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Indian Standard

घरेलू प्रेशर कुकर — विशिष्टि

(सातवां पुनरीक्षण)

Domestic Pressure Cooker — Specification

(Seventh Revision)

ICS 98.540.50

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Utensils, Cutlery Domestic Hardware Sectional Committee, MED 33

FOREWORD

This Indian Standard (Seventh Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by Utensils, Cutlery Domestic Hardware Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard was first published in 1963 and subsequently revised in 1966, 1974, 1987, 1995, 2006 and 2017. The seventh revision has been taken up for incorporating the modifications found necessary as a result of experience gained with the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standards, and references wherever applicable have been updated. BIS certification marking clause has also been modified to align with the revised *Bureau of Indian Standards Act*, 2016. The major modifications incorporated in this revision are as follow:

a) New terminology has been incorporated;
b) Tolerance has been specified on the gross capacity of the cooker;
c) Suitable grades of aluminium alloy as per IS 21 has been prescribed for manufacturing of cookers;
d) Additional requirements for electric pressure cooker have been specified;
e) Provision of glass lid for serving purpose has been added;
f) Provision of visual pressure indicator has been added;
g) Provision of chain for linking PRD with vent tube has been added;
h) Requirement for 'change in shape' has been added;
j) Provision of internal level marking has been added;
k) Requirement of pressure drop after PRD operation has been added;
m) Requirement for cooker with fastened by screw clamps or any other locking device, under tests for removal of lid under pressure has been added;
n) Test for effectiveness for induction bottom has been added; and
p) All amendments have been incorporated.

The relevant SI units and corresponding conversion factors are given below for guidance:

Pressure 1 Pa (Pascal)	=	01 N/m^2
1 kgf/mm^2	=	9.806 650 MPa

The composition of the Committee responsible for the formulation of this standard is given in Annex V.

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

DOMESTIC PRESSURE COOKER — SPECIFICATION

(Seventh Revision)

1 SCOPE

This standard covers the requirements for domestic pressure cookers. This standard does not cover microwaveable pressure cookers.

2 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 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Pressure Cooker — A closed domestic pressure cooking vessel for use with external/integral heat source and capable of maintaining nominal cooking steam pressure over 0.1 kgf/cm^2 and up to 1.0 kgf/cm^2 gauge nominal.

3.2 Gross Nominal Capacity of the Cooker — The full water capacity of the vessel, that is, total internal volume of the cooker with its lid in position.

NOTE — This capacity is used when internal separators are used.

3.3 Cooking Capacity — The maximum cooking capacity of the vessel is two-third of the capacity as specified in **3.9**. In case of separator cooking, *see* **3.2**.

3.4 Container — Vessel which is placed inside the pressure cooker for cooking foods separately. It is also known as a separator.

3.5 Grid — It is used inside a pressure cooker to ensure that there is a gap between the separator and the cooker inside base so that the food does not burn. This may be also used for cooking food in steam without getting into direct contact with water or base of the cooker. It may be used when separators are used.

3.6 Nominal Cooking Pressure — The pressure at which the cooker operates, within a limit of ± 20 percent of the declared nominal cooking steam pressure.

3.7 Pressure Regulating Device (PRD) — Device which regulates the pressure inside the pressure cooker during its use.

3.8 Safety Relief Device — Device which prevents the pressure cooker from exceeding the safety pressure. The device could be destructive or resettable type. The cooker which is using gasket release system (GRS) shall also have additional safety relief device.

3.9 Body Capacity — Maximum quantity of water that can be contained in the cooker body, when placed on a flat, horizontal surface.

3.9.1 Body capacity shall be more than 2/3rd of the gross nominal capacity as given in **3.2**.

3.10 Greatest Nominal Cooking Pressure — Maximum pressure achieved during test for PRD (*see* **8.3**) in first five readings of operations of PRD.

4 CAPACITIES

The gross capacity of pressure cookers shall be from 1 litre to 24 litre and shall be expressed only in complete or half litre units. The tolerance on the gross capacity shall be $^{+499}_{0}$ ml. For pressure cooker with integral electrical heating (*see* **8.13**), gross capacity shall be from 1 litre to 10 litre.

4.1 The gross capacity of the cooker shall be tested as given in Annex B.

NOTE — If the capacity of a cooker is not in complete or half litre unit, its nominal capacity shall be marked as the nearest lower complete litre units or half litre units.

4.2 Body Capacity — The body of the cooker shall be kept on flat and horizontal surface. The pressure cooker body shall be filled with water up to the brim with the help of a measuring jar. The volume of the water measured shall be the body capacity of the pressure cooker.

5 MATERIALS

5.1 Body, Lid, Containers and Grid

5.1.1 The body, lid of the pressure cookers, the

containers, and the grid shall conform to designation 19000, 19500, 31000, 40800 of IS 21 or stainless steel conforming to designation X04Cr19Ni9/ X07Cr18Ni9 of IS 5522 or stainless steel conforming to designation X8Cr16Mn8Cu2Ni2N of IS 15997.

NOTES

1 Only chemical composition of stainless steel and aluminium needs to be complied with for grid and separator.
2 The containers and the grid shall form separate items and may not be supplied with the pressure cooker unless specifically ordered.
3 In case of electric pressure cooker, the Body which comes in contact with food may also be a separate container placed inside the housing where all the electrical controls, thermal cut-outs and heaters are placed.

5.1.2 The body and lid shall be made from the materials specified in **5.1.1** or a combination thereof.

5.1.3 If stainless steel pressure cooker is provided with composite bottom, the composite bottom shall conform to IS 15960. The protector plate may be made of induction friendly material of designation X07Cr17 (grade 430) as per IS 6911.

NOTES

1 The staining test as per IS 15960 is also applicable for stainless steel pressure cooker without the composite bottom.
2 The solutions as prescribed in IS 15960 shall be filled inside the cooker upto the brim of vent pipe, instead of dipping the cooker into the solution.
3 Only chemical composition of stainless steel and aluminium needs to be complied with for core and protector plate in composite bottom.

5.1.4 If the aluminium cooker is provided with an induction friendly base, the material of the induction plate shall be as per 430 or 439 series as given in IS 6911.

NOTE — Only chemical composition of stainless steel needs to be complied with.

5.1.5 If the body of the pressure cooker is made of a 3 ply construction, 3 ply material shall be made with inner layer – designation X04Cr19Ni9 (grade 304) of IS 5522, middle layer – aluminium as per IS 21 and induction friendly outer layer – designation X07Cr17 (grade 430)/designation X02Cr18Ti (grade 439) of IS 6911.

NOTE — Only chemical composition of stainless steel and aluminium needs to be complied with.

5.2 Safety Relief Device

5.2.1 *Destructive Type Safety Relief Device*

The chemical composition of the fusible plug shall be such that it melts/ejects before a gauge pressure greater than 3 kgf/cm^2 (300 kN/m^2 approximately) is reached. Maximum lead content shall not exceed 0.05 percent by mass in fusible plug pellet, when determined by any standard instrumental method or chemical method. The housing material used shall be aluminium alloy of designations 19000/19500/ 64430 as per IS 733 or stainless steel of designation X04Cr18Ni10/X02Cr18Ni11/X07Cr18Ni9 as per IS 6527 or X02Cr19Ni10/X10Cr17Mn6Ni4N as per IS 6603 or brass as per IS 319 (nickel chrome plated complying to service condition 2 as per IS 1068) or stainless steel of properties conforming to Annex Q. If rubber part is used, it shall comply with the requirements of IS 7466. If the housing or any part of the safety relief device is electroplated or hard anodized shall comply to IS 1068 or IS 6057 respectively.

NOTES

1 Only chemical composition of aluminium alloy and stainless steel needs to be complied with.
2 Supplier certificate is acceptable for rubber parts. Testing period of 120 h to be changed to 180 h as per Annex F of IS 7466.
3 Supplier certificate is acceptable for electroplated and hard anodized coated parts.

