

भारतीय मानक
Indian Standard

IS 1867 : 2023

गर्म पानी की रबड़ की बोतलें — विशिष्टि
(दूसरा पुनरीक्षण)

Rubber Hot Water Bottles —
Specification
(Second Revision)

ICS 83.060

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Price Group 5

Rubber and Rubber Products Sectional Committee, PCD 13

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.

This standard was first published in 1961 and subsequently revised in 1975. In the first revision, requirements of plastic stopper, water immersion test and sampling procedure were modified and requirement of rubber washer was incorporated.

The second revision has been brought out to keep pace with the latest technological developments and international practices. In this revision, the following major changes have been made:

- i) Cross referred standards updated in **2**;
- ii) Immersion time specified in **4.3.2**;
- iii) Instruction for use incorporated in **5.3**; and
- iv) Amendment No. 1 and 2 to the previous version incorporated.

In the preparation of this standard, considerable assistance has been derived from BS 1970 : 2012 'Hot water bottles manufactured from rubber and PVC — Specification'.

This standard contains **3.1.2**, **4.1.2** 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 given in Annex F.

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 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

RUBBER HOT WATER BOTTLES — SPECIFICATION

(*Second Revision*)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for rubber hotwater bottles without fabric insertion.

2 REFERENCES

The standards given below 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 agreement based on standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

<i>IS No.</i>	<i>Title</i>
IS 3400	Methods of test for vulcanized rubber:
(Part 1) : 2021 /ISO 37 : 2017	Part 1 Tensile stress — Strain Properties (<i>fourth revision</i>)
(Part 4) : 2012 /ISO 188 : 2011	Part 4 Accelerated ageing and heat resistance (<i>third revision</i>)
(Part 13) : 2021 /ISO 2285 : 2013	Part 13 Tension set (<i>second revision</i>)

3 SIZE AND CAPACITY

3.1 Size

3.1.1 The rubber hot water bottles shall be of the following nominal sizes, with a tolerance of ± 10 mm.

- a) Height 250 mm $\times$ width 190 mm; and
- b) Height 300 mm $\times$ width 200 mm.

3.1.2 Other sizes may also be manufactured as agreed to between the purchaser and supplier.

3.2 Capacity

3.2.1 When determined according to the method prescribed in Annex A, the capacity of rubber hot water bottles shall be not less than 1.5 litres in case of size 250 mm $\times$ 190 mm and 2 litres in case of size 300 mm $\times$ 200 mm.

3.2.2 In case of other sizes (*see 3.1.2*), the capacity of rubber hot water bottle shall be

declared by the manufacturer.

4 REQUIREMENTS

4.1 Raw Material, Construction and Workmanship

4.1.1 The raw materials and the construction shall be such as to ensure satisfactory performance of the rubber hot water bottles under normal conditions of use. The workmanship shall be good throughout and the rubber hot water bottles shall be free from porosity and from flaws causing local reductions in the thickness or strength of the vulcanized rubber below that specified in this standard.

4.1.2 The rubber hot water bottles shall have a smooth or patterned surface as agreed between the purchaser and the supplier. Every bottle shall be accompanied with a spare rubber washer. The rubber washer shall be of good quality and have hardness between 55 and 70 IRHD. It shall not show change in hardness of more than 5 IRHD nor any other apparent deterioration on ageing at $100^{\circ}\text{C} \pm 1^{\circ}\text{C}$ for 72 h in air oven in accordance with IS 3400 (Part 4).

4.1.3 The stopper shall provide a water-tight seal and metal parts, if any, shall be made from a corrosion-resisting material or have a corrosion-resisting finish. The stopper shall also withstand the test stipulated in Annex B.

4.2 Thickness

The rubber hot water bottle at no point shall have a wall thickness of less than 1.2 mm, when measured by thickness gauge.

