

**AMENDMENT NO. 2 NOVEMBER 2024**  
**TO**  
**IS 17790 : 2022 INSULATED FLASK FOR DOMESTIC USE — SPECIFICATION**

*(Foreword, para 3)* — Insert the following at the end:

‘As material grades conforming to IS 6911 and IS 15997 have been permitted, so requirements for the welding procedure, staining test, and migration of heavy materials have been made mandatory. Apart from the importance of corrosion resistance, following requirements have been also added:

- a) Sensory verification analysis to ensure no discernible sensory alterations.
- b) Constituent migration assessment to verify compliance with safe transfer levels.
- c) Corrosion resistance evaluation to confirm maintenance of stainless steels intrinsic anticorrosion properties.’

*(Foreword, para 5)* — Substitute the following for existing:

‘The composition of the Committee responsible for the formulation of this standard is given in Annex G’.

*(Page 1, clause 4)* — Substitute the following for the existing:

**‘4 SHAPE, SIZE AND NOMINAL CAPACITY**

**4.1** The stainless-steel insulated flasks normally comes in various capacities from 150 ml to 2 500 ml. The mouth portion (size) comes in typically following two variants:

- a) Wide mouth above 45 mm; and
- b) Narrow mouth 45 mm and below.

NOTE — The design of the flask shall be such that it is easy to clean and prevent accumulation of dirt/muck.

**4.2 Types**



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**4.2.1** Heat retention Type 1 as per Table 1 A.

**4.2.2** Heat retention Type 2 as per Table 1 B.

**4.2.3** Cold retention Type 1 as per Table 2 (there is no Type 2).’

*(Page 2, clause 5.3)* — Substitute the following for the existing:

**‘5.3** Metal to metal welding if done, the weld shall be free from welding defects. The welding electrode shall conform to grade 308L (07Cr18Ni9) or higher grade as per IS 5856. The weld shall be finished properly so that when a finger is passed on the joint, it shall be smooth.

NOTE — The welding shall comply with Annex E.’

*(Page 2, clause 7.1.1)* — Substitute the following for the existing:

**‘7.1.1** The materials used to manufacture the inner containers shall be stainless steel of grades N1, N2 as per IS 15997/IS 6911 or grade 304 series as per IS 5522/IS 6911 or 316/316L as per IS 6911.’

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(Page 2, clause 7.1.2.1) — Substitute the following for the existing:

‘7.1.2.1 The material used for the outer container shall be stainless steel of grades N1, N2 as per IS 15997/IS 6911 or grade 304 series as per IS 5522/IS 6911 or 316/316L as per IS 6911. The minimum thickness of the outer container shall be 0.3 mm for flasks with capacity less than 1 000 ml and 0.4 mm for flasks with capacity 1 000 ml and above.

NOTE — If grades N1 and N2 are used, then material shall comply with the requirements given in Annex C, D, and E’.

(Page 2, clause 7.1.2.2) — Substitute the following for the existing:

‘7.1.2.2 The material used shall be food grade plastic, free from bisphenol A (BPA) and shall have a minimum thickness of 1.2 mm. In case, the material used is PET (polyethylene terephthalate), the minimum thickness shall be 0.5 mm.’

(Page 2, clause 7.3) — Substitute the following for the existing:

**‘7.3 Test for Heat Retention Capability**

The temperature of water heated to 95 °C and kept in flask, measured in accordance with the method prescribed in Annex A.

**7.3.1 Thermal Insulated Flask Type 1**

When measured at intervals of 1 h, 6 h, 12 h, and 24 h respectively, temperature shall not be less than as given in Table 1 A.

**7.3.2 Thermal Insulated Flask Type 2**

When measured at intervals of 1 h, 3 h, and 6 h respectively, temperature shall not be less than as given in Table 1 B.

7.3.3 For routine testing, the flask shall be tested for 1 h and 6 h. For type testing, the flask (Type 1) shall be tested for 12 h and 24 h.’