5.2.2 *Resettable Type Safety Relief Device*

The material used shall be aluminium alloy of designations 19000/19500/64430 as per IS 733 or stainless steel of designation X04Cr18Ni10/ X02Cr18Ni11/X07Cr18Ni9 as per IS 6527 or X02Cr19Ni10/X10Cr17Mn6Ni4N as per IS 6603 or brass as per IS 319 (nickel chrome plated complying to service condition 2 as per IS 1068) or stainless steel of properties conforming to Annex Q. If rubber part is used, it shall comply with the requirements of IS 7466. If spring is used, it shall be of stainless steel as per IS 4454 (Part 4). In case of electrical pressure cookers, safety devices shall comply with IS 302 (Part 2/Sec 15).

NOTES

1 Only chemical composition of aluminium alloy and stainless steel needs to be complied with.
2 Supplier certificate is acceptable for rubber parts. Testing period of 120 h to be changed 180 h as per Annex F of IS 7466.

5.3 Gasket

The gasket shall conform to IS 7466.

5.4 Handles and Knobs

Construction and material of the handle/knob shall conform to IS 13395. In case of electric pressure cookers, the handles shall meet the requirements of IS 302 (Part 1).

5.5 Pressure Regulating Device

The metallic part of PRD except the vent seal pin, shall be made of brass as per IS 319 or stainless steel of designation X02Cr18Ni11/X04Cr18Ni10/ X07Cr18Ni9/X10Cr17Mn6Ni4 as per IS 6527 or stainless steel of designation X02Cr19Ni10/ X10Cr17Mn6Ni4N as per IS 6603 or stainless steel of properties conforming to Annex Q. In case of electric pressure cookers, the PRD shall conform to IS 302 (Part 1).

NOTE — Only chemical composition of stainless steel and brass needs to be complied with.

5.6 Vent Seal Pin for Pressure Regulating Device

Material used for vent seal pin shall be stainless steel conforming to the designation X04Cr18Ni10/ X07Cr18Ni9 as per IS 6527 or stainless steel of properties conforming to Annex Q.

NOTE — Only chemical composition of the stainless steel needs to be complied with.

5.7 Vent Pipe

The material used shall be nickel chrome plated brass (Brass as per IS 319 and nickel chrome plating with service condition 2 as per IS 1068) or stainless steel of designation X02Cr18Ni11/X04Cr18Ni10/ X07Cr18Ni9/X10Cr17Mn6Ni4 as per IS 6527 or stainless steel of designation X02Cr19Ni10/ X10Cr17Mn6Ni4N as per IS 6603 or stainless steel of properties conforming to Annex Q.

NOTE — Only chemical composition of stainless steel and brass needs to be complied with.

5.8 Vent Pipe Nut

The material used shall be aluminium alloy of designations 19000/19500/64430 as per IS 733 or stainless steel of designation X04Cr18Ni10/ X02Cr18Ni11/X07Cr18Ni9 as per IS 6527 or stainless steel of properties conforming to Annex Q.

NOTE — Only chemical composition of aluminium alloy and stainless steel needs to be complied with.

5.9 Spring

If the lid is operated by spring loaded mechanism, the spring shall be of stainless steel wire as per IS 4454 (Part 4).

NOTE — Only chemical composition of stainless steel needs to be complied with.

5.10 If the cooker is provided with tempered glass lid, the lid shall conform to the performance requirements as given in **8.15**. The minimum thickness of glass shall be 3.5 mm. If the stainless steel rim is provided on the glass lid, the material of rim shall be as per IS 5522 or IS 15997 and the thickness of the rim shall be 0.25 mm minimum.

NOTE — The glass lid is used with cooker for serving purpose only. Do not attempt pressure cooking with the glass lid.

5.11 Visual Pressure Indicator

If the cooker is provided with visual pressure indicator, the material shall conform to aluminium as per IS 733/IS 739 or stainless steel as per IS 6527/IS 6528. Visual pressure indicator, indicate that there is pressure inside the cooker (more than 0.04 kgf/cm^2 or 4 kPa). The indicator may be coloured for easy visibility.

5.12 Gasket Release System

The gasket shall comply to IS 7466. The gasket release system shall comply with **H-1.2**.

6 CONSTRUCTION

The construction of the domestic pressure cooker shall be suitable to ensure an easy and safe handling, good performance and a reasonable life. The cooker shall be so constructed that no distortion takes place under normal conditions of use.

6.1 Pressure Regulating Device

Pressure regulation shall be effected by a free fall dead weight valve. There shall be no intermediate linkage between the vent pipe and weight valve. In case of electric pressure cooker, the pressure regulation may be done by self-resetting type thermal cut out device.

6.1.1 The passage from the interior of the vessel giving access through the valve to the atmosphere shall be so arranged that it is not liable to clog while the cooking is in progress. Minimum inside diameter of vent pipe shall be 2.5 mm.

6.1.2 The PRD shall be easy to clean and so designed that when working parts are removed, the obstructions (if any) shall be clearly visible.

6.1.3 The PRD shall be provided with a suitable lifting attachment. It can be made of brass or stainless steel. The lifting attachment can also be made from heat insulating material like arnite, glass filled nylon, polycarbonates, etc. that insulate the heat from the PRD sleeve. It can encapsulate any stainless steel metal as long as the metal does not come in contact with food.

6.1.4 The PRD dead weight shall not fall off when

the lid is held upside down.

6.1.5 The vent pipe nut shall have a minimum of two holes. The combined area of the holes on the nut shall be more than the area of vent pipe hole. The holes shall not be blocked when nut is fully tightened on the vent pipe.

NOTE — Hole is an opening of any geometry or shape.

6.1.6 Metallic chain may be provided for linking the PRD (weight valve) with vent tube, to prevent misplacement of the PRD (weight valve). This shall not affect the functioning of the PRD. The chain shall be made of brass or coated steel.

6.2 Safety Relief Device

In addition to a pressure regulating device, an independent safety relief device with separate and direct connection with the interior of the vessel shall be fitted. This safety relief device may be of destructible type or resettable type or both. Cookers provided with a gasket release system shall have one more safety relief device.

6.2.1 The destructible type of safety relief device shall consist of an ejectable disc or fusible safety pellet or ejectable fusible pintle or other devices of a like character. The fusible safety device, under its normal conditions of use, shall not be susceptible to corrosion or dimensional changes which might interfere with its satisfactory functioning.

6.2.2 In the resettable type of safety pressure relief device, the orifice or orifices, disclosed when the device functions, shall be of a form not susceptible to clogging by the issue of food or other contents of the cooker.

6.2.3 Any food or froth in excess ejected or oozed out from the safety device shall not put off the gas flame (leading to the flame being put off, with the gas is still on).

6.3 Temperature Responsive Safety Relief Device

6.3.1 A temperature responsive safety relief device shall comply to Annex C.

6.3.2 If the safety pressure relief device is not of the fusible type, the cooker shall satisfy the type test prescribed in Annex D.

6.3.3 In case of electrical pressure cooker, in addition to **6.3.2**, a thermal fuse shall be provided. The thermal fuse shall be deemed to have passed the test if it functions when the steam reaches a gauge pressure between 1.25 and 3 times the greatest nominal cooking pressure.

6.4 Handles and Knobs

6.4.1 The handle and knobs shall confirm to IS 13395. For electrical pressure cooker, *see* the requirement given in **8.10.1**.

6.4.1.1 Wherever applicable, the lid handle shall be in alignment with the body handle in closed position.

6.4.2 The screws, studs/nuts, locking loop used for fitting handles and knobs shall be made from corrosion resistant material such as stainless steel or brass. The brackets may be made of aluminium or stainless steel or a combination of aluminium and stainless steel.

6.4.2.1 The rivets shall be made from aluminium as per IS 740 or stainless steel of designation X04Cr18Ni10/X02Cr18Ni11/X07Cr18Ni9 as per IS 6527/IS 6528 or stainless steel of properties conforming to Annex Q. Stainless-steel capped aluminium rivets can also be used. The material of stainless steel cap shall be as per IS 5522.

NOTE — Only chemical composition of aluminium and stainless steel needs to be complied with.