4.2.1 The edges and neck shall be strengthened by increasing the thickness of rubber.

4.3 Leakage Test

4.3.1 The rubber hot water bottle shall not show any leakage when tested according to the method prescribed in Annex C.

4.3.2 The rubber hot water bottle, when inflated with air to a pressure of 10 kN/m² and immersed in water for a minimum time of 5 s, shall show no sign of leakage.

IS 1867 : 2023

4.4 Tensile Strength and Elongation at Break

4.4.1 Before Ageing

When tested according to the method prescribed in IS 3400 (Part 1), the vulcanized rubber shall have a tensile strength of not less than 14 MN/m² ($\approx$ 140 kgf/cm²) and elongation at break of not less than 500 percent.

4.4.2 After Ageing

The rubber component of the hot water bottle, when aged in an air oven at a temperature of 100 °C $\pm$ 1 °C for 72 h, in accordance with the method prescribed in IS 3400 (Part 4), shall not become tacky or show any cracks on the surface, the tensile strength and elongation at break of aged test pieces of rubber shall not vary by more than $\begin{matrix} +10 \\ -30 \end{matrix}$ percent and $\begin{matrix} +10 \\ -35 \end{matrix}$ percent respectively of the corresponding values of the unaged test pieces, when tested according to the method prescribed in IS 3400 (Part 1).

4.4.3 After Immersion

After continuous immersion of the test pieces in water at a temperature of 90 °C $\pm$ 1 °C for 72 h, the tensile strength and elongation at break shall not be less than 75 percent and 80 percent, respectively of the original value.

4.4.3.1 The dimensions of the test pieces shall be taken before immersion in water. After termination of the immersion period, the test pieces shall be stored in water at room temperature for a period of 16 h to 24 h before testing. All free surface moisture shall be removed by a suitable absorbent from the test pieces before testing.

4.5 Tension Set

The tension set of the vulcanized rubber, when determined by the method prescribed in IS 3400 (Part 13), shall not exceed 15 percent. The test piece shall be stretched to 100 percent elongation at room temperature.

5 PACKING AND MARKING

5.1 Packing

The rubber hot water bottle and spare rubber washers shall be packed as agreed to between the purchaser and the supplier.

5.2 Marking

Each rubber hot water bottle shall be permanently

marked with:

- a) Size and capacity;
- b) Month and year of manufacture;
- c) Batch number/lot number; and
- d) Manufacturer's name or trade-mark, if any.

5.3 The following additional instructions for use shall be provided:

- a) An adequate cover should be used, in case of prolonged contact with skin;
- b) Rubber hot water bottle should not be used as cushion;
- c) Prevent contact with oil or grease;
- d) Drain the water when not in use;
- e) Do not place anything on the bottle during the storage; and
- f) Retain these instructions for future references.

5.4 Warning

The following 'WARNING' shall be provided in the form given below:

HOT WATER BOTTLES CAN CAUSE BURNS, AVOID PROLONGED DIRECT CONTACT WITH THE SKIN.

5.5 Rubber articles deteriorate with time in use and in storage. To reduce this natural deterioration, the recommendation for proper use and storage of rubber hot water bottles given at Annex D may be provided with rubber hot water bottle.

5.6 BIS Certification Marking

Each rubber hot bottle 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

Representative samples shall be drawn and conformity of the material to the requirements of the specification shall be determined according to the procedure given in Annex E.

ANNEX A

(Clause 3.2)

DETERMINATION OF CAPACITY

A-1 PROCEDURE

Fill the rubber hot water bottle with water at room temperature up to the top of the closure or neck plug,

and keep it suspended in a vertical position. At the end of the five minutes make up the water, if necessary, and then measure the total volume of water as the capacity of the bottle.

ANNEX B

(Clause 4.1.3)

TEST FOR STOPPER

B-1 PROCEDURE

Keep the plastics stopper immersed in boiling water for 2 h using sinker, if necessary. Remove the stopper from water and allow it to cool in air at room

temperature. The stopper shall not show any signs of deterioration, distortion or other defects when examined after the above treatment. It shall also give satisfactory leak-proof closure when tested as given in Annex C.

