FINALIZED TANZANIA STANDARD

Stainless Steel Cookware — Specification

First Edition 2021

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TANZANIA BUREAU OF STANDARDS

0 National Foreword

This finalized Tanzania Standard has been prepared under Metals and Structures Technical Committee MEDC 02, under supervision of Mechanical Engineering Standards Divisional Committee.

During preparations of this draft standards assistance was derived from the following standard:

IS 14756:2017 Stainless Steel Cooking Utensils — Specification.

IS 13395:1995 (Reaffirmed 2015) Performance of Handles and Handle Assemblies Attached to Cookware — Specification.

IS 5522:2014 (Reaffirmed 2019) Stainless Steel Sheets and Strips for Utensils — Specification.

IS 9040:1978 (Reaffirmed 2017) Methods for sampling of utensils.

IS 15960:2013 (Reaffirmed 2018) Specifications for composite bottom stainless steel cooking utensils / pressure cookers

IS 15997:2012 (Reaffirmed 2018) Low nickel austenitic stainless steel sheet and strip for utensils and kitchen appliances — Specification.

Stainless Steel Cookware — Specification

1 Scope

This standard lays down the requirements for the following types of stainless steel utensils:

a) Cooking utensils,

b) Serving utensils,

c) Table utensils, and

d) Storage utensils.

2 Normative references

ISO 431, Copper refinery shapes

ISO 1190-1, Copper and copper alloys — Code of designation — Part 1: Designation of materials

ISO 209, Aluminium and aluminium alloys — Chemical composition

TZS 2550, Wrought aluminium and aluminium alloys — Sheets, strips and plates — Part 5: Chemical composition

3 Terms and definitions

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

3.1 Cookware

A utensil, in the form of a hollow container, intended for use in the preparation and/or cooking of food or beverages on the top of a stove, or any other heating appliance.

3.2 Cookware Body

That part of an item of cookware intended to retain the contents during use and including the base, side(s), lid and any movable or removable section(s).

3.3 Handle

A projection affixed to the body of an item of cookware and intended to facilitate the carrying and handling of the article in normal use.

NOTE: A handle or part of a handle, affixed to a lid is regarded as a knob.

3.4 Handle (or Knob) Assembly

The complete arrangement of a handle (or knob) and its fixing system as embodied in a finished, manufactured item of cookware or mounted onto a rigid support such that the position and fixing conditions in an actual item of cookware are exactly simulated.

4 Materials

4.1 The stainless steel used for manufacture of utensils shall conform to the following requirements:

4.1.1 Specified Analysis

The ladle analysis shall be as given in Table 1.

Table 1A: Chemical Composition

Grade Designation		Constituents, Percent							
Letter Symbol	**Numerical Symbol**	**C** *Max*	**Si** *Max*	**Mn** *Max*	**Ni**	**Cr**	**S** *Max*	**P** *Max*	**Ni** *Max*
Austenitic									
X04Cr19Ni9	304	0.07	0.75	2.00	8.0 - 10.5	17.5 - 19.5	0.030	0.045	0.10
X07Cr18Ni9	302	0.12	0.75	2.00	8.0 - 10.0	17.0 - 19.0	0.030	0.045	0.10
Ferritic									
X07Cr17	430	0.12	1.00	1.00	0.75, *max*	16.0 - 18.0	0.030	0.040	—

Table 1B: Chemical Composition – New Grade

Grade Designation		Chemical composition, in Percentage Maximum								
ASTM	**JIS**	**C**	**Si**	**Mn**	**P**	**S**	**Cr**	**Cu**	**N**	**Ti (Titanium)**
UNS No. S44330	SUS443J1	≤ 0.025	≤ 1.00	≤ 1.00	≤ 0.040	≤ 0.030	20.00 - 23.00	0.30 - 0.80	0.02 5	8 × (C% + N%) - 0.80

4.1.2 Check Analysis

In case of check analysis, the permissible variation for the limits specified in Table 1 shall be as given in Table 2.

Table 2: Permissible Variation between Specified Analysis and Check Analysis

S/No.	Element	Permissible Deviation Percent
1	Carbon, C	± 0.01
2	Silicon, Si	± 0.05
3	Manganese, Mn	± 0.04
4	Nickel, Ni (1%)	± 0.03
5	Nickel, Ni (1-10%)	± 0.10
6	Chromium, Cr	± 0.20
7	Sulphur, S	+ 0.005
8	Phosphorus, P	+ 0.005
9	Nitrogen, N	+ 0.010
[1)] In one cast the deviation may occur over the upper value or under the lower value of the specified range in Table 1.		

4.2 The materials used for electro-deposition on bottom of the utensil shall be electrolytic copper conforming to ISO 431. The materials used for cladding 2-ply shall be copper or aluminium as specified in ISO 1190-1 or ISO 209 /TZS 2550 respectively.

4.3 In case of 3-ply construction, the protector plate material shall conform to Table 1 and Table 2. The material for the core shall be either copper or aluminium. Copper used for core shall conform to ISO 1190-1. Aluminium used for core shall conform to ISO 209/ TZS 2550.

4.4 Rivets, legs and other fittings used on the body of the utensils shall be made of the stainless steel conforming to Table 1 and Table 2 or aluminium conforming to ISO 209/ TZS 2550.

4.5 The screws used to screwing handle with the body shall be made of either stainless with nickel chromium or steel conforming to Table 1 and Table 2 or brass plate any other non-corrosive material suitably plated.

4.6 The handle and knob shall conform to 6.3. The knobs for the lids shall be made of corrosion resisting material or non-ferrous material suitably plated or made from impact resistant and heat resistant plastics.

4.7 The stainless steel materials used for manufacture of utensils shall conform to the mechanical properties as shown in Table 3.

Table 3: Mechanical Properties

Steel Grade Designation		0.2% proof stress (N/mm^2) Min	Tensile stress (N/mm^2) Min	Elongation (%)	Hardness (HV) Max	Bend Test
Name	**ISO number**					
Austenitic Stainless Steel						
X04Cr19Ni9	304	205	515	40	197	Not required
X07Cr18Ni9	302	205	515	40	197	Not required
Ferritic Stainless Steel						
X07Cr17	430	205	450	20% for <1.27t 22% for > 1.27t	184	r = 1*t*[1)]
ASTM	**JIS**					
UNS No. S44330	SUS443J1	205	390	22	200	r = 1*t*, Bending angle 180°
[1)] *t* — thickness of test piece.						

5 Shapes and Dimensions

5.1 The shapes and dimensions for various types of utensils shall be as per the agreement between the purchaser and the manufacturer. However, some of the shapes of different types of utensils are given in Annex H for guidance.