6.5 Construction of electrical pressure cooker shall additionally comply with IS 302 (Part 2/Sec 15).

6.6 If the manufacturer desires to change the shape of the existing declared cooker(s) without any other change (requirements as per **6.8** shall be maintained), the cooker shall comply with the requirements as given in **8**. Record shall be maintained by the manufacturer.

6.7 Internal Level Marking

The cooker may be permanently marked internally to indicate two-third and half of the body capacity. The marking can also indicate maximum level and minimum level.

6.8 A fully dimensioned sectional drawing of the pressure cooker and its material along with grades, shall be submitted by the manufacturer to the inspecting agency. The basic minimum dimensions in the sectional drawing of the pressure cooker shall include flange/lug thickness for body, thickness for lid, wall thickness of body at the middle, cooker base thickness etc.

7 WORKMANSHIP AND FINISH

7.1 The body and the lid shall be free from wrinkles, scratches, and other surface defects, when checked with naked eyes or corrected vision.

7.2 The body and the lid shall be neat and clean, when checked with naked eyes or corrected vision.

7.3 The brass parts except the screws, studs and nuts shall be plated chromium over nickel and the plating shall conform to service condition number 2 of IS 1068 (adhesion and thickness to be tested). Corrosion test per IS 1068 is a type test.

7.4 The cooker, if hard anodized, fully or partially, shall satisfy the requirements as given in Annex E. The requirements of Annex E shall be applicable only to the anodized portions in the body and lid. Annex E is not applicable to other parts of pressure cookers.

8 TESTS

8.1 Air Pressure Test

The cooker shall be subjected to air pressure of 40 percent of the nominal cooking steam pressure, slowly raised to nominal cooking steam pressure as specified by the manufacturer. It shall not show any sign of leakage or deformation.

8.2 Proof Pressure Test

The cooker shall be subjected to a proof pressure test as prescribed in Annex F. It shall not show any sign of leakage or other forms of failure either during or after the test.

8.3 Operating Test for Pressure Regulating Device

8.3.1 The PRD shall operate within ± 20 percent of the nominal cooking steam pressure as declared by the manufacturer. The device shall pass the test prescribed in Annex G. The drop in the pressure after operation of the PRD shall not be more than 40 percent of the average measured cooking steam pressure when PRD operates (*see* **G-2**).

8.3.2 Each PRD shall be tested by the cooker manufacturer before assembly as per **8.3.1**. In any consignment, there shall not be more than 5 percent rejection.

8.3.2.1 In case, the PRD is supplied as a full assembly, supplier certificate is acceptable.

8.4 Test for Safety Relief Device

8.4.1 The device shall satisfy the test prescribed in Annex H. After the test, the cooker shall be in normal serviceable condition and the PRD shall satisfy the requirements of the test prescribed in Annex G.

8.4.2 Test 5 samples of destructible safety relief device from a consignment as per **8.4.1**, the result shall be within a range of ± 20 percent of the mean values.

NOTE — If the induction plate separates off from the body of the cooker, the cooker fails the test.

8.5 Bursting Pressure Test

The bursting pressure of the cooker shall be not less than 6 kgf/cm^2. The cooker shall pass the test as prescribed in Annex J. The pressure should be developed in a reservoir approximate 10 kgf/cm^2 and then released gradually through a valve to the cooker under test. During this test, the pressure cooker may undergo deformation but shall not show any incipient fracture nor any crack. The separation of base/bottom of composite cooker (*see* **8.8**) is acceptable.

8.6 Tests for Removal of Lid Under Pressure

8.6.1 *For Outer Lid Cooker*

A force of 12 kgf (120 N approximately), when applied to the lid or cover or its fastening or locking device, shall not be able to release the lid or cover of the cooker unless the steam pressure inside has fallen below 0.18 kgf/cm^2 (18 kN/m^2 approximately) gauge (*see* Annex K).

8.6.2 *For Inner Lid Cooker*

A force of 12 kgf (120 N approximately), when applied to the lid or cover or its fastening or locking device, shall not be able to release the lid or cover of the cooker unless the steam pressure inside has fallen below 0.18 kgf/cm^2 (18 kN/m^2 approximately) gauge (*see* Annex L).

8.6.3 *For Cooker Fastened by Screw Clamps or Any Other Locking Device*

If the cooker is provided with lid or cover fastened by screw clamps or any other locking device (other than **8.6.1** and **8.6.2**), which ensure that the internal pressure is reduced before the lid is freely released or can be opened, the cooker shall comply with **8.6.3.1**.

8.6.3.1 A force of 12 kgf (120 N approximately) is applied to the opening device, the lid or cover shall not open until the steam pressure inside the pressure cooker has fallen below 0.18 Kgf/cm² (18 kN/m² approximately) gauge (*see* Annex T).

8.6.4 In case of electrical pressure cooker, the pressure cooker shall be constructed so that the lid cannot be removed while the pressure within the container is excessive. They shall incorporate a means to release the pressure to a value such that the lid can be removed without risk as per requirement of IS 302 (Part 2/Sec 15).

8.7 Test for Spring Loaded Mechanism

When the lid is operated by a spring-loaded mechanism, the spring shall be completely compressed and kept in that position for 24 h. It shall then be compressed completely and released 3 000 times consecutively. After the test, the spring shall not suffer a permanent set of more than 3 percent in length.

8.8 Test for stainless steel cookers, which have composite cooker base/bottom, refer to the tests given in IS 15960.

8.9 For stainless steel, aluminium induction compatible base and 3 ply cooker, the cooker shall be tested as prescribed in Annex M. It shall be conducted on a separate cooker.

8.10 The handles of the cooker shall comply with the following tests as given in IS 13395:

a) Resistance to burning;
b) Heat resistance;
c) Torque strength;
d) Bending strength;
e) Fatigue resistance; and
f) Thermal insulation test.

NOTES

1 The handle tests should be done at least once a year.
2 One from smallest and one from the largest is sufficient for complying with handle testing requirements.
3 There shall be no leakage through any fixing system of the sample cooker which has undergone tests given at **8.10**, when the cooker is subjected to proof pressure testing as per **8.2**.
4 All the materials shall be finished smooth and free from burrs, splinters, or sharp edges.
5 The handles shall be positioned above the centre of gravity of the cooker when filled to its gross capacity. The mass and position of the handle shall be such that the cooker is stable when placed empty with or without lid on a flat surface.
6 Threaded fixing shall incorporate a locking washer or similar device or suitable thread locking or sealing adhesive to hold them secure.

8.10.1 In case of electrical pressure cooker, the handle shall meet the requirements of IS 302 (Part 1) or **8.10** (a) to **8.10** (f).

8.11 External Coating

8.11.1 The pressure cooker if coated with powder coating or ceramic coating or high temperature resistant liquid coating fully or partially externally, shall conform to the thickness test, adhesion test as per IS 9730. The coating shall comply with IS 9806. The minimum thickness of the coating shall be declared by the manufacturer. The externally coated cooker shall be subjected to thermal shock test as given at **8.11.1.1**.

8.11.1.1 Dry heat the cooker body on gas stove to 220^{+5}_{-0} °C and then quench in water at ambient temperature. Repeat the test 25 times. There shall be no blistering of coating from the cooker during or on completion of 25 gas heat cycles.

NOTE — Temperature to be measured at inside bottom of the cooker body.

8.12 Internal Coating

The pressure cooker, if coated with non-stick coating internally, the non-stick coating shall conform to IS 9730.

8.13 Pressure cooker with integral electrical heating device shall conform to IS 302 (Part 2/Sec 15).

8.14 For 3 ply construction cooker body, the body shall be tested as per Annex R. The body shall not show any separation (or delamination) of the 3 ply or shall not show blisters, after the completion of 50 cycles.

8.15 Test(s) on Tempered Glass Lid

8.15.1 *Fragmentation Test*

8.15.1.1 One lid from each lot having the same thickness is to be tested for this purpose. The sample lid shall be supported on a level surface (vitrified tile or smooth concrete surface). Paste a 50 mm × 50 mm transparent tape inside the glass lid, where the glass would be impacted. The glass lid shall be broken by means of a center punch of (0.20 ± 0.05) mm in radius of curvature at its tip by giving one severe blow to cause fracture. The point can be center point between the outer edge and the center (away from a hole, if provided).