(Page 3, Table 1) — Renumber the existing Table 1 as Table 1 A and modify its title as follows:

**‘Table 1 A Heat Retention Capability — Type 1**

(Clauses 4.2.1 and 7.3.1)’.

(Page 3, Table 1 A) — Insert the following new Table 1 B after Table 1 A:

**‘Table 1 B Heat Retention Capability — Type 2**

(Clauses 4.2.2 and 7.3.2)

| Sl No. | Capacity of the Flask (in ml) | Temperature Attained (in °C) for Narrow Mouth |           |           | Temperature Attained (in °C) for Wide Mouth |           |           |
|--------|-------------------------------|---|-----------|-----------|---|-----------|-----------|
|        |                               | After 1 h                                     | After 3 h | After 6 h | After 1 h                                   | After 3 h | After 6 h |
| (1)    | (2)                           | (3)   | (4)       | (5)       | (6)   | (7)       | (8)       |
| i)     | 0 - 200                       | 72  | 47        | 38        | 68  | 47        | 35        |
| ii)    | 201 - 400                     | 72  | 47        | 38        | 68  | 47        | 35        |
| iii)   | 401 - 600                     | 74  | 49        | 40        | 74  | 48        | 37        |
| iv)    | 601 - 800                     | 79  | 58        | 45        | 78  | 58        | 42        |
| v)     | 801 - 1 200                   | 80  | 60        | 50        | 78  | 60        | 47        |
| vi)    | >1 200                        | 85  | 70        | 55        | 85  | 70        | 55        |

(Page 6, clause 7.9) — Insert the following at the end:

‘NOTE — If the stopper construction is as per Fig. 6 (with spout/sipper/straw type), the leakage test shall be conducted with water at room temperature. In case, a separate insulated lid is provided, the flask shall be tested as per 7.9 with the insulated lid also.’

(Page 6, clause 7.10, line 4) — Substitute ‘1 min’ for ‘5 min’.

(Page 6, clause 7.12) — Substitute the following for the existing:

**‘7.12 Check the Thermal Insulation Material**

Separate sample other than as specified in 6 is taken and cut to check the declared insulating material. The same sample can be used for checking of container thickness.

NOTE — The density of the PUF shall be  $\geq 32 \text{ kg/m}^3$  as per Annex F.’

(Page 7, Fig. 5) — Insert the following at the end:

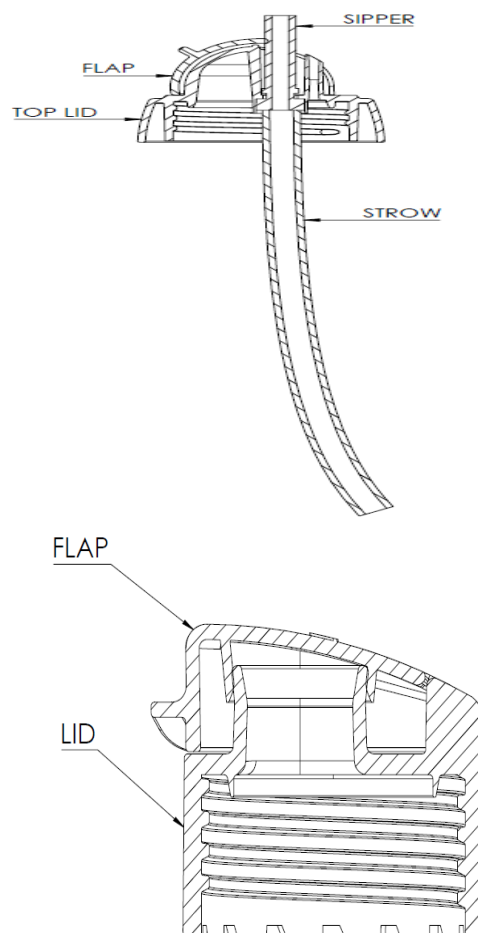


FIG. 6 INSULATED FLASK WITH SPOUT/SIPPER/STRAW TYPE’

(Page 7, clause 9.1) — Substitute the following for the existing:

‘9.1 Each insulated flask shall be legibly and permanently marked with the following minimum information:

- a) Nominal capacity;
- b) Grade of material of inner container and outer container along with applicable IS No.;
- c) Temperature drop/rise for a given time period (to be specified on the packaging);

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- d) Name or trade mark of the manufacturer;
- e) Batch number;
- f) Type of insulation used; and
- g) Type 1 (heat retention only or cold retention only or both heat and cold retention) or Type 2 (heat retention only)'.

