 (175)		
	2) Successive 2 h	25.8 (4)	25.8 (4)		
xv)	Polycyclic aromatic hydrocarbons (PAH)			-	EN 16143[2)]
	Benzo(a)pyrene (BaP)	< 1 mg/ kg			
	Sum of the benzo(e)pyren (BeP), benzo(a)anthracene (BaA), chrysen (CHR), benzo(b)fluoranthene (BbFA), benzo(j)fluoranthene (BjFA), benzo(k)fluoranthene (BkFA), dibenzo(a, h)anthracene (DBAhA)	< 10 mg/ kg			

* To be computed as percentage of the recorded value of the unaged test piece.

[1)] In case of dispute, ISO 19050 to be followed.

[2)]EN 16143 test method to be used till corresponding IS test method is developed.

Table 2 Permissible Levels of Heavy Metals in Gasket
(*Clause* 4.5)

Sl No.	Heavy Metals	Maximum Limit, mg/kg		Ref to IS No.
		Type 1	Type 2	
(1)	(2)	(3)	(4)	(5)
i)	Antimony	15	15	IS 15303
ii)	Arsenic	10	10	IS 3025 (Part 37)
iii)	Chromium	10	10	IS 3025 (Part 52)
iv)	Mercury	10	10	IS 3025 (Part 48)
v)	Cadmium	20	20	IS 3025 (Part 41)
vi)	Lead	25	25	IS 3025 (Part 47)
vii)	Barium	100	100	IS 1699
viii)	Selenium	100	100	IS 3025 (Part 56)[3)] /IS 15303

[3)] In case of dispute, IS 3025 (Part 56) shall be the referee method for selenium.

ANNEX A
(*Clause* 2)
LIST OF REFERRED STANDARDS

IS No./Other Publications	*Title*
IS 170 : 2020	Acetone — Specification (*fifth revision*)
IS 1070 : 1992	Reagent grade water — Specification (*third revision*)
IS 1699 : 1995	Methods of sampling and test for food colours (*second revision*)
IS 3025	Methods of sampling and test (physical and chemical) for water and wastewater:
(Part 37) : 2022	Arsenic (*second revision*)
(Part 41) : 1992	Cadmium (*first revision*)
(Part 47) : 1994	Lead (*first revision*)
(Part 48) : 1994	Mercury (*first revision*)
(Part 52) : 2003	Chromium (*first revision*)
(Part 56) : 2003	Selenium (*first revision*)
IS 3400 (Part 1) : 2021/ISO 37 : 2017	Methods of test for vulcanized rubbers: Part 1 Tensile stress-strain properties (*fourth revision*)
IS 3400	Methods of test for rubber, vulcanized or thermoplastic:
(Part 2)	Determination of hardness,
(Sec 2) : 2022/ISO 48-2 : 2018	Hardness between 10 IRHD and 100 IRHD (*fifth revision*)
(Sec 4) : 2022/ISO 48-4 : 2018	Indentation hardness by durometer method (Shore hardness) (*second revision*)
(Part 4) : 2012/ISO 188 : 2011	Accelerated ageing and heat resistance (*third revision*)
(Part 6) : 2018/ISO 1817 : 2015	Determination of the effect of liquids (*fourth revision*)
(Part 10)	Compression set,
(Sec 1) : 2020/ISO 815-1 : 2014	At ambient or elevated temperatures (*second revision*)
IS 3565 : 2018	Teats for feeding bottles — Specification (*first revision*)
IS 4905 : 2015/ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 15303 : 2003	Determination of antimony, iron and selenium in water by electrothermal atomic absorption spectrometric method
IS 15495 : 2020	Printing ink for food packaging — Code of practice (*first revision*)
ISO 19050 : 2021	Rubber, raw, vulcanised — Determination of metal content by ICP-OES
EN 16143 : 2013	Petroleum products — Determination of content of benzo(a)pyrene (BaP) and selected polycyclic aromatic hydrocarbons (PAH) in extender oils — Procedure using double LC cleaning and GC/MS analysis