8.15.1.2 The particle count determination shall be completed within 3 min of the fracture of that glass. No magnifying lens or other aid to vision need be used when making the particle count. The broken particle in a square of side 50 mm shall be counted. There shall be not less than 60 particles in a square of side 50 mm (50 mm × 50 mm).

8.15.2 *Ball Drop Test*

8.15.2.1 One lid from each lot having the same thickness is to be tested for this purpose. The specimen shall be supported on a level surface (vitrified tile or smooth concrete surface). Mark three points 120° apart, the point can be center point between the outer edge and the center (away from a hole, if provided).

8.15.2.2 The smooth surface steel ball of $^{+225}_{-5}$ g is placed at a minimum height of 1 000 mm from the surface (can be inside a plastic tube with a sliding

stopper), allow the ball to free fall on the three points. No crack shall be seen by the naked eye under normal light.

8.15.3 *Thermal Shock Test*

8.15.3.1 This test is applicable for glass lids used for cooking utensils, for others this test is optional.

8.15.3.2 One lid from each lot having the same thickness is to be tested for this purpose. Place the glass in an air circulating oven at (120 ± 5) °C. Soak for the cited temperature for 30 min. Remove the glass and pour one litre of water at ambient temperature on the lid. The lid shall not shatter.

8.15.4 *Free Fall Test*

8.15.4.1 *Glass lid with rim*

Drop the lid with rim facing down, from a height of 900 mm on a vitrified tile surface or a level smooth concrete surface. The glass shall not break/crack.

8.15.4.2 *Glass lid without rim*

Drop the lid without rim facing down, from a height of 900 mm on a vitrified tile surface or a level concrete surface. The glass shall not break/crack.

8.16 If the PRD is provided with the chain (*see* **6.1.6**), the chain shall be tested as per **8.16.1**.

8.16.1 Hang a weight of three times the weight of PRD (weight valve) for 4 h, there shall be no deformation or breakage of chain or its locating area.

8.17 Test for Effectiveness for Induction Bottom

This test is applicable to induction bottom cooker only (also includes stainless steel and 3 ply induction compatible cooker). This test is a type test. The cooker shall be subjected to the test as prescribed in Annex S. After the test, the cooker shall be stable, when placed on a gas stove or induction cooktop. If the induction plate of the cooker detaches during or after this test, the cooker fails the test.

9 SAMPLING

9.1 When the purchaser desires, the procedures laid down in **9.2** may be followed for judging the conformity of the lot.

9.2 Lot Inspection Plan

9.2.1 *Lot*

All the domestic pressure cookers having the same capacity group and produced under similar conditions of manufacture shall be grouped together to constitute a lot.

9.2.2 *Number of Samples*

For ascertaining the conformity of the material in a lot to the requirements of the specification, tests shall be carried out on each lot separately. The number of samples to be selected from the lot shall depend upon the size of the lot and shall be in accordance with Table 1.

9.2.2.1 Each pressure cooker shall be selected at random from the lot (*see* IS 4905).

9.2.3 *Number of Tests and Criteria for Conformity*

9.2.3.1 Each pressure cooker selected in the sample as per col (3) of Table 1, shall be tested for workmanship and finish (*see* **7**). A pressure cooker failing in one or more of the above requirements shall be termed as defective. The lot shall be considered as conforming to the requirements of these characteristics, if the number of defective in the sample is less than or equal to the corresponding acceptance number given in col (4) of Table 1.

9.2.3.2 The lot which has been found satisfactory as per **9.2.3.1** shall then be tested for the requirements of air pressure test (*see* **8.1**), proof pressure test (*see* **8.2**), operating test for PRD (*see* **8.3**) and test for safety relief device (*see* **8.4**) on the sub-sample selected as per col (5) of Table 1. Wherever applicable, two pressure cookers shall also be subjected to tests for removal of lid under pressure (*see* **8.6**) and test for spring-loaded mechanism (*see* **8.7**). The lot shall be considered as conforming to the requirements of this standard, if both the pressure cookers in the sample meet the requirements for any of the above mentioned tests.

9.2.3.3 The lot having been found satisfactory as per **9.2.3.2** shall be further subjected to bursting pressure tests (*see* **8.5**) and thickness and plating on the two pressure cookers in the sub-sample. Chemical composition should be done every 6 months or on production of a minimum of two lakhs cookers (whichever is higher).

NOTE — For every lot, certificate of supplier/manufacturer of the material is acceptable.

9.2.3.4 The lot shall be considered as conforming to the requirements of the standard, if all the pressure cookers in the sub-sample meet the corresponding requirements.

Table 1 Scale of Sampling

(*Clauses* 9.2.2, 9.2.3.1 *and* 9.2.3.2)

Sl No.	No. of Pressure Cookers in the Lot	No. of Pressure Cookers to be Selected in a Sample		Sub-sample for Physical Tests
		Sample Size	Acceptance No.	
(1)	(2)	(3)	(4)	(5)
i)	Up to 50	8	0	3
ii)	51 to 90	13	0	3
iii)	91 to 150	20	1	3
iv)	151 to 280	32	2	3
v)	281 to 500	50	3	3
vi)	501 to 1 200	80	5	3
vii)	1 201 to 3 200	125	7	5
viii)	3 201 and above	200	10	5

10 INSTRUCTIONS FOR USE

10.1 The manufacturer shall supply fully illustrated instructions for use with each cooker and shall include instructions or illustrations to identify features intended to reduce risks.

10.2 The instruction manual shall include the important safeguards specified in **10.3**, **10.4** and **10.5**.

10.3 Unless otherwise indicated, the text of the instructions shall be verbatim to, or in equally definitive terminology as specified in **10.5**, except where specific conflict in the risk alluded to has been reduced. The items may be numbered. In a list of items, the phrases 'Read all Instructions', 'Save these Instructions' shall be first and last, respectively. Other important and safeguard items considered appropriate by the manufacturer may be inserted.

10.4 The instruction manual shall include instructions and caution statements for cleaning, user-maintenance operations recommended by the manufacturer and shall warn a user that any other servicing should be performed by an authorized service representative. In case of electric pressure cooker, in addition to the instruction given in this specification, instructions as given in Annex U shall be provided by the manufacturer.

10.5 Important Safeguards

10.5.1 The instruction manual shall include the following, when using pressure cookers, basic safety precautions should always be followed:

a) Read all instructions before use;

b) Before putting the PRD on the cooker, it should be ensured that the steam starts coming out of the vent pipe of the cooker freely;

c) Pressure cooker body should not be used for deep frying;

d) Do not touch hot surfaces. Use handles or knobs;

e) Close supervision is necessary. When the pressure cooker is used near children;

f) Do not place the pressure cooker in a heated oven;

g) Extreme caution must be used when moving a pressure cooker containing hot liquids;

h) Do not use pressure cooker for other than intended use;

j) This appliance cooks under pressure. Improper use may result in scalding injury. Make certain that the cooker is properly closed before operating (*see* 'Operating Instructions');

k) Do not fill the unit over 2/3 of the body capacity. When cooking foods that expand during cooking such as rice or dried vegetable. Do not fill the unit over ½ of the body capacity (*see* 'Food Preparation Instructions') (such instructions shall appear elsewhere in the manual as noted in **10.1**);

m) Food items which tend to foam, froth, and sputter are likely to block the pressure release device. Therefore, while cooking such items, the cooking instructions supplied by the manufacturer shall be strictly followed;

n) Always check the pressure release devices

for clogging before use;

p) Do not open the pressure cooker until the unit has cooled and internal pressure has been reduced. If the handles of the body and lid are difficult to push apart, this indicates that the cooker is still pressurized. Do not use force to open the cooker. The pressure remaining in the cooker can be dangerous (*see* 'Operating Instructions');

q) Do not use the pressure cooker for pressure frying with oil;

r) After the normal cooking pressure has been reached, reduce the heat so that all the liquid inside the cooker which creates the steam, does not evaporate;

s) Ensure the handles are not loose. If found loose please tighten the same before use;

t) It is recommended to replace fusible safety device after one year of everyday use;

u) In case, the safety relief device fuses, please take the cooker to an authorized service centre; and

v) 'Save these Instructions'.