(Page 9, clause A-1) — Substitute the following for the existing:

'A-1 The heat retention capacity of an insulated flask is determined by filling hot water at 95 °C in it, as prescribed in A-2 and measuring the temperature of water at intervals of 1 h, 6 h, 12 h and 24 h (Type 1) and 1 h, 3 h and 6 h (Type 2), respectively. While carrying out the test, maintain the atmospheric conditions at 27 °C ± 2 °C and 65 percent ± 5 percent RH. The samples are to be pre-conditioned at 95 °C ± 2 °C for a minimum period of 2 h before starting the test.'

(Page 9, clause A-2.1) — Substitute the following for the existing:

'A-2.1 Rinse the flask with water at 95 °C ± 2 °C, drain out water. Quickly fill with boiling water. Allow the temperature to drop slowly to 95 °C. Close the flask with stopper and cup and note the time. Note the temperature of water in the flask at the end of 1 h, 6 h, 12 h and 24 h (Type 1) and 1 h, 3 h and 6 h (Type 2), respectively from the time the water in the flask attained the temperature of 95 °C.'

(Page 9, clause A-2.2) — Substitute the following for the existing:

'A-2.2 The flask shall be taken as having passed the test, if the temperatures measured at the end of end of 1 h, 6 h, 12 h and 24 h (Type 1) and 1 h, 3 h and 6 h (Type 2), are not less than those specified in 7.3.'

(Page 9, Annex B) — Insert the following at the end:

### ANNEX C

(Clause 7.1.2.1)

#### TEST METHOD FOR LEACHING OF FOOD GRADE STAINLESS STEEL (WELDED SAMPLE) (TYPE TEST)

##### C-1 GENERAL

C-1.1 Stainless steel coupons are collected/made to conduct leaching in food simulated medium through analytical studies. Coupons shall be of dimensions 70 mm (length) × 50 mm (breadth) × t mm (thickness of RM sheet used) with weld in the center parallel to the breadth. For welding and finish, please refer to Annex E.

C-1.2 Details of stimulants are given below:

- a) 3 percent acetic acid — Solution prepared by diluting 30 g of acetic acid with distilled water to a volume of 1 litre; and
- b) 4 percent NaCl (common salt) — Solution prepared by diluting 40 g of NaCl (common salt) with distilled water to a volume of 1 litre.

C-1.3 Following instruments/equipment's are required for carrying out this test:

- a) Inductively coupled plasma-mass spectrometer (ICP-MS);
- b) Millipore water purification system or distilled water;
- c) Hot plate ambassador, with energy regulator; and
- d) Calibrated Vernier calliper.

**C-2 PROCEDURE**

**C-2.1** Different beaker/Petri dish containing one coupon each in the different simulated food are to be heated to boiling temperature and soaked at the same temperature for 30 min\*. At the same time, prepare a sample blank also. The sample blank shall contain only simulated food medium without coupon.

**C-2.2** After soaking, remove the coupons using cleaned tongs and cool to room temperature.

NOTE — \*Soaking can be in boiling temperature for 30 min/70 °centigrade for 2 h/40 °centigrade for 10 days.

**C-2 METHOD OF ANALYSIS ON ICP-MS**

The leaching solution shall be analysed for the presence of Fe, Cu, Ni, Cr and Mn and other elements on the ICP-MS.