ANNEX B
[*Table* 1, *Sl No.* (viii)]

DISCOLOURATION TEST

B-1 Take a gasket, wash it is warm water using a mild detergent. Rinse the gasket with water. Cut the gasket into 6 equal cords. Fill the cooker to half capacity with 1 : 3 of rice and water. Put the 6 pieces into the cooker. Close the cooker with the lid. Put the cooker on a heat source. Cook the rice, after the first whistle reduce the heat and after the third whistle shut of the heat source. Allow the cooker to cool at ambient temperature. Open the cooker, use a clean stainless steel spoon to scoop the rice and check if there is discoloration of the rice due to the gasket pieces.

ANNEX C
[*Table* 1, *Sl No.* (ix)]

ODOUR AND TASTE TEST

C-1 Take a gasket, wash it is warm water using a mild detergent. Rinse the gasket with water. Cut the gasket into 6 equal cords. Fill the cooker with half capacity distilled water. Put the 6 pieces into the cooker. Close the cooker with the lid. Put the cooker on a heat source. Boil the gaskets for 30 minutes. Shut of the heat source, allow the cooker to cool at ambient temperature. Open the cooker, use a clean stainless steel spoon to take a spoon full of water, smell and taste it, there should be no smell or bitter taste

ANNEX D
[*Table* 1, *Sl No.* (xi)]

DETERMINATION OF ZINC OXIDE

D-1 GENERAL

Presence of zinc oxide is estimated by titrating with standardized EDTA solution. Calcium, magnesium, iron, titanium, aluminium, antimony and silica, if present in the gasket material, do not interfere.

The sample is ashed and the ash is dissolved in hydrochloric acid. Aluminium chloride and ammonium fluoride are added to precipitate calcium and magnesium as the hexafluoro-aluminates, fluoride complexes iron, titanium and excess aluminium. The *p*H is adjusted to 4.5 and zinc is titrated with EDTA. Total zinc content of the sample is determined and calculated as zinc oxide.

D-2 APPARATUS

D-2.1 Crucibles — porcelain or silica, 30 ml nominal capacity.

D-2.2 Asbestos Board — approximately 100 mm square and 6 mm thick with a hole in the centre to support the crucible so that approximately two-third of it projects below the board.

D-2.3 Electric Muffle Furnace — with thermocouple and thermostat for control of temperature.

D-2.4 Burette — 10 ml capacity, graduated with 0.02 ml dimensions.

D-3 REAGENTS

D-3.1 Acetone — *see* IS 170.

D-3.2 Aluminium Chloride Solution (0.1 M)

Dissolve 2.42 g of aluminium chloride hexahydrate ($AlC1_3.6H_2O$) in water and dilute to 100 ml.

D-3.3 Ammonium Fluoride Solution (3 M)

Dissolve 55.5 g of ammonium fluoride (NH_4F) in water and dilute to 500 ml. Store in a polythene or wax-coated bottle.

D-3.4 Buffer Solution

Dissolve 60 g of acetic acid (CH_3COOH) and 77 g of ammonium acetate (CH_3COONH_4) in water and dilute to 100 ml.

D-3.5 Dithizone Indicator Solution

Dissolve 0.01 g of dithizone in 10 ml of acetone. Prepare fresh every 48 hours.

D-3.6 EDTA Solution (0.01M)

Dissolve 3.72 g of ethylene-diamine tetracetic acid, disodium salt, dihydrate, in water and dilute to 100 ml.

D-3.7 Zinc Chloride, Standard Solution

Ignite zinc oxide in a porcelain crucible for 2 h at (550 ± 25) °C and cool in a desiccator. Dissolve about 1.0 g of the dried reagent, weighed to the nearest 0.001 g in 50 ml of water and 20 ml of HCl. Transfer to a 1 000 ml volumetric flask and dilute to the mark with water.