11 MARKING

11.1 Each cooker shall be permanently marked on the body:

a) Nominal cooking pressure (for example, NCP 1 kgf/cm^2) (*see* Note 5 also);

b) Gross capacity;

c) Grade of material used for the manufacture of body and lid (for example, Lid-SS 304 or Al 19000 or SS304/Al 19000/SS 430, Body-SS 304 or Al 19000 or SS304/Al 19000/ SS 430) (*see* Note 1 also); and

d) Batch number.

NOTES

1 The material grade of the body and lid can be added as a sticker/packaging box and indicated in the user and care manual.

2 The manufacturer shall declare and define the nominal body capacity along with the gross capacity of the cooker in the user manual.

3 In case of electric pressure cooker, in addition to marking as given in **11.1**, **11.2** and **11.3**, it shall be marked with requirements as given in IS 302 (Part 2/Sec 15).

4 The packaging of the cooker may be marked with induction friendly or gas friendly or both.

5 In case of aluminium induction based cooker, the nominal cooking pressure can be marked on the lid.

11.2 Each cooker shall be permanently marked on the lid:

a) The name or recognized trade-mark of the manufacturer.

11.3 Each cooker shall be indelibly and legibly marked on the lid or body with a notice emphasizing the reading of the instructions for example 'IMPORTANT — READ INSTRUCTIONS BEFORE USE'.

11.4 BIS Certification Marking

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 product(s) may be marked with the Standard Mark.

12 PACKING

Each pressure cooker shall be suitably packed in a carton with suitable cushioning.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 21 : 1992	Wrought aluminium and aluminium alloys for manufacture of utensils specification (*fourth revision*)
IS 228	Method for chemical analysis of steels:
(Part 1) : 1987	Determination of carbon by volumetric method (for carbon 0.05 to 2.50 percent) (*third revision*)
(Part 2) : 1987	Determination of manganese in plain-carbon and low alloy steels by arsenite method (*third revision*)
(Part 3) : 1987	Determination of phosphorus by alkalimetric method (*third revision*)
(Part 4) : 1987	Determination of total carbon by gravimetric method (for carbon ≥ 0.1 percent) (*third revision*)
(Part 5) : 1987	Determination of nickel by dimethylglyoxime (Gravimetric) method (for nickel ≥ 0.1 percent) (*third revision*)
(Part 6) : 1987	Determination of chromium by persulphate oxidation method (for chromium ≥ 0.1 percent) (*third revision*)
(Part 8) : 1989	Determination of silicon by the gravimetric method (for silicon 0.05 to 5.00 percent) (*third revision*)
(Part 9) : 1989	Determination of sulphur by evolution method (for sulphur 0.01 to 0.25 percent) (*third revision*)
(Part 11) : 1990	Determination of total silicon by reduced molybdosilicate spectrophotometric method in carbon steels and low alloy steels (for silicon 0.01 to 0.05 percent) (*third revision*)
(Part 12) : 2001	Determination of manganese by periodate spectrophotometric method in plain carbon, low alloy and high alloy steels (for manganese 0.01 to 5.0 percent) (*fourth revision*)
(Part 14) : 1988	Determination of carbon by thermal conductivity method (for carbon 0.005 to 2.000 percent)
(Part 20) : 2021/ ISO 15350 : 2000	Determination of total carbon and sulfur content — Infrared absorption method after combustion in an induction furnace (Routine Method) (*third revision*)
IS 302	Safety of household and similar electrical appliances:
(Part 1) : 2008	General requirements (*sixth revision*)
(Part 2/Sec 15) : 2009	Particular requirements, Section 15 Appliances for heating liquids (*first revision*)
IS 319 : 2007	Free cutting brass bars, rods and section — Specification (*fifth revision*)
IS 733 : 1983	Specification for wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purposes) (*third revision*)
IS 739 : 1992	Wrought aluminium and aluminium alloys — Wire for general engineering purposes — Specification (*third revision*)
IS 740 : 1977	Specification for wrought aluminium and aluminium alloy rivet stock for general engineering purposes (*second revision*)
IS 1068 : 1993	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium — Specification (*third revision*)
IS 1342 : 2019	Oil pressure stoves — Specification (*seventh revision*)
IS 4246 : 2002	Domestic gas stoves for use with liquefied petroleum gases — Specification (*fifth revision*)
IS 4454 (Part 4) : 2001	Steel wires for mechanical springs: Part 4 Stainless steel wire (*second revision*)

IS No.	*Title*
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 5522 : 2014	Stainless steel sheets and strips for utensils — Specification (*third revision*)
IS 5523 : 1983	Methods of testing anodic coatings on aluminium and its alloys (*first revision*)
IS 6012 : 1992	Measurement of coating thickness by eddy current method (*first revision*)
IS 6057 : 1988	Specification for hard anodic coatings on aluminium and aluminium alloys (*first revision*)
IS 6527 : 1995	Stainless steel wire rods — Specification (*first revision*)
IS 6528 : 1995	Stainless steel wire — Specification (*first revision*)
IS 6603 : 2001	Stainless steel bars and flats — Specification (*first revision*)
IS 6911 : 2017	Stainless steel plate, sheet and strip — Specification (*second revision*)
IS 7466 : 2023	Rubber gaskets for pressure cookers — Specifications (*second revision*)
IS 9730 : 2008	Non-stick unreinforced plastics coatings on domestic cooking utensils — Specification (*first revision*)
IS 9806 : 2001	Methods of test for and permissible limits of toxic materials released from ceramic ware, vitreous enamelware, glassware and glass-ceramic ware in contact with food (*first revision*)
IS 13395 : 2021	Performance of handles and handle assemblies attached to cookware — Specification (*first revision*)
IS 15960 : 2013	Composite bottom stainless steel cooking utensils — Specification
IS 15997 : 2012	Low nickel austenitic stainless steel sheet and strip for utensils and kitchen appliances — Specification

ANNEX B

(*Clause* 4.1)

GROSS CAPACITY TEST

B-1 PROCEDURE

The pressure cooker shall be filled with water upto the brim of vent pipe. The volume of the water shall be measured with the help of a measuring jar. This shall give the gross capacity of the pressure cooker.

ANNEX C

(*Clause* 6.3.1)

TEST FOR TEMPERATURE RESPONSIVE SAFETY RELIEF DEVICE

C-1 PROCEDURE

The cooker, fitted with a calibrated pressure gauge, with all relief device, sealed and containing a quantity of water equal to 1/16 part of the internal volume of the cooker, shall be placed in still air on a burner such as a pressure stove (*see* IS 1342) or LPG stove (*see* IS 4246). In case of electric pressure cooker, after disabling the pressure control devices and other safety relief devices, the integral heating has to be switched on to start this test. Before sealing the cooker, it shall be ensured that the steam starts coming out of vent pipe of the cooker steadily. The temperature responsive device shall release before a gauge pressure not greater than 3 kgf/cm^2 (300 kN/m^2 approximately) is reached.

ANNEX D

(*Clause* 6.3.2)

TEMPERATURE TEST FOR COOKERS WITHOUT FUSIBLE SAFETY RELIEF DEVICE

D-1 PROCEDURE

D-1.1 Take a fresh sample of cooker and test the function of PRD as per **8.3.1**. Affix a fusible plug (*see* **5.2**) to the lid. Put the empty cooker on a LPG stove as per IS 4246. Keep heating till the fusible plug melts. Stop heating and wait until the cooker cools to ambient temperature.

D-1.2 Test the cooker for function of PRD as per **8.3.1** and then for safety relief device as per **8.4.1**.

NOTE — The gasket of the cooker may be replaced if deformed or damaged during dry heating.

ANNEX E

(*Clause* 7.4)

TEST FOR HARD ANODIZED SURFACE

E-1 FINISH AND APPEARANCE

E-1.1 Basic Metal — It shall be as given in **5.1** of IS 6057.