5.2 The minimum finished thickness of the utensils shall conform to the requirements given in Table 4 except beaded portion. The minimum thickness of sheet used as per Table 4 is recommended for use. However, the utensils with higher thickness may be supplied, if required.

Table 4: Requirement for Thickness for Sheet/Utensils

S/No.	Types of Utensils	Minimum Thickness in mm for	
		Sheets	Utensils
1	Cooking utensils	0.9	0.7
2	Serving utensils	0.7	0.55
3	Table utensils	0.7	0.55
4	Storage utensils:		
	- Deep drawn	0.7	0.5
	- Fabricated	0.56	0.5

5.3 In case of 2-ply construction at the bottom of the utensil, the minimum thickness of the cladding material shall be as given in Table 5.

Table 5: Cladding Material Thickness

S/No.	Diameter of Cladding Disc in mm	Thickness of Copper Disc in mm	Thickness of Aluminium Disc in mm
i)	Up to 150	1.5	2.5
ii)	Above 150 to 200	1.8	3.0
iii)	Above 200	2.4	3.5

5.4 In case of electro-deposition of copper, the minimum thickness of copper layer shall be 0.5 mm.

5.5 In case of 3-ply composite bottom stainless steel cooking utensils, the protective stainless steel layer shall not have a nominal thickness less than 0.5 mm and minimum thickness of the sandwiched core shall be as given in Table 6.

Table 6: Core Thickness for 3-ply Construction

S/No.	Diameter of Cladding Disc in mm	Minimum Thickness of Copper Disc in mm	Minimum Thickness of Aluminium Disc in mm
i)	Up to 150	1.5	2.5
ii)	Above 150 to 200	1.8	3.0
iii)	Above 200	2.4	3.5

6 Workmanship and Finish

6.1 The utensils shall not have any sharp edges and shall be free from distortion, dents, wrinkles, burns, splinters, scratches, pitting, deep tool marks and other surface defects. The utensils generally be bright finish, matt finish or combination of both finish and shall not rock when placed on flat surface (*see* Note 1 and Note 2). In case of electrolytic copper deposition on the utensils at the bottom the coating shall be free from defects such as unplated area and their superficial blemishes visible to the naked eye.

NOTES

1 Flat bottom utensil shall not rock when placed on flat surface.

2 For curved base utensils attachment shall be provided by manufacturer to make the utensils stable when placed on the flat surface.

6.2 The construction of the utensils shall be such that it is possible to clean them thoroughly and all surfaces for cleaning are accessible by hand or brush.

6.3 Handles Construction Requirements

6.3.1 Metal handles shall be fitted to the utensils by spot welding or riveting. Spot welded joints shall not have any crevices. In case of plastic handles, it shall be suitably fitted to the body through a metal bracket or ferrule fixed to the utensil by spot welding or riveting.

6.3.2 Handles and knobs shall be of such proportions that they can be held safely and with a secure grip. The provision of moulded finger grips and/or a textured, matt finish may be of assistance in providing secure gripping features.

6.3.3 Any exposed length of metal or flame guard between an insulated handle, if used, and the body of the cookware shall not exceed 25 mm for saucepans, etc., or 40 mm for shallow items when measured in the direction parallel to the axis of the handle.

6.3.4 The type and minimum number of handles to be used on cookware of a given gross capacity shall be in accordance with Table 7.

Table 7: Selection Criteria

Size of Cookware - Gross Capacity, litre	Number and Type of Handle(s)
1 to 2	1 straight
2 to 5	1 straight or 2 loop/flange
5 to 10	1 straight and 1 loop/flange or 2 loop/flange or single handle, provided that this enables both hands to be used
10 and above	1 straight and 1 loop/flange or 2 loop/flange

Where an item of cookware has a single straight handle only this shall be not less than 150 mm in length when measured along its top surface from the point of contact with the cookware and including

any flame guard. Loop or flange handles shall be not less than 50 mm in the dimension adjoining the circumference of the body of the cookware.

NOTE- Knobs should be of such dimensions that, in normal use, the hand cannot readily contact the material of the cookware. The provision of an extended ring of the material at the base of a knob to act as a finger guard can be advantageous in this respect.

6.4 Handles position with respect to cookware

Handles shall be positioned above the center of gravity of the cookware when filled to its gross capacity. For shallow items there shall be a minimum clearance of 30 mm between the handles and the horizontal projection of the base of the cookware at the point 0.33 times the length as shown in Fig 01.

The mass of a handle shall be such that the cookware is stable when placed empty, and without any lid, on a level surface. Knobs shall be positioned so as to provide ease of movement and/or maximum stability to any removable section or lid during and after its removal. It shall not be possible to contact a heated surface of the cookware in using the knob for its normal purpose.

6.5 Handles Attachment to Cookware

Attachment shall be by riveting, welding and/or threaded fixing for handles and knobs not integral with the body of the cookware. Symmetrical knobs shall be fixed at two points.

Welded stud fixing shall be capable of withstanding an applied torque of 11 N.m per stud for handle attachment and 4 N.m per stud for knob attachment without visible distortion of the stud or weld.

Threaded fixing shall incorporate a locking washer or similar device like suitable thread locking/sealing adhesive to hold them secure.

Attachment of handles and knobs to cookware shall be firm and close, presenting no traps for dirt within the cookware where contact with food could be made in normal use.

It shall not be possible to touch, from the exterior of the cookware body with a spherical probe of diameter 14 mm, any part of a metal fixing system in the holding zone of the handle directly attached to, or penetrating, the cookware body which may reach a temperature exceeding 50°C in normal use.

6.6 Handles Performance

6.6.1 General

The requirements specified in this clause are intended to be applied to complete items of cookware, incorporating the handle and its fixing system.

Permanent deformation of, or failure in, the body of the cookware adjacent to a handle in a performance test shall be regarded as failure to satisfy the related requirement.

Handle assemblies, or knob assemblies, shall satisfy each of the appropriate requirements specified in 5.6.2 to 5.6.10. A handle or part of a handle, affixed to a lid shall satisfy only those requirements appropriate to knob assemblies.

6.6.2 Bending Strength

A handle assembly shall withstand a bending force of 75 N when tested without visible failure of, or damage to, any part thereof and without permanent distortion or permanent loosening of the fixing system.

6.6.3 Torque Strength

A handle assembly shall withstand a torque of 5 N.m and a knob assembly a torque of 3 N.m when tested as described in Annex B, without visible failure of, or damage to, any part thereof and without permanent distortion or permanent loosening of the fixing system.

6.6.4 Impact Strength

A handle assembly shall withstand an impact mass equal to one half of the mass of the empty item of cookware or 500 g, whichever is less subject to a minimum mass of 250 g, and a knob assembly, an impact mass of 250 g when tested without visible failure of, or damage to, any part thereof and without permanent distortion or permanent loosening of the fixing system.