D-3.8 Standardization of EDTA Solution

Standardize the EDTA solution with zinc chloride standard solution. With a pipette, transfer 25 ml of standard zinc chloride solution to a 250 m1 conical flask. Add 5 ml of HCl and proceed according to **D-4.3**, beginning with the addition of aluminium chloride ($AlCl_3$) solution. A 50 m1 capacity of burette is to be used.

D-3.9 Methyl Orange Solution (1 g/100 ml)

Dissolve 0.025 g of methyl orange in 25 ml of water.

D-3.10 Magnesium Chloride Solution (0.1 M)

Dissolve 2.03 g of magnesium chloride hexahydrate ($MgCl_2.6H_20$) in water and dilute to 100 ml.

D-4 PROCEDURE

D-4.1 Weigh approximately 1 g of sample to the nearest 0.001 g in a porcelain crucible, previously ignited and weighed. Ash it in accordance with **C-4.1.1**, if the sample does not contain chloroprene or other rubbers containing halogens.[a)]

NOTE — If halogens are present, ash the sample by adding about 5 ml of H_2SO_4 to the[b)] crucible containing the weighed specimen followed by cautions heating over a small flame slowly, to allow completion of reaction. Heating rate must be adjusted so that there is no splattering or loss of material from the crucible, until all sulphuric acid has been dried off. Ignite to burn off the carbonaceous material over flame, or in a muffle furnace (at about 950 °C for approximately 1h).

D-4.1.1 Weigh, to an accuracy of 0.01 g, about 1g of the sample into a previously ignited and weighed crucible and place in a hole in the asbestos board. Heat gently over a small bunsen flame so that the rubber does not ignite and no spurting occurs. When the rubber is completely decomposed to charred mass, transfer the crucible to the muffle furnace at a temperature of (550 ± 25) °C. Continue the heating until the ash free from specks of carbon, cool in a desiccator and weigh. Repeat heating, cooling and weighing until the change in mass on further heating for 20 minutes does not exceed 1 mg.

D-4.2 Cool the crucible and wash the ash into 250 m1 beaker with a stream of water. Add 5 ml of HCl to the crucible and warm it on a hot plate until the solution just begins to boil. Pour the washings into the beaker. Rinse the crucible once more with 5 ml of HCl and again add the washings to the beaker. Do not filter the solution. Then add 10 ml of HCl to the beaker. Break up any large cakes of ash with a glass stirring rod. Evaporate the solution to 10 ml. If large amounts of precipitate are present, some bumping and splattering may occur. This can be reduced by agitating the solution until boiling begins. Transfer the solution to a 100 m1 volumetric flask and dilute to the mark with water.

D-4.3 Take out an aliquot of 10 ml from the above solution and transfer it to a 250 ml conical flask, mixing the solution and suspended solids well before aliquoting. Dilute the aliquot to 25 ml and add 1 ml of concentrated HC1, 2 ml of $AlCl_3$ solution, 5 ml of $MgCl_2$ solution, 10 ml of NH_4F solution and 1 drop of methyl orange indicator solution. Add NH_4OH until the indicator is pure yellow in colour and add 0.5 ml more NH_4OH. If the sample is known to be high in zinc or calcium, bring it to a boil. Boil for 30 s, and cool to room temperature. Add 10 ml of buffer solution. Titrate with EDTA solution to a yellow-green colour, using the 10 ml capacity burette.

D-5 CALCULATIONS

Standardization: $C = \frac{M}{(V_1 \times 40)}$

Analysis: ZnO, percent $= \frac{(V_2 \times C \times 100 \times 100)}{(S \times A)}$

$= \frac{(V_2 \times C \times 1\,000)}{S}$

where

C = Concentration of EDTA solution, g ZnO/m1;
M = Mass of zinc oxide, g;
V_1 = Volume of EDTA solution used in standardization, ml;
V_2 = Volume of EDTA solution used in titration, ml;
S = Mass of sample, g; and
A = Aliquot size, ml.