E-1.2 Finish of the Coating — It shall be as given in **5.2** of IS 6057.

E-2 THICKNESS

The minimum thickness of anodized layer shall be 25 μm. Thickness of the hard anodic coating shall normally be determined by microscopic method as specified in IS 5523 or with the help of instruments based on eddy current principle as specified in IS 6012.

E-3 ABRASION RESISTANCE

It shall be as given in **7** of IS 6057.

E-4 HARDNESS

Hard anodized coating shall be tested as follows.

E-4.1 Type Test

Hardness shall be tested by micro-indentation method (type test), to be tested once in 6 month or once in 2 lakh cooker produced (whichever is greater). The hardness should be more than 350 HV.

E-4.2 Routine Test

Routine test for hardness shall be carried out as specified in **10.1** of IS 6057.

E-5 RESISTANCE TO STAINING OF ANODIZED COATINGS

When tested as specified in Annex N there shall be no staining visible on any surface intended to come in contact with food.

E-6 ALKALI RESISTANCE

When tested as specified in Annex P there shall be no loss of the insulating properties of the coating of any surface intended to come in contact with food.

ANNEX F

(*Clause* 8.2, 5.2.1 *and* 5.2.2)

PROOF PRESSURE TEST

F-1 PROCEDURE

The cooker shall be coupled to a hydraulic test pump provided with a calibrated pressure gauge. All the remaining openings in the body and lid of the cooker shall be suitably sealed. A pressure not less than twice the greatest nominal cooking pressure shall be applied. The cooker shall not show any sign of leakage or other forms of failure either during or after the test.

NOTE — The instructions given by the manufacturer in the Instruction manual regarding the fixing of the gasket shall be followed.

ANNEX G

(*Clauses* 8.3.1 *and* 8.4.1)

OPERATING TEST FOR PRESSURE REGULATING DEVICE

G-1 PROCEDURE

The cooker shall be fitted with a calibrated pressure gauge in place of safety pressure relief device. It shall be half filled with water and placed in still air on a burner such as a pressure stove. In case of electric pressure cookers, the heating has to be switched on to start this test. The heat input shall be continued until the PRD first operates and the pressure noted. Operating pressure shall be within ± 20 percent of the nominal cooking pressure declared by the manufacturer.

G-2 Continue testing, note five readings for operating pressure and pressure drops. Take the average of five operating pressure and pressure drops.

ANNEX H

(*Clauses* 8.4.1 *and* S-3)

TEST FOR SAFETY RELIEF DEVICE

H-1 PROCEDURE

The cooker shall be fitted with a calibrated pressure gauge in place of the pressure regulating device/in the lid. It shall be filled with water equal in quantity to 1/16 of the internal volume of the vessel and placed in still air on a burner such as a pressure stove (*see* IS 1342) or LPG stove (*see* IS 4246). In case of electric pressure cookers, the heating has to be switched on to start this test. Before starting the test, it shall be ensured that the steady stream of steam starts coming out of the vent pipe of the cooker, minimum for 2 min.

NOTES

1 For safety purpose, this test may be performed inside cage.
2 In case more than one safety relief device is provided in the pressure cooker, each device is to be tested separately by blocking the other.

H-1.1 For Destructible Devices

The safety relief device shall be deemed to have passed the test, if it functions when the steam reaches a gauge pressure between 1.25 and 3 times the greatest nominal cooking pressure.

H-1.2 For Gasket Release System

The device shall be deemed to have passed the test if it functions when the steam reaches a gauge pressure between 1.25 and 2.5 times the greatest nominal cooking pressure.

H-1.3 For Resettable Devices (other than H-1.2)

H-1.3.1 The device shall be deemed to have passed the test if it functions when the steam reaches a gauge pressure between 1.25 and 3 times the greatest nominal cooking pressure.

H-1.3.2 The device shall be tested 25 times as per **H-1.3.1**. This is a type test.

ANNEX J

(*Clause* 8.5)

BURSTING PRESSURE TEST

J-1 PROCEDURE

J-1.1 The cooker shall be coupled to a hydraulic test pump provided with a calibrated pressure gauge, suitably graduated. All the remaining openings in the body and lid of the cooker shall be suitably sealed or deactivated or removed.

NOTE — If the pressure cannot be reached, because the pressure cooker leaks due to gasket or resettable device, an artificial sealing method (like special gasket, etc) can be applied to ensure the burst pressure is achieved.

J-1.2 A gradually increasing hydraulic pressure shall be applied to the vessel of the cooker until:

a) A rupture takes place; or
b) A deformation occurs so that an appreciable leakage takes place at the joint of the lid or elsewhere.

J-1.3 The maximum gauge pressure obtained as in **J-1.2** shall be taken as the bursting pressure of the cooker for the purpose of this standard. In case the

cooker satisfactorily stands a pressure of 6 kgf/cm^2, further applications of pressure is not necessary.

CAUTION — Failure of the cooker under test is likely to be accompanied by an explosion. Therefore, before conducting this test, adequate protection for operator as well as property shall be provided.

ANNEX K

(*Clause* 8.6.1)

TESTS FOR REMOVAL OF LID UNDER PRESSURE FOR OUTER LID COOKER

K-1 Use a new gasket.

K-2 Boil the gasket for 2 h in water.

K-3 Dry and let it cool down to room temperature.

K-4 Place the gasket in the lid.

K-5 Open and close the cooker three times.

K-6 Fill the cooker to 50 percent of its body capacity, use distilled water. Boil this water for 15 min in the open cooker body.

K-7 Close the pressure cooker with its lid.

K-8 Connect the pressure cooker to a calibrated gauge.

K-9 Put the pressure cooker on the testing equipment. The cooker should be held in place. The cooker body should be held such that it does not rotate. The wire should be connected one side to the handle and the other side should have an option to load weight of 12 kgf (*see* Fig. 1).

K-10 The test equipment should have a heat source. Switch on the heat source and increase the pressure inside the pressure cooker to the maximum operating pressure.

K-11 Once the nominal cooking pressure is reached, switch off the heat source.

K-12 Put a load of 12 kgf. The cooker should not open until the pressure inside has fallen below 0.18 kgf/cm^2.

NOTES

1 The wire should be fitted around up to 15 mm from the edge of the handle.

2 Breakage of the handle during testing would mean failure of the test.

3 For inner lid cookers follow the same method, except that the lock lever is removed before applying the load on the lid.

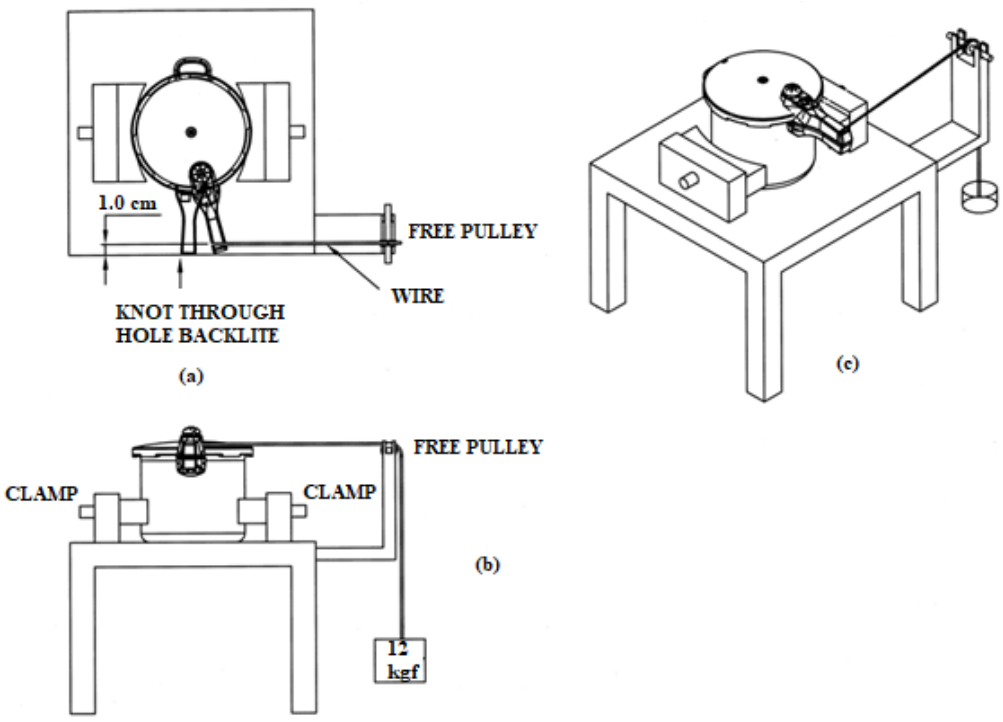

FIG. 1 LID OPENING TEST SETUP FOR OUTER LID COOKER

ANNEX L

(*Clause* 8.6.2)

TESTS FOR REMOVAL OF LID UNDER PRESSURE FOR INNER LID COOKER

L-1 Use a new gasket.