6.6.5 Fatigue Resistance

A handle assembly shall withstand 1 500 raising and lowering cycles without permanent distortion or permanent loosening of the handle or of its fixing system

6.6.6 Leakage

There shall be no leakage of the content of the cookware through any fixing system penetrating the body of the cookware during the performance of the test. This test shall be carried out before and after the tests described in 6.6.2 to 6.6.5.

6.6.7 Thermal Insulation

The maximum temperature rise above ambient of a handle material or knob material to be contacted by the hand in normal use shall not exceed the following, as appropriate,

a) Plastics, wood, rubber : 50°C

b) Glass, porcelain, vitreous material: 40°C

c) Metal: Either 30°C, or where this is exceeded, the cookware shall carry a warning that in use the handle must be insulated, for example by the use of an oven glove.

6.6.8 Heat Resistance

A handle assembly or knob assembly shall continue to meet the appropriate requirements of 6.2 to 6.5 following:

a) for thermosetting plastics material, heating in an air circulating oven at 180 ± 2 ºC for 1 h and cooling at ambient temperature for 3 h;

b) for all other materials* heating in an air circulating oven at 100 ± 2 ºC for 168 h and cooling at ambient temperature for 3 h.

NOTE-However blisters appearing **on** plastic handles will not constitute failure under this test.

6.6.9 Washing Resistance

A handle assembly or knob assembly shall continue to meet the appropriate requirements of 6.2 to 6.5 following either:

a) 100 wash and dry cycles, simulating hand washing. of immersion in a 2 percent V/V solution of mestic washing-up liquid, for 6 ± 1 min at 60 ± 5 ºC, followed by drying suspended in air at room temperature for 6 ± 1 min;

b) 25 cycles in a domestic dishwashing machine, operating at 70 ± 5 ºC, with a 35 g charge of detergent approximately to the following analysis:

32 percent sodium triolyphosphate (anhydrons)

25 percent sodium carbonate (anhydrous)

35 percent sodium metasilicate (anhydrous)

5 percent calcium hypochlorite (anhydrous)

Remainder surfactant (anionic type)

Caustic alkannity = 15 percent as NaO (sodium oxide)

The test temperature shall be that measured on the article under test during the hot washing part of the cycle. Allow the article under test to rest for not less than 1 h at ambient conditions between each cycle.

6.6.10 Burning Resistance

A handle shall not melt or drip molten and/or burning material with the a position when tested as described in Annex F Any burning shall either extinguish itself within 15 s of removal of the flame, or if burning continues beyond 15 s, it shall be extinguished by a steady drought of 5 m/s a the area of burning. Once extinguished the handle material shall not spontaneously re-ignite.

With the test flame applied at the body/handle junction there shall be no loosening or distortion of the handle attachment during or after the test.

7 Tests

7.1 Staining Test

The surface of the utensil shall be thoroughly washed with hot soapy water. Thoroughly rinse and then degrease the test specimens in acetone or methylated spirits, then wiped using a soft cloth. The utensils, when dipped for 16 h in each of the following solutions maintained at 60 ± 2ºC temperature, shall not show any sign of staining after removal from the solutions at the end of above period:

a) Ten grams of glacial acetic acid (99 percent) dissolved in distilled water to make 100 ml; and

b) Five grams of pure sodium chloride dissolved in distilled water to make 100 ml.

7.2 Mechanical Shock Test (for cladded utensils only)

The utensil body shall be supported in air with the bottom side up and a steel ball weighing half a kilogram dropped on to it from the height of 500 mm five times. After completion of the test, the cladded or deposited layer shall show no sign of peeling off or coming off.

7.3 Thermal Shock Test (for cladded utensils only)

The utensil body only shall be kept in an oven to attain a temperature of 275 ºC (+25/–0 ºC). Thereafter the utensil shall be removed and dipped immediately in water maintained at room temperature. This process shall be repeated three times and at the end of the process the deposited layer/cladding shall not show any sign of peeling off or coming off.

7.4 Dry Heat Test (for cladded utensils only)

The Utensil body only shall be heated upto 250ºC (+25/–0 ºC) on induction and immediately quench in water (water temperature before quenching shall be around 35ºC ± 5 ºC). Repeat the cycle for 25 times on induction and repeat the cycle for 25 times on gas. Check the bottom for bulge, separation of disc or blisters after cooling every cycle. There shall be no separation of cowl or disc from the utensil after cooling.

7.5 Coating Thickness Test

The total thickness of the utensil including copper deposit shall be measured. The copper deposit shall then be stripped off in two areas of required size. The thickness of the stainless steel sheet shall then be measured. The difference between the total thickness including copper deposited and the thickness of stainless steel sheet be considered as the thickness of the copper deposited. This test is for electro deposition of copper only.

8 Sampling

8.1 The utensils to be selected from a lot are to be drawn at random. When utensils in a lot are packed in different boxes, a suitable number of boxes (not less than 10% of the total number in a lot

subject to a minimum of 2) shall be first chosen at random. From each of the boxes so chosen, an approximately equal number of utensils shall be selected at random so as to obtain the required number of utensils.

8.2 Visual and Dimension Characteristics

Unless agreed to between the purchaser and the manufacturer, the sampling of utensils and criteria of conformity shall be according to Table 8 for visual and dimensional characteristics.

Table 8: Scale of sampling and criteria for conformity, for visual characteristics and dimensions (Normal Inspection)

LOT SIZE	VISUAL CHARACTERISTICS AQL = 2.5				
	Sample	Sample size	Cumulative Sample size	Acceptance number	Rejection number
0 to 50	First	8	8	0	2
	Second	8	16	1	2
51 to 100	First	13	13	0	2
	Second	13	26	1	2
101 to 150	First	20	20	0	3
	Second	20	40	3	4
151 to 300	First	32	32	1	4
	Second	32	64	4	5
301 to 500	First	50	50	2	5
	Second	50	100	6	7
501 to 1000	First	80	80	3	7
	Second	80	160	8	9
1001 to 3000	First	125	125	5	9
	Second	125	250	12	13
3001 to 10000	First	200	200	7	11
	Second	200	400	18	9
10001 and above	First	315	315	11	16
	Second	315	630	26	27
LOT SIZE	**DIMENSIONS AQL = 2.5**				
	Sample	**Sample size**	**Cumulative Sample size**	**Acceptance number**	**Rejection number**
0 to 50	First	5	5	0	2
	Second	5	10	1	2
51 to 100	First	8	8	0	2
	Second	8	16	1	2
101 to 150	First	13	13	0	2
	Second	13	26	1	2
151 to 300	First	20	20	0	3
	Second	20	40	3	4
301 to 500	First	32	32	1	4
	Second	32	64	4	5
501 to 1000	First	50	50	2	5
	Second	50	100	6	7
1001 to 3000	First	80	80	3	7
	Second	80	160	8	9
3001 to 10000	First	125	125	5	9
	Second	125	250	12	13
10001 and above	First	200	200	7	11
	Second	200	400	18	9

8.3 Staining Test

The lots which have been found satisfactory in respect of visual and dimensional characteristics shall then be tested for staining test (where applicable). Unless agreed to between the purchaser and the

manufacturer, the sampling of utensils and criteria of conformity shall be according to Table 9 for staining test.