ANNEX E
[*Table* 1, *Sl No.* (xiv)]

EXTRACTABLE IN WATER AND HEXANE

E-1 EXTRACTABLE IN WATER

5 g of sample is reflux in doubled distilled water for 7 h and total extractable are measured after evaporating water against blank. Than sample is subject to 2 h successive reflux in doubled distilled water and total extractable are measure by evaporating water against blank.

E-2 EXTRACTABLE IN HEXANE

5 g of sample is reflux in analytical grade *n*-hexane for 7 h and total extractable are measured after distilling out hexane against blank. Than sample is subjected to 2 h successive reflux in analytical grade *n*-hexane and total extractable are measure by distilling out hexane against blank.

ANNEX F
(*Clause* 4.6)

PERFORMANCE TEST FOR PRESSURE COOKER GASKETS

F-1 GENERAL

F-1.1 The test consists of exposing gasket to actual service conditions and observing effects of the test on the gasket.

F-2 APPARATUS

F-2.1 Pressure Cooker — for which the gasket has been designed.

F-3 PROCEDURE

F-3.1 Fill up the pressure cooker to half its height with water. Close the lid properly, ensuring that it fits tight all over the circumference. Put the cooker on the burner or hot plate taking precaution to put the safety counterweight as soon as the steam is generated. Continue the operation for a period of 120 h, stopping the operation at periodic intervals of 4 h, replacing water level if need be in the cooker. During this operation of 120 h, no leakage of steam shall be observed.

NOTE — After each 4 h of testing, water and pressure cooker either be changed or cooled down to the normal ambient temp then start testing for the next 4 h and so on until 120 h of testing.

ANNEX G
(*Clause* 6.1)

SAMPLING PROCEDURE FOR RUBBER GASKETS FOR PRESSURE COOKERS

G-1 SCALE OF SAMPLING

G-1.1 Lot

All rubber gaskets of the same material and produced under similar conditions of manufacture, in a single consignment shall be grouped together and each group shall constitute a lot.

G-1.1.1 For determining the conformity of the lot the requirements of this specification, samples shall be tested from each lot separately.

G-1.2 The number of rubber gaskets to be selected for the purpose shall depend on the lot size and shall be in accordance with Table 3.

Table 3 Scale of Sampling and Permissible Number of Defectives
(*Clause* G-1.2)

Sl No.	Lot Size	Sample Size	Permissible Number of Defectives	Sub-Sample Size
(1)	(2)	(3)	(4)	(5)
i)	Up to 200	13	1	2
ii)	201 to 500	20	2	3
iii)	501 to 1 000	32	2	4
iv)	1 001 and above	50	3	5

G-1.2.1 These rubber gaskets shall be selected at random. In order to ensure the randomness of the selection, random sampling procedures given in IS 4905 may be followed.

G-2 CRITERIA FOR ACCEPTANCE

G-2.1 All rubber gaskets selected under **G-1.2** shall be examined for visual and dimensional characteristics (**4.1**, **4.2**, **4.3**) as well as performance test (**4.6**). Any gasket failing to satisfy any of these requirements shall be considered as defective. If the number of defective gaskets found in the sample is less than the corresponding number given in col (4) of Table 3, the lot shall be considered to have met these requirements.

G-2.2 From each lot which has been found satisfactory under **G-2.1,** the number of gaskets as given in col (5) of Table 3 shall be taken and tested for physical characteristics [Table 1, Sl No. (i) to (x)]. The lot shall be deemed to have passed the physical requirements if all these gaskets satisfy the relevant tests.

G-2.3 From each lot found satisfactory under **G-2.1** and **G-2.2**, three more gaskets shall be taken and a composite sample shall be prepared by mixing suitably the rubber material of the gaskets. The composite sample so prepared shall be tested for chemical characteristics [clause **4.5** and Table 1, Sl No. (xi) to (xv)].