L-2 Boil the gasket for 2 h in water.

L-3 Dry and let it cool down to room temperature.

L-4 Put the gasket in the lid.

L-5 Open and close the cooker three times.

L-6 Fill the cooker to 50 percent of its body capacity, use distilled water. Boil this water for 15 min in the open cooker body.

L-7 Close the pressure cooker.

L-8 Connect the pressure cooker to a calibrated gauge.

L-9 Put the pressure cooker on the testing equipment. The cooker should be held in place. The wire should be connected to the clip of the handle as shown in Fig. 2 to load weight of 12 kgf.

L-10 The test equipment should have a heat source. Switch on the heat source and increase the pressure inside the pressure cooker to the maximum operating pressure.

L-11 Once the nominal cooking pressure is reached, switch off the heat source.

L-12 Put a load of 12 kgf. The cooker should not open until the pressure inside has fallen below 0.18 kgf/cm^2.

NOTES

1 Breakage of the handle during testing would mean failure of the test.

2 The wire should be fitted to the handle loop as shown in Fig. 2.

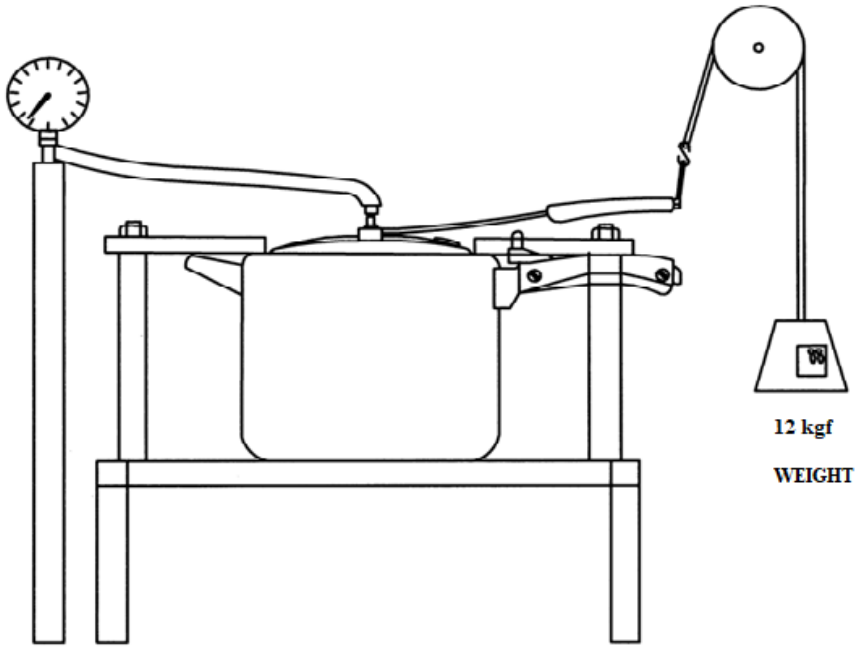

FIG. 2 LID OPENING TEST SETUP FOR INNER LID COOKER

ANNEX M

(*Clause* 8.9)

TEST FOR STAINLESS STEEL, ALUMINIUM INDUCTION COMPATIBLE BASE AND 3 PLY COOKER

M-1 Dry heat the cooker body on induction cook top to 250_{0}^{+25} °C and then quench in water at ambient temperature. Repeat the test 25 times.

M-2 Dry heat the same cooker body used in **M-1** on Gas stove to 250_{0}^{+25} °C and then quench in water at ambient temperature. Repeat the test 25 times. The induction steel base shall not peel off or separate from the cooker bottom during or on completion of a total of 50 heat cycles (25 cycles of gas heat and 25 cycles of induction heat). In case of 3 ply cookers, the body shall not show any separation (or delamination) of the 3 ply or shall not show blisters.

NOTE — Temperature to be measured at inside bottom of the cooker body.

ANNEX N

(*Clause* E-5)

RESISTANCE TO STAINING OF ANODIZED COATINGS

N-1 APPARATUS

A means of raising the temperature of the sample and the solution to (25 ± 5) °C and maintaining them at that temperature during the test.

N-2 REAGENTS

N-2.1 A (40 ± 5) percent *v*/*v* aqueous solution of nitric acid (HNO_3) solution, freshly prepared on the day of the test.

N-2.2 Dye, aluminium blue 2LW or methyl violet with methyl alcohol or anthraquinone violet R-dye solution prepared by dissolving 1 g in 50 ml distilled water.

NOTE — As alternate to 'anthraquinone violet R-dye solution' other dyes as prescribed in IS 5523 may be used.

N-3 PROCEDURE

N-3.1 Apply a drop of the nitric acid (**N-2.1**) to the anodized surface and allow to stand for (120 ± 5) s.

N-3.2 Wash the test area thoroughly with running water and dry with a clean, dry cloth.

N-3.3 Apply a drop of the dye solution (**N-2.2**) to the test area and allow it to remain for (300 ± 10) s.

N-3.4 Wash the test area thoroughly and dry with clean, dry cloth.

N-3.5 Visually examine the test area to ascertain if the oxide coating has taken up any of the dye.

ANNEX P

(*Clause* E-6)

RESISTANCE TO ALKALI OF ANODIZED ALUMINIUM

P-1 APPARATUS

P-1.1 A means of raising the temperature of the sample and the solution to 35_{-2}^{+5} °C and maintaining them at that temperature during the test.

P-1.2 Multimeter, or any meter capable of measuring the electrical conductivity between the coating and the substrate, operating at 9 V.

P-2 REAGENTS

P-2.1 Five percent sodium hydroxide solution, freshly prepared on the day of the test.

P-2.2 Degreasing Agent

Any substance which will degrease the test specimen without leaving any residue.

P-3 PROCEDURE

P-3.1 Remove sufficient of the oxide coating to allow contact by the multimeter probe from an area close to the test area (the contact area).

P-3.2 Clean the test area with the degreasing agent,

rinse with deionized water and dry.

P-3.3 Raise sample and test solution to 35^{+5}_{-2} °C.

P-3.4 Apply the sodium hydroxide solution to the test area to cover at least a 10 mm diameter spot to a depth greater than 2 mm, allow to sit for 2 min at a temperature of 35^{+5}_{-2} °C.

P-3.5 Rinse the solution from the test area with deionized water and dry.

P-3.6 Apply the multimeter probes between the contact area and any point of the surface not under test. Note any current flow.

P-3.7 Apply the multimeter probes between the test area and the contact area and check if there is a difference in current flow from that found in **P-3.6**.

ANNEX Q

(*Clauses* 5.2.1, 5.2.2, 5.5, 5.6, 5.7, 5.8 *and* 6.4.2.1)

STAINLESS STEEL PROPERTY

Q-1 CHEMICAL PROPERTIES

Q-1.1 The steel shall conform to the following chemical composition (in percent):

C	:	0.15 *Max*
Si	:	1.00 *Max*
Mn	:	2.00 *Max*
S	:	0.15 to 0.25
P	:	0.20 *Max*
Cr	:	17.0 to 19.0
Ni	:	8.0 to 10.0

Q-1.2 The analysis of the steel shall be carried out according to IS 228 and its relevant parts or any other established instrumental/chemical method. In case of dispute, the procedure given in IS 228 and its relevant parts shall be referee method.