Table 9: Scale of sampling and criteria for conformity for Standard Test

Sample	Sample size	Cumulative Sample size	Acceptance number	Rejection number
First	5	5	*	2
Second	5	10	*	2
Third	5	15	0	2
Fourth	5	20	0	3
Fifth	5	25	1	3
Sixth	5	30	1	3
Seventh	5	35	2	3
*Acceptance not permitted at this sample size				

8.4 The tests 7.2 to 7.5 are type tests applicable to cladded utensils and shall be done on separate sample in every batch. To ensure the quality of the utensils additional tests shall be conducted on three utensils selected at random from one shift production or 100 pieces, whichever is less in the order specified in Table 10.

Table 10: Addition Tests

S/No.	Tests	Remarks
i)	i) Sample 1: a) Mechanical shock test (*see* **6.2**) b) Thermal shock test (*see* **6.3**)	 If found OK subject to next test. Only for electro deposited utensils
ii)	Sample 2: Staining test (*see* **6.1**)	This test is to be carried out for every 5000 pieces or once in a month whichever is earlier
iii)	Sample 3: Dry heat test (*see* **6.4**)	For cladded 2-ply and 3-ply construction utensils

9 Marking, Packaging and Labeling

9.1 Marking

Each utensil shall be legibly and indelibly (by stamping or engraving or etching) marked with the following:

a) Manufacturer name and/or initials and/or trademark;
b) Material grade or batch number;
c) Country of origin.

9.2 Packaging

Utensils shall be wrapped in soft tissue paper and shall be packed in accordance with the best trade practices or according to the instructions of the purchaser. All utensils shall be packed neatly in the package that is closed to prevent contamination during storage and transportation. Care shall be taken to see that the utensils do not get dented or damaged during transit.

9.3 Labeling

Each package of the utensil shall be labeled with the following information:

a) manufacturer's name or trademark;
b) country of origin;
c) batch number;
d) material grade.
e) name of the utensil, gross capacity (in litres)/ size (in mm) and quantity in the package.

ANNEX A

BENDING STRENGTH TEST

A-1 APPARATUS

A-1.1 A means of applying a force of 75 N at a speed not exceeding 50 mm/min.

NOTE - A tensile testing machine is an appropriate means of achieving this.

A-1.2 A D section loading bar, diameter 10 ± 1 mm, to transmit the applied force evenly across the width of a handle under test.

A-1.3 A means of attaching the cookware firmly to a rigid base throughout the test, for example, a G clamp, or for attaching a handle via its fixing system to an appropriate support.

A-2 PROCEDURE

A-2.1 Attach the cookware firmly to the rigid base so that the contacting face of the loading bar is 10 ± 1 mm from the end of the handle (see Fig. 1).

A-2.2 Apply the loading bar at a speed not exceeding 50 mm/min until a force of 75 N is applied or until failure of the assembly occurs, whichever is the sooner.

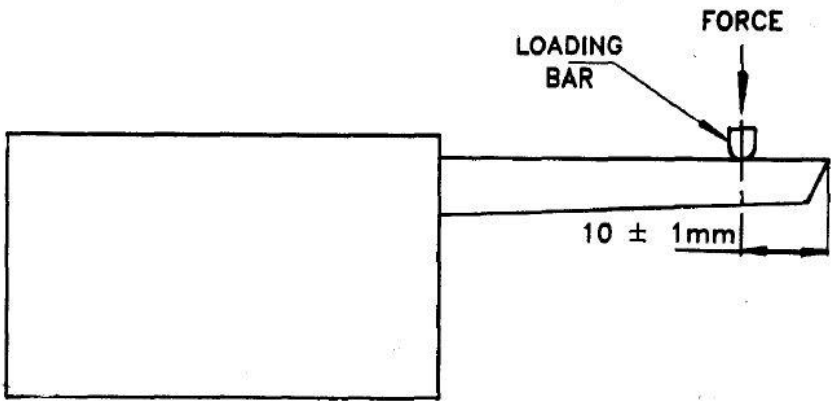


Fig. 1 Arrangement for Bending Strength Test

ANNEX B

TORQUE TEST

B-1 APPARATUS

B-1.1 A calibrated torque wrench capable of applying a torque of up to 5 N.m.

B-1.2 A means of attaching the cookware firmly to a rigid base throughout the test, for example, a G clamp, or for attaching a handle or knob via its fixing system to an appropriate support.

B-2 PROCEDURE

B-2.1 Attach the cookware firmly to the rigid base and clamp the torque wrench to the handle or knob adjacent to the fixing system at 90’ to the major axis of the fixing system.

B-2.2 By means of the wrench twist the handle or knob until a torque of 5 N.m for a handle or 3 N.m for a knob is applied or until failure of any part of the assembly occurs, whichever is the sooner.

ANNEX C

IMPACT STRENGTH TEST

C-1 APPARATUS

C-1.1 A means of dropping a weighted striker from a height of 500 ± 5 mm so that it falls vertically, essentially without friction, using guides.

C-1.2 A steel striker of hemispherical striking surface 25 ± 1 mm in diameter and mass 250 ± 5 g capable of being weighted to a total mass of 500 ± 5 g.

C-1.3 A means of attaching the cookware firmly to a rigid base throughout the test, for example, a G clamp, or for attaching a handle or knob via its fixing system to an appropriate support and arranged such that the cookware may also be turned through 90° and 1 80° so that the handle or knob may additionally be struck on its side and, if appropriate, on its lower surface.

C-2 PROCEDURE

C-2.1 Attach the cookware or the lid firmly to the rigid base so that it is correctly aligned below the striker. Support the underside of a lid when striking the knob directly.

C-2.2 Load the striker to the appropriate mass (one half of the mass of the empty cookware of 500 g, whichever is less for a handle, 250 g for knob or for the handle of cookware of mass less than 500 g) and release it so that it strikes the handle within 10 mm of its end (see Fig. 2) or the knob directly.

C-2.3 Inspect the assembly and report any visible damage.

C-2.4 Rotate the assembly through 90’ so as to strike the handle or knob on one side.

C-2.5 Repeat the procedures described in C-2.2 and C-2.3.