ANNEX C

(Clause 4.3.1 and B-1)

LEAKAGE TEST

C-1 PROCEDURE

C-1.1 Fill the rubber hot water bottle completely with hot water having temperature of 80 °C to 90 °C and screw the stopper in position. Suspend the bottle by means of the eyelet at the bottom and allow it to remain in that position for one hour. There shall be no leakage from any part of the bottle.

C-1.2 Fill the rubber hot water bottle completely with water maintained at 80 °C to 90 °C and screw the stopper in position. Allow the bottle to lie horizontally on a flat surface and subject it to a load of 20 kg evenly distributed over the surface of the bottle for half an hour. There shall be no sign of leakage or other damage.

IS 1867 : 2023

ANNEX D

(Clause 5.5)

RECOMMENDATIONS FOR STORAGE AND USE OF RUBBER HOT WATER BOTTLES

D-1 STORAGE

The bottles should be stored in a dry and cool place, packed loosely in boxes or containers to protect them from the action of light and from being crushed away, from hot pipes, radiators, electrical equipment liable to spark, ultra-violet light, oil and grease. Establish withdrawal from old stock first.

D-2 USE

D-2.1 To put into use, fill the bottle with hot, but not

boiling water to not more than two-third of its capacity by holding it by the neck which should be kept upright and lowering it on to a flat surface until water appears at the opening. Screw the stopper tightly. Do not allow the bottle to come into contact with any hot surfaces, oil or grease.

D-2.2 When not in use, drain completely and store as recommended. When cleaning the surface of the bottle, use soap and water; if synthetic detergents are used, care shall be taken in their selection as some are harmful to rubber.

ANNEX E

(Clause 6)

SAMPLING PLAN FOR RUBBER HOT WATER BOTTLES

E-1 LOT

E-1.1 All rubber hot water bottles of the same size and capacity and produced under similar conditions of manufacture shall be grouped together to constitute a lot.

E-1.2 Tests for the determination of the conformity of a lot to the requirements of the specification shall be carried out for each lot separately. For this purpose, a number of hot water bottles shall be selected from the lot. This number depends on the size of the lot and shall be as given in Table 1.

E-1.3 The hot water bottles shall be selected at random in accordance with col (1) and (2) of Table 1. In order to ensure the randomness of selection, random sampling procedures given in IS 4905 'Random sampling and randomization procedures (first revision)' may be followed.

E-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

E-2.1 All the hot water bottles selected according to **E-1.2** and **E-1.3** shall be examined for raw material, construction and workmanship (4.1). A bottle failing in one or more of these requirements shall be

considered as defective. The lot shall be considered to have satisfied these requirements if number of defective bottles found in the sample is less than or equal to the corresponding permissible number given in col (4) of Table 1.

E-2.2 The lot having been found satisfactory according to **E-2.1** shall be examined for size (3.1) and capacity (3.2). For this purpose, the sample size and permissible number of defectives shall be as given in col (5) and (6) of Table 1.

E-2.3 If the lot is found to be satisfactory according to **E-2.2**, it shall be tested for leak-proofness (4.3) of bottles. For this purpose, the sample size and permissible number of defectives shall be as given in col (7) and (8) of Table 1.

E-2.4 The lot found satisfactory according to **E-2.3** shall be finally tested for thickness (4.2), tensile strength and elongation at break (4.4) and tension set (4.5). The number of bottles to be tested for this purpose is given in col (9) of Table 1. A sample bottle failing in any of these requirements shall be considered as defective. The lot shall be considered to have met these requirements, if none of the bottles tested in the sample is found to be defective for each of these requirements.