NOTE — The rubber gaskets needed for testing under **G-2.2** and **G-2.3** may be chosen from those which have been selected under **G-2.1.**

G-2.4 The lot shall be considered to conform to the requirements of this specification if **G-2.1, G-2.2** and **G-2.3** are satisfied.

ANNEX H
(*Foreword*)

COMMITTEE COMPOSITION

Rubber and Rubber Products Sectional Committee, PCD 13

Organization	*Representative(s)*
Rubber Research Institute of India, Rubber Board, Kottayam	DR SIBY VARGHESE **(*Chairperson*)**
All India Rubber Industries Association, Mumbai	SHRI SRIKANTH KRISHNAMURTHY SHRI CHINMOY RAY (*Alternate*)
Apcotex Industries Limited	DR S. V. GOVINDRAJU
Association of Latex Producers of India, Kerala	SHRI SATISH ABRAHAM
Association of Planters of Kerala, Thiruvananthapuram	SHRI SANTOSH KUMAR SHRI PHILIP C. JACOB (*Alternate*)
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Block Rubber Processors Association of India, Mumbai	SHRI RAJIV THARIAN SHRI RONNY JOSEPH (*Alternate*)
Directorate General of Quality Assurance (DGQA), Ministry of Defence, New Delhi	SHRI S. K. SAXENA SHRI V. K. CHHABRA (*Alternate*)
Dow Corning India Pvt Ltd, Mumbai	SHRI SUBHRANSHU GUPTAZ
Flame Retardants Association of India, Gurgaon	SHRI P. V. MURALI MOHAN
GRP Limited, Mumbai	SHRI KALYAN DAS SHRI K. M. RAVI (*Alternate*)
Hari Shankar Singhania Elastomer & Tyre Research Institute (HASETRI), Mysore	DR SAIKAT DAS GUPTA
Indian Oil Corporation R&D Centre, Faridabad	DR DEEPAK SAXENA DR PANKAJ BHATNAGAR (*Alternate*)
Indian Rubber Manufacturers Research Association (IMRA), Mumbai	DR K. RAJKUMAR DR BHARAT KAPGATE (*Alternate*)
Indian Synthetic Rubber Private Limited (ISRPL) Noida	SHRI LALIT KUMAR SHARMA SHRI BHANU PRATAP SINGH (*Alternate*) SHRI TUHIN KANTI DAS (*Young Professional*)
KA Prevulacanized, Tamilnadu	SHRI PRAVEEN MATHEW
LPG equipment research centre, Bangalore	SHRI SANTOSH K GUPTA SHRI ASHIS KUMAR BERA (*Alternate*)

Organization	*Representative(s)*
LANXESS India Private Limited, Kolkata	SHRI ARINDAM GHOSH
MRF Limited, Chennai	SHRI G. SHYJU DR P. INDUMATHI (*Alternate*)
Newage Fire Protection Industries Pvt Ltd	SHRI BHARAT J. SHAH SHRI JAYANT SINHA (*Alternate*)
Rado Industries Ltd, Faridabad	SHRI KAILASH GUPTA
Reliance Industries Ltd, Vadodara	DR ABHIJIT ADHIKARY SHRI SHAMBHU LAL AGARWAL (*Alternate*)
Research, Designs & Standards Organization (RDSO), Lucknow	SHRI P. K. BALA SHRI MANOJ MINZ
Shri Sati Rubber Industries, Jaipur	SHRI VIJAY KUMAR AGARWAL SHRI SUDHIR AGARWAL (*Alternate*)
Voluntary Organization in Interest of Consumer Education (VOICE), New Delhi	SHRI M. A. U. KHAN SHRI H. WADHWA (*Alternate*)
In Personal Capacity (*A-302-303, Casa Central, Sarabhai Compound, Genda Circle, Vadiwadi Vadodara – 390007*)	DR ARUP K. CHANDRA
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(*Continued from second cover*)

This standard contains clauses **4.3** and **5.1** which call for agreement between the purchaser and the supplier.

The composition of the committee responsible for formulation of this standard is listed in Annex H.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 (*second revision*). The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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