C-2.6 Rotate the assembly through a further 90º so as to strike the handle or knob (if appropriate) on its underside.

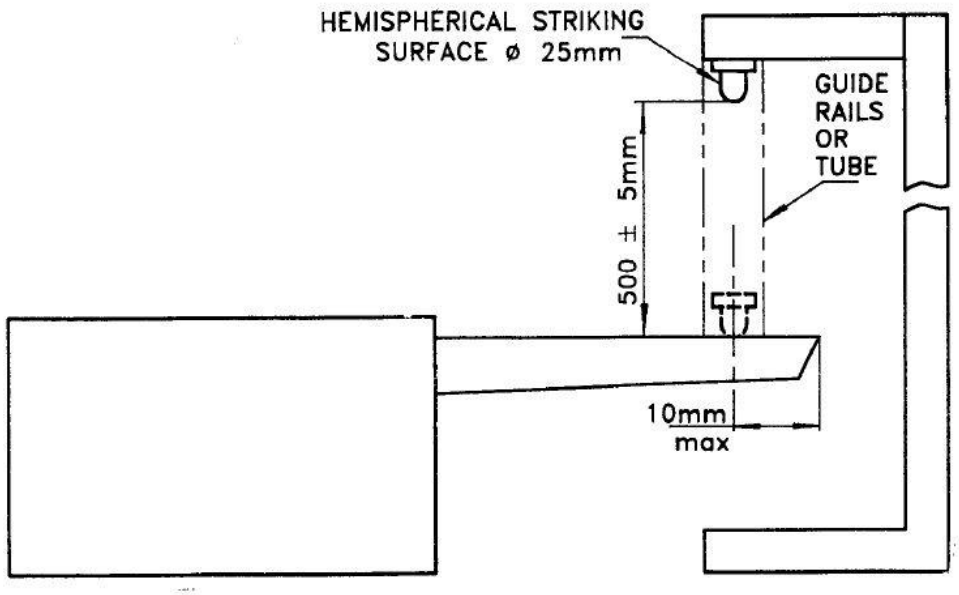


Fig. 2 Arrangement for Impact Test

ANNEX D

FATIGUE TEST

D-1 APPARATUS

D-1.1 A means of continuously raising the lowering a loaded item of cookware from a level surface once per minute by means of its handle. The general form of a suitable apparatus is shown in Fig. 3, the profile of the cam providing the raising and lowering action is such that a smooth graduation from rest to the fully raised position (40 ± 2 mm) and back to rest is achieved in 60 ± 1 s.

D-1.2 Metal spheres 40 ± 10 mm in diameter, as loading for the cookware during the test.

D-2 PROCEDURE

D-2.1 Place into the cookware a loading of metal spheres of mass equivalent to 2.25 times the mass of water at the gross capacity of the cookware.

D-2.2 Attach the cookware securely to the apparatus as shown in Fig. 3A, 3B or 3C, as appropriate and raise and lower it once per minute by means of the rotating cam. The selection of apparatus is made according to the number and type of handle(s) specified in 4.3 irrespective of the number and type of handle(s) actually fitted.

D-2.3 At the completion of 1500 raising and lowering cycles, examine the cookware and report any permanent visible distortion or weakening of any part of the handle assembly or assemblies.

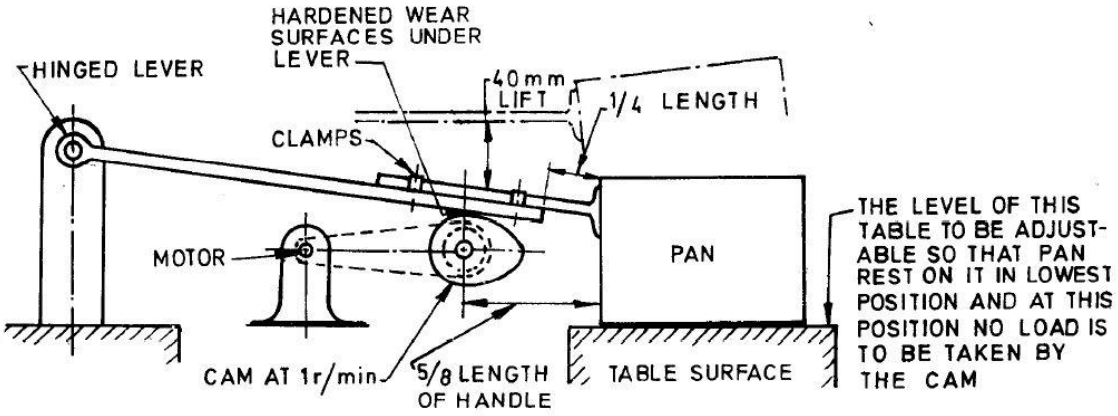


Fig. 3A Arrangement for Fatigue Tests - For a Single Straight Handle

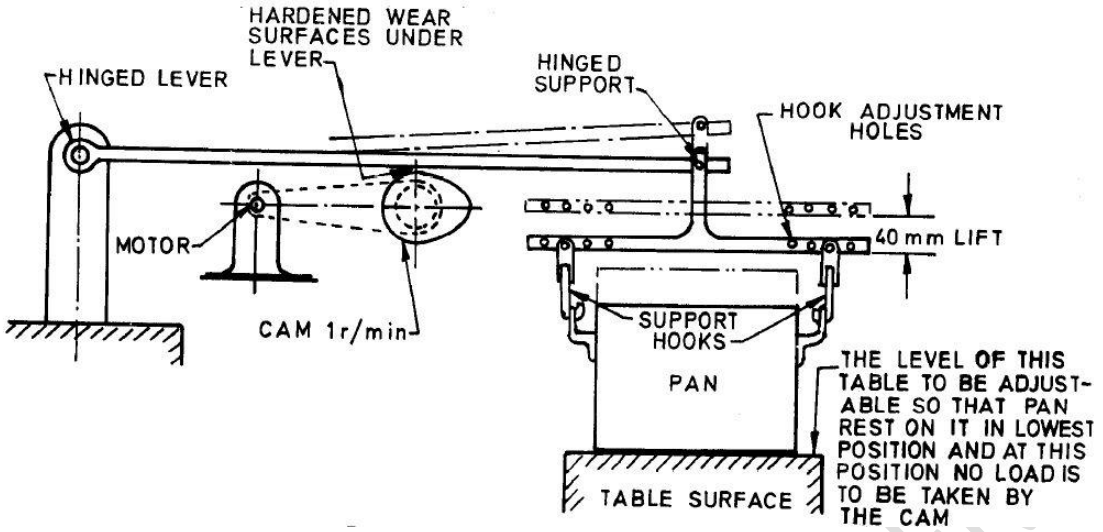


Fig. 3B Arrangement for Fatigue Tests - For Two Loop, Flange or Similar Handles

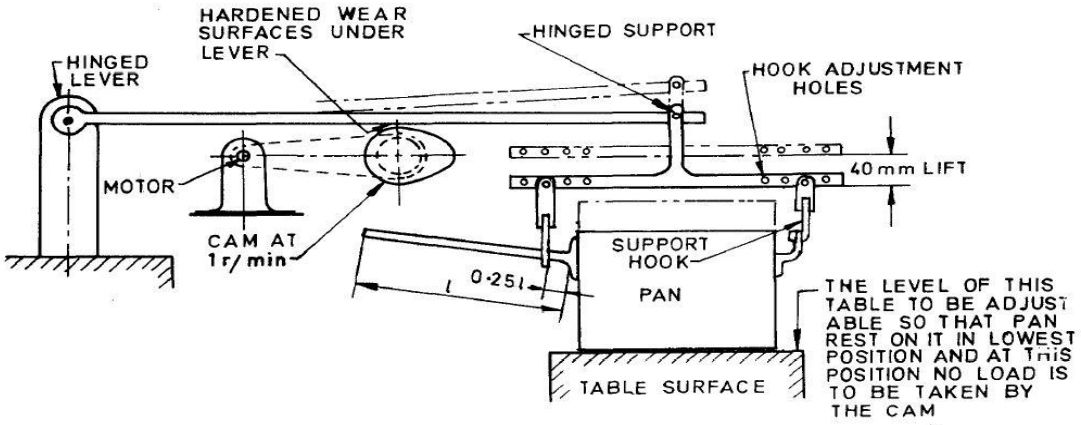


Fig. 3C Arrangement for Fatigue Tests - For One Straight Handle and One Loop, Flange or Similar Handle

ANNEX E

LEAKAGE AND THERMAL INSULATION TEST

E-1 APPARATUS MATERIALS AND CONDITIONS

E-1.1 Gas ring or hot plate rated at 3 kW in still air and of sufficient size to heat the whole area of the base of the cookware under test without extending beyond this in the area below the handle.

E-1.2 Thermocouple,or any other temperature measuring device accurate to ± 3ºC over the range 30°C to 100°C and consisting of a surface contact probe capable of being held in intimate contact with a handle or knob.

NOTE -Temperatures are measured on the underside of a handle and half way up at the sides of a knob or a handle fixed to a lid.

E-I.3 Water of no special degree of purity and cooking oil of flash point in excess of 250 ºC.

E-I.4 The tests are carried out in draught free conditions at room temperature.

The actual room temperature at the time of the measurements required by E-2.1.3, E-2.2.3 or E-2.3.3 is recorded to accuracy off 3°C to enable calculation of the temperature rise above room temperature (see 5.7).

E-2 PROCEDURE

E-2.1 Cookware in which cooking oil is not normally intended to be used, other than pressure cookers

(see E-2.3).

E-2.1.1 Fill the cookware with cold water to above the level of the main handle connection(s) and attach the lid, if any.

E-2.1.2 Raise the temperature of the water to boiling point and maintain at a constant, moderate rate of ebullition.

E-2.1.3 By means of the thermocouple or any other temperature measuring device, measure the temperatures reached at each of the points specified in Fig. 4A to 4D, as appropriate and record these after 30 minutes ebullition.

E-2.1.4 During the test observe and record whether there is leakage through any fixing penetrating the body of the cookware.

E-2.2 Cookware in Which Cooking Oil is Intended to be Used

E-2.2.1 Fill the cookware with cooking oil to 50 percent of gross capacity for shallow items or 90 percent of gross capacity for other items.

NOTE - For reasons of safety, it is essential that this test be carried out without any lid or cover on the cookware unless the product under evaluation is expressly intended to be covered.

E-2.2.2 Raise the temperature of the cooling oil to:

a) 220 f 5OC for -shallow items of cookware; and

b) 180 f 5’C, for other items of cookware.

Maintain the cooking oil at the appropriate temperature.

E-2.2.3 By means of the thermocouple measure the temperature reached at each of the point specified in Fig. 4A to 4D as appropriate and record these after 15 minutes at the appropriate temperature.

E-2.2.4 During the test observe and record whether there is leakage through any fixing penetrating the body of the cookware.

WARNING NOTE - Due care should be exercised when conducting this test with cooking oil. The temperatures specified are close to the flash point of the oil and adequate ventilation is essential.

E-2.2.5 If the level of oil in the test does not come above the level of the main handle connections, carry out test described in E-2.1 omitting the temperature measurements of E-2.1.3.

E-2:3 Pressure Cookers

E-2.3.1 Fill the pressure cooker to one halfof its gross capacity with cold water and attach the lid in accordance with the manufacturer's instructions.

E-2.3.2 Raise the temperature of the water to the nominal operating pressure of the cooker and maintain it steadily at the nominal operating pressure with the burner adjusted to the minimum setting required to achieve this.

E-2.3.3 By means of the thermocouple measure the temperature reached at each of the points specified in Fig. 4A to 4E as appropriate and record these after 10 minutes of steady operating at the nominal operating pressure.

NOTE - A handle, or part of a handle, affixed to the lid of a pressure cooker is measured at the point specified in Fig. 4E.

All dimensions in millimetres.

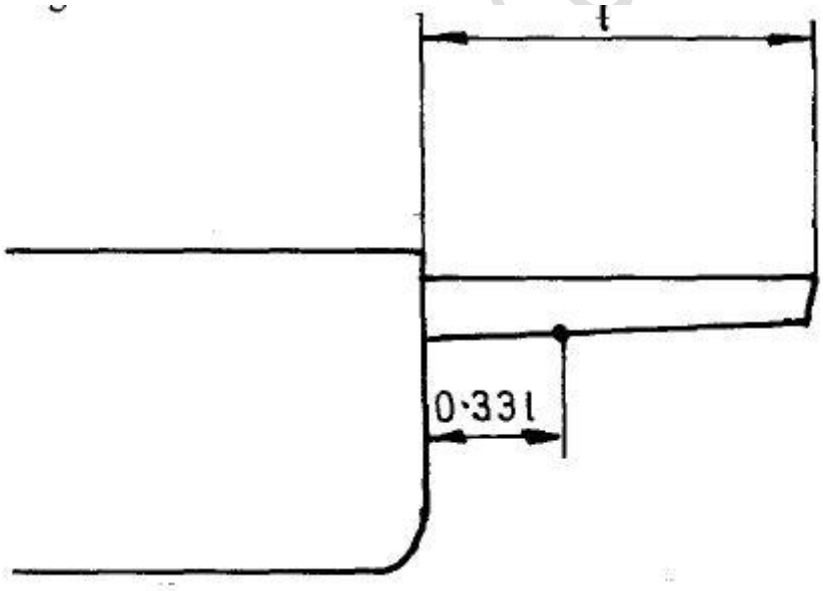


Fig. 4A Points for Temperature Measurement - Long Handle

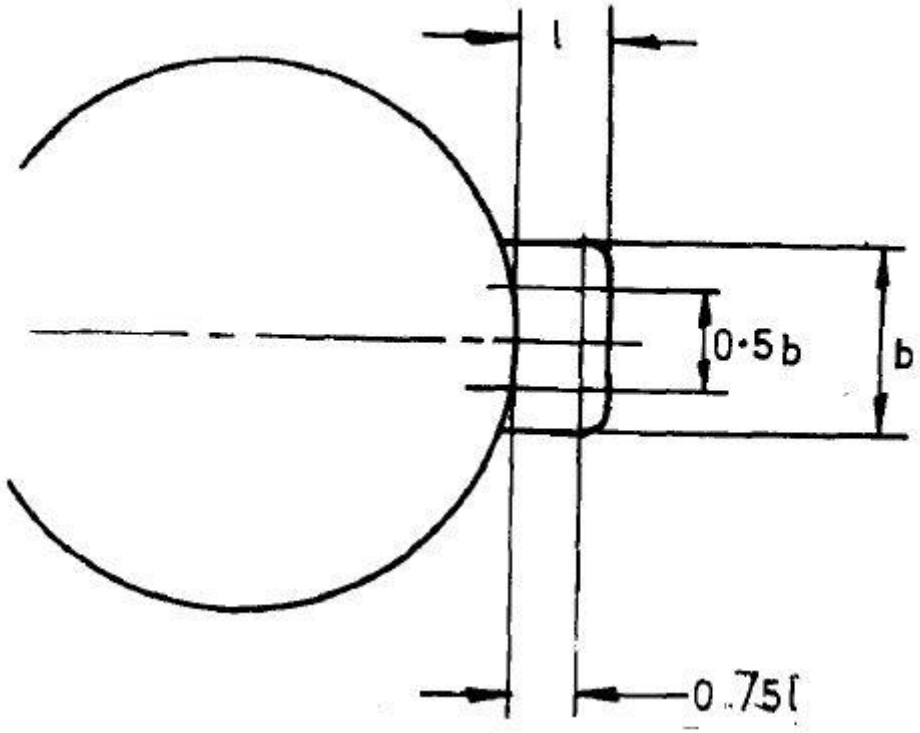


Fig. 4B Points for Temperature Measurement - Solid Flange Handle

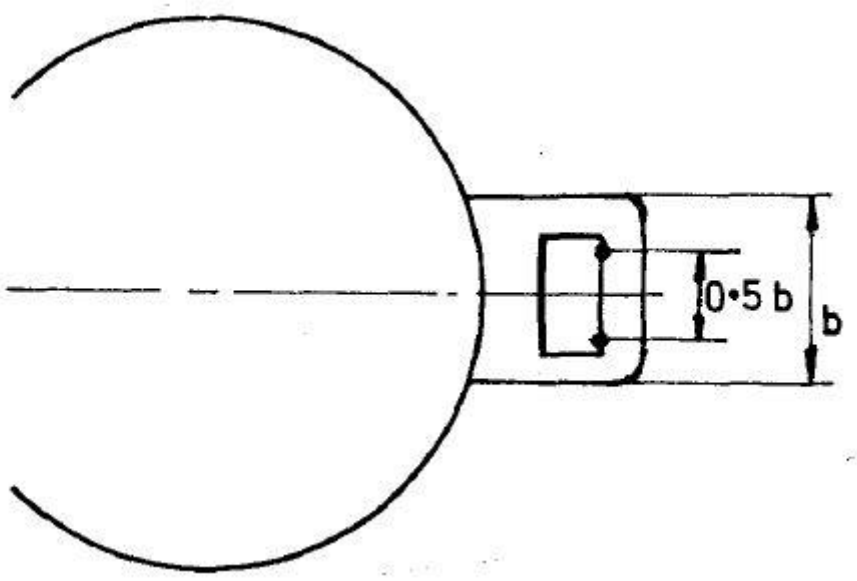


Fig. 4C Points for Temperature Measurement - Loop Handle

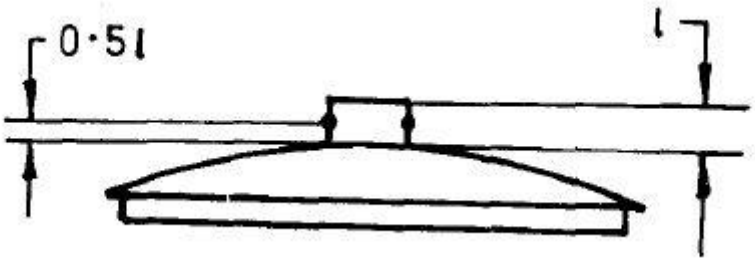


Fig. 4D Points For Temperature Measurement - Knob

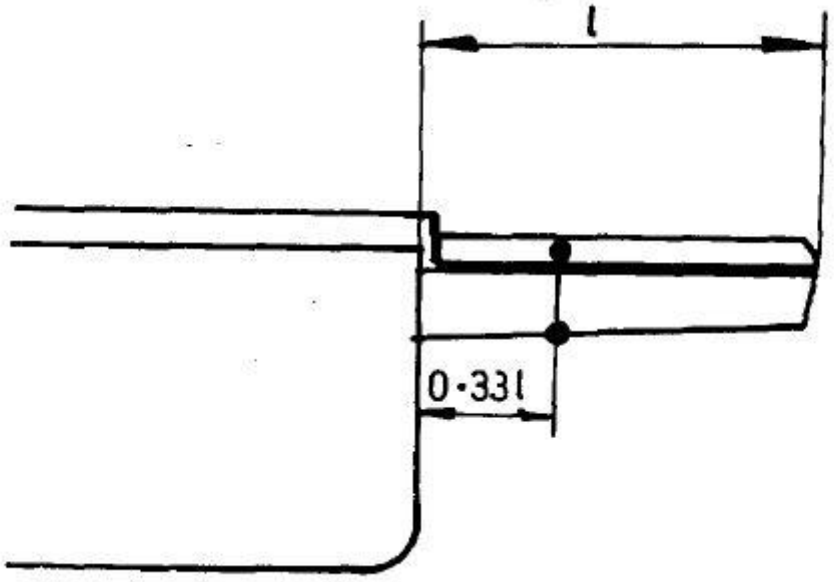


Fig. 4E Points For Temperature Measurement - Pressure Cooker Handle(S)

ANNEX F

RESISTANCE TO BURNING

F-1 APPARATUS

F-1.1 A burden burner, tube diameter 9.5 ± 0.5 mm fuelled by natural gas and adjusted to a flame height of 38 ± 2 mm with the air inlet to the burner closed.

F-1.2 A means of attaching the cookware firmly to a rigid base throughout the test for example, a G clamp, or for attaching a handle or knob via its fixing system to an appropriate support.

F-1.3 A draught free area provided with a facility for the extraction of any fumes immediately following the test.

F-2 PROCEDURE

F-2.1 Attach the cookware to the rigid base.

F-2.2 Position the burner (alight) so that the centre of the burner tip is 18 ± 2 mm below the bottom surface of the end of the handle (see Fig. 5).

F-2.3 Expose the handle to the flame for 30 ± 1 s, remove the flame, and allow the handle to burn either until any flame extinguishes or for 15 s whichever occurs first. Observe whether molten or burning material falls from the handle during this period.

F-2.4 Measure the record the length of any time for which the handle continues to burn following removal of the flame. If this reaches 15 s, immediately apply a steady draught of 5 m/s across the area of burning for 5 s and record whether burning continues or is extinguished.

F-2.5 Reposition the burned under the handle, ignoring any flame guard, as close as practicable to the body/ handle junction and repeat the procedures described in F-2.2 to F-2.4.

F-2.6 Allow the cookware to cool for 3 h at ambient temperature and then carry out the appropriate tests descirbed in Annexes C and E (see 4.10).

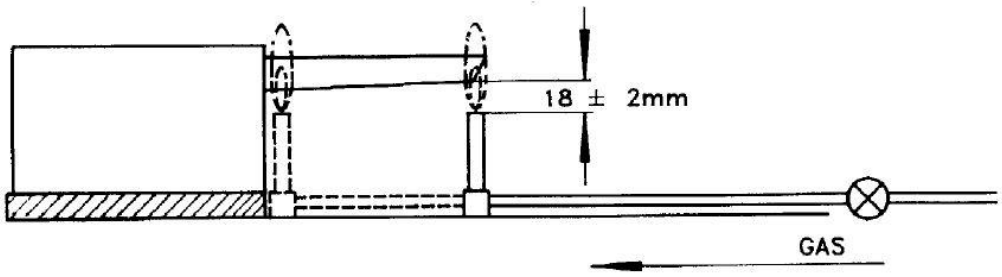
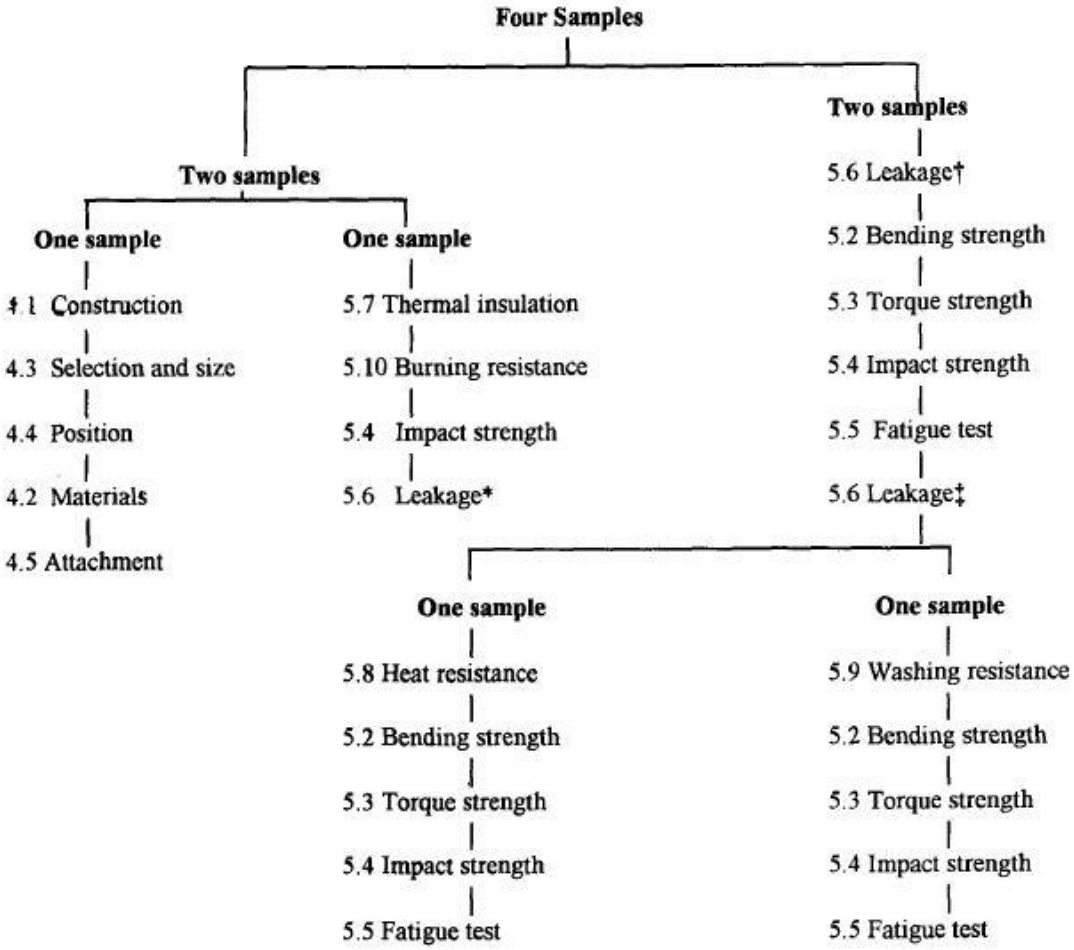


Fig. 5 ARRANGEMENT FOR BURNING TEST

ANNEX G

TESTING SEQUENCE

A suggested sequence for testing cookware/kitchenware/utensil to the requirements of this standard is shown below:



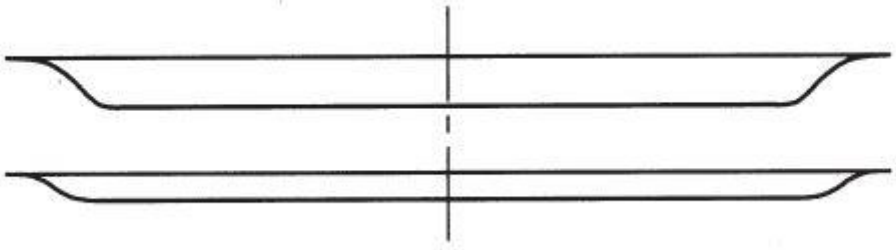
* *See* 5.6 paragraph 1.
† *See* 5.6 paragraph 2.
‡ *See* 5.6 paragraph 3.

Fig. 06 Test Sequence