Table 1 Scale of Sampling

(Clause E-1 and E-2)

Sl No.	No. of Hot Water Bottles in the Lot	No. of Bottles to be Selected in Respect of 4.1	Permissible No. of Defectives in Respect of 4.1	No. of Bottles to be Selected in Respect of 3.1 and 3.2	Permissible No. of Defectives in Respect of 3.1 and 3.2	No. of Bottles to be Tested for 4.3	Permissible No. of Defectives for 4.3	No. of Bottles to be Tested for 4.2, 4.4 and 4.5
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Up to 5	All	0	1	0	2	0	1
ii)	6 to 15	5	0	1	0	3	0	1
iii)	16 to 25	8	0	2	0	5	0	1
iv)	26 to 50	13	0	2	0	8	0	2
v)	51 to 100	20	1	3	0	13	0	2
vi)	101 to 300	32	2	5	0	20	0	2
vii)	301 to 1 000	50	3	8	0	32	0	3
viii)	1 001 to 5 000	80	5	13	0	50	0	5
ix)	5 001 to 10 000	125	7	20	1	80	1	8
x)	10 001 and above	200	10	20	1	125	2	8

IS 1867 : 2023

ANNEX F

(Foreword)

COMMITTEE COMPOSITION

Rubber and Rubber Products Sectional Committee, PCD 13

<i>Organization</i>	<i>Representative(s)</i>
Rubber Research Institute of India, Rubber Board, Kottayam	DR SIBY VARGHESE (<i>Chairperson</i>)
All India Rubber Industries Association, Mumbai	SHRI SRIKANTH KRISHNAMURTHY SHRI CHINMOY RAY (<i>Alternate</i>)
Apcotex Industries Limited, Talaja	DR S. V. GOVINDRAJU
Association of Latex Producers of India, Kottayam	SHRI SATISH ABRAHAM
Association of Planters of Kerala, Thiruvananthapuram	SHRI PHILIP C. JACOB
Automotive Tyres Manufacturers Association (ATMA), New Delhi	SHRI RAJIV BUDHRAJA SHRI NITEESH K. SHUKLA (<i>Alternate</i>)
Block Rubber Processors Association of India, Mumbai	SHRI RAJIV THARIAN SHRI RONNY JOSEPH (<i>Alternate</i>)
Directorate General of Quality Assurance (DGQA), Ministry of Defence, New Delhi	SHRI S. K. SAXENA SHRI V. K. CHHABRA (<i>Alternate</i>)
Dow Corning India Pvt Ltd, Mumbai	SHRI SUBHRANSHU GUPTA
Flame Retardants Association of India, Gurugram	SHRI P. V. MURALI MOHAN
GRP Limited, Mumbai	SHRI KALYAN DAS SHRI K. M. RAVI (<i>Alternate</i>)
HASETRI, Mysuru	DR SAIKAT DAS GUPTA
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KA Prevulcanized, Nagarcoil	SHRI PRAVEEN MATHEW
LANXESS India Private Limited, Kolkata	SHRI ARINDAM GHOSH

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MRF Limited, Chennai	SHRI G. SHYJU DR P. INDUMATHI (<i>Alternate</i>)
Newage Fire Protection Industries Pvt Ltd, New Delhi	SHRI BHARAT J. SHAH SHRI JAYANT SINHA (<i>Alternate</i>)
Rado Industries Limited, Faridabad	SHRI KAILASH GUPTA
Reliance Industries Ltd, Vadodara	DR ABHIJIT ADHIKARY SHRI SHAMBHU LAL AGARWAL (<i>Alternate</i>)
Research, Designs & Standards Organization (RDSO), Lucknow	SHRI P. K. BALA SHRI MANOJ MINZ (<i>Alternate</i>)
Shri Sati Rubber Industries, Jaipur	SHRI VIJAY KUMAR AGARWAL SHRI SUDHIR AGARWAL (<i>Alternate</i>)
United Planters Association of Southern India, Coimbatore	SHRI SANTOSH KUMAR
Voluntary Organization in Interest of Consumer Education (VOICE), New Delhi	SHRI M. A. U. KHAN SHRI H. WADHWA (<i>Alternate</i>)
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Amendments Issued Since Publication

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