ANNEX R

(*Clause* 8.14)

TEST FOR ADHESION OF 3 PLY CONSTRUCTION COOKER BODY

R-1 Heat the pressure cooker body to 250^{+25}_{0} °C and quench in water at ambient temperature. Before quenching, the cooker body shall be checked at a minimum of two locations to confirm, that the temperature of the cooker body has attained 250^{+25}_{0} °C. Temperature to be measured at inside bottom and top edge (mouth portion) of the cooker (record the temperature for at least the first and the last cycle). Repeat this cycle 50 times.

NOTES

1 Hold (soak) the cooker body for 2 min at 250^{+25}_{0} °C under heating condition, before measuring and subsequent quenching in ambient temperature water.

2 For guidance purpose, heating source may be hot air oven or any other equipment which can be used to achieve such temperature.

ANNEX S

(*Clause* 8.17)

TEST FOR EFFECTIVENESS FOR INDUCTION BOTTOM

S-1 Take a fresh sample of cooker.

S-2 Fill the cooker with water equal to 1/16 part of the internal volume of the cooker. Put this cooker onto induction cooktop (full power). Note the timing for first PRD operation.

NOTE — Use minimum 1 800 W induction cooktop.

S-3 Test this cooker three times as per Annex H (*see* **H-1.1**).

S-4 Repeat the test as per **S-2** above with same induction cooktop. The time noted after this test shall not be more than 25 percent of the time noted after the test **S-2**.

ANNEX T

(*Clause* 8.6.3.1)

TESTS FOR REMOVAL OF LID UNDER PRESSURE FOR COOKER FASTENED BY SCREW CLAMPS OR ANY OTHER LOCKING DEVICE

T-1 Use a new gasket.

T-2 Boil the gasket for 2 h in water.

T-3 Dry and let it cool down to room temperature.

T-4 Put the gasket in its location of pressure cooker.

T-5 Open and close the cooker three times.

T-6 Fill the cooker to 50 percent of its body capacity, use distilled water. Boil this water for 15 min in the open cooker body.

T-7 Close the pressure cooker.

T-8 Connect the pressure cooker to a calibrated gauge.

T-9 Put the pressure cooker on the testing equipment. The cooker should be held in place. The cooker body should be held such that it does not rotate.

T-10 A force of 12 kgf (120 N approximately) is applied to the opening device, the lid or cover shall not open until the steam pressure inside the pressure cooker has fallen below 0.18 kgf/cm² (18 kN/m² approximately) gauge.

ANNEX U

(*Clause* 10.4)

IMPORTANT SAFEGUARDS FOR ELECTIC PRESSURE COOKER

U-1 The instruction manual for electric pressure cooker shall include the following as a basic requirement:

a) Instruction for use (how to open and close, how to use the menus);
b) Important safeguards;
c) Safety instruction;
d) Do's and don'ts;
e) Care and cleaning;
f) At least two recipes using each function, unless it's only a keep warm function or child lock;
g) Trouble shooting;
h) Spares;
j) Service centres; and
k) Customer care number and email id, web site details. With instruction on how to log a complaint or service request.

U-2 IMPORTANT SAFEGUARDS

U-2.1 Save These Instructions

U-2.1.1 *Safety Instruction*

a) Be sure to observe the following to prevent malfunction that may cause an accident;
b) Measure the quantity of rice and water according to the instructions;
c) Clean the cooker, particularly the condensation collector, after each use (*see* **U-2.1.2**);
d) Set the unit on a stable surface;
e) Do not expose to water, high humidity, or heat sources. Do not use the pot directly on an open flame;
f) Be sure to keep the unit out of the reach of children;
g) Keep holes that drain into the condensation collector clean and free of debris;
h) Plug into a properly wired wall outlet. Before you plug it in, make sure the voltage of the unit is the same as your local supply;
j) After plugging in, press the switch on immediately;
k) Cooking with the switch in 'Keep Warm' position will cause low heat cooking and this will not cook the rice properly;
m) The unit becomes hot when in use. Do not touch the lid with your hand, and do not place your face or hand directly over the steam coming from the cooker;
n) Always keep the outside bottom of the pot and the heating plate clean and dry. Any foreign matter between them will cause the unit to malfunction;
p) Do not tilt the cooker on its edge or place it upside down with its power supply plug connected or with food in the pot as this may cause damage to the cooker or injury

to yourself. When tilting or placing the rice cooker upside down, make sure to disconnect the power supply plug;

q) The pot must not be filled above the 'Maximum Cup Marking';

r) The lid must be closed tightly in the latched position at all times during cooking (that is, the unit must not be operated with the lid opened);

s) Do not cover the lid with a cloth. The lid may deform or change colour;

t) Do not damage the power cord and do not attempt to repair it if it is damaged;

u) Never attempt to customize the cord. Keep the cord away from high temperatures. Avoid unnecessary bending, twisting and pulling on the cord. Never place heavy objects on the cord or attempt to tie it up. Using a damaged power cord can lead to electrical shock, shorting or fire;

v) Ensure that the plug fits all the way into the outlet;

w) Partially plugged-in cords may cause electric hazard; and

y) Do not move the unit while cooking.

U-2.1.2 *Cleaning and Care Instruction*

a) Do not immerse the cooker in water;

b) Clean the body and outer lid with a damp cloth. Do not use dishwashing detergent;

c) Wash the rice cooker pot, steaming basket, measuring cup, scoop, and condensation collector in warm soapy water;

d) Remove the detachable inner lid by grasping on both sides and gently pulling down. Wash in warm soapy water and dry thoroughly.

U-2.1.3 *Helpful Suggestions*

a) Using the 'Keep Warm' function for more than 5 h may cause discoloration or an odour in the rice;

b) You can adjust the amount of water and/or rice to your own taste preferences;

c) When steaming vegetables please refer the steaming chart in this manual. The charts are merely a guide, you may wish to adjust the times according to your own taste preferences;

d) Washing rice, when rice is milled some bran and residues adhere to the surface of the rice. You can remove these residues by first washing the rice with water before cooking. This will remove excess starch and residues, which will provide you with much whiter, fluffier rice;

e) Remember to always use the measuring cup provided to accurately measure the rice. Add the desired amount of rice to the rice cooker pot. Fill with cold water until all of the rice is submerged. Wash the rice by simply stirring the rice around in the water and rubbing between your hands. You will notice that the colour of the water will become cloudy as the rice is cleaned. Without spilling the rice, tip the rice cooker pot to remove the cloudy water and repeat several times until the water remains clear.

f) Cooking other types of rice such as long grain rice, wild rice, yellow rice, brown rice, basmati rice, etc. When cooking rice other than short grain white rice it will be necessary to increase the amount of water by 1.5 to 2 times more than the standard short grain white rice recipe. Adjust to suit your own personal taste;

g) Foods that are overly sweet or oily can cause the rice cooker to switch to 'Keep Warm' earlier than desired. If this happens, add some liquid like water, wine, stock, milk, or juice;

h) When baking in the rice cooker, it is usually necessary to push cook more than once. You will need to wait for about 10 min after the machine switches to 'Keep Warm' to be able to press it back to cook. This is normal; and

j) Do not double recipes in the rice cooker. The tightly closed lid will force excess liquid out of the steam vent if you do.

ANNEX V

(*Foreword*)

COMMITTEE COMPOSITION

Utensils, Cutlery Domestic Hardware Sectional Committee, MED 33

Organization	*Representative(s)*
In Personal Capacity (*A-504, K G Chandra Vista, OMR, Opp to Satyabhama University, Sholinganallur, Chennai 600119*)	SHRI G. SHANMUGANATHAN **(*Chairperson*)**
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CSIR - National Metallurgical Laboratory, Jamshedpur	DR GOPI KISHOR MANDAL DR HIMADRI BAR (*Alternate*)
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Hindalco Industries Limited, Mumbai	SHRI DEVESH KUMAR SHRI ATUL GUPTA (*Alternate*)

Organization	*Representative(s)*
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Member Secretary
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