**C-3 CALCULATIONS**

The values of the presence of Fe, Cu, Ni, Cr and Mn and other elements are analysed using ICP-MS. The value of sample blank shall be subtracted from it. Then, resultant values shall be normalized with respect to the area of the coupon in contact with simulated food medium, per unit volume of the simulator food item, so that the final concentration is given in mg/kg. Resultant values for Fe, Cu, Ni, Cr and Mn and other elements shall not be more than specific release limits (SRLs) given below:

| <i>Sl No.</i> | <i>Element(s)</i> | <i>Specific Release Limit<br/>(SRL)<br/>(mg/kg)</i> |
|---------------|-------------------|---|
| (1)           | (2)               | (3)   |
| i)            | Antimony          | 0.04  |
| ii)           | Arsenic           | 0.002   |
| iii)          | Chromium          | 0.25  |
| iv)           | Cobalt            | 0.02  |
| v)            | Copper            | 4   |
| vi)           | Iron              | 40  |
| vii)          | Lead              | 0.01  |
| viii)         | Manganese         | 1.8   |
| ix)           | Mercury           | 0.003   |
| x)            | Molybdenum        | 0.12  |
| xi)           | Nickel            | 0.14  |
| xii)          | Tin               | 100   |

**ANNEX D**

*(Clause 7.1.2.1)*

**SENSORIAL TEST METHOD (TYPE TEST)**

**D-1 FOOD STIMULANT**

Distilled water.

**D-2 TEST PROCEDURE**

Fill the flask/bottle with 95 °centigrade distilled water, ensure the welded portion is in touch with the water, close the cap/lid and soak till the temperature of distilled water reaches ambient water temperature. At the same time, similarly prepare a sample blank, the water should not touch the welded portion, follow the protocol as cited above.

**D-3 ACCEPTANCE CRITERIA**

Transfer of taste and smell to the distilled water shall be less than 3. The distilled water samples of soaked and blank are smelled and tasted by a minimum of 5 personnel and results tabulated. The average of the results tabulated shall be taken for acceptance criteria.

NOTE — Evaluation criteria for transfer of taste and smell are as follows:

0 = No discernible deviation

1 = Barely discernible deviation

2 = Weak deviation

3 = Clear deviation

4 = Strong deviation

**ANNEX E**

*(Clauses 5.3, 7.1.2.1 and C-1.1)*

**WELDING AND FINISHING**

**E-1 GENERAL**

Tungsten inert gas welding (TIG) welding is the preferred process because there is no flux or cleaning agent involved. The metal joints shall have clean TIG welding. Mechanical cleaning followed by chemical cleaning shall be done on joints.

NOTE — Mechanical processes may include any of the processes like grinding, filing, sanding, sand blasting, and brushing. Chemical processes use solvents and acids to remove paint, oil, grease, and oxide.

**E-2 PROCEDURE**

- a) TIG welding shall be used;
- b) Preferred filler material grade 308L (07Cr18Ni9) as per IS 5856 to be used;
- c) After the weld, the weld surface and adjacent area to be grinded using 60 Grit wheel;
- d) Clean the weld surface and adjacent area using a brush;
- e) Polish the weld and adjacent area in the following sequence:
  - 1) 120 Grit;
  - 2) 200 Grit;
  - 3) 400 Grit;
  - 4) Jute brush;

- 5) Hard buff; and
- 6) Clean with chalk powder or electro polishing.

**ANNEX F**

(Clause 7.12)

**SOP FOR MEASUREMENT OF POLYURETHANE DENSITY**

**F-1 PROCEDURE**

- a) Draw sample as per sampling plan and identify the same;
- b) Cut the outer body to separate the outer and inner body of the sample;
- c) Cut the PUF sample carefully, face/edge should not compress.
- d) The outer layer should be trimmed with a sharp knife;
- e) Measure/record weight in air (A);
- f) Fill beaker with water and place on weight balance and set it to zero;
- g) Fix the sample on needle and dip into the water. The top layer of sample should just dip into water; and
- h) Measure/record weight in water (B).

Calculate the density of PUF as shown below:

$$\text{Density} = \frac{\text{Weight in air (A)}}{\text{Weight in water (B)}} \times 1\,000'$$

(Page 10, Annex C) — Substitute 'Annex G' for 'Annex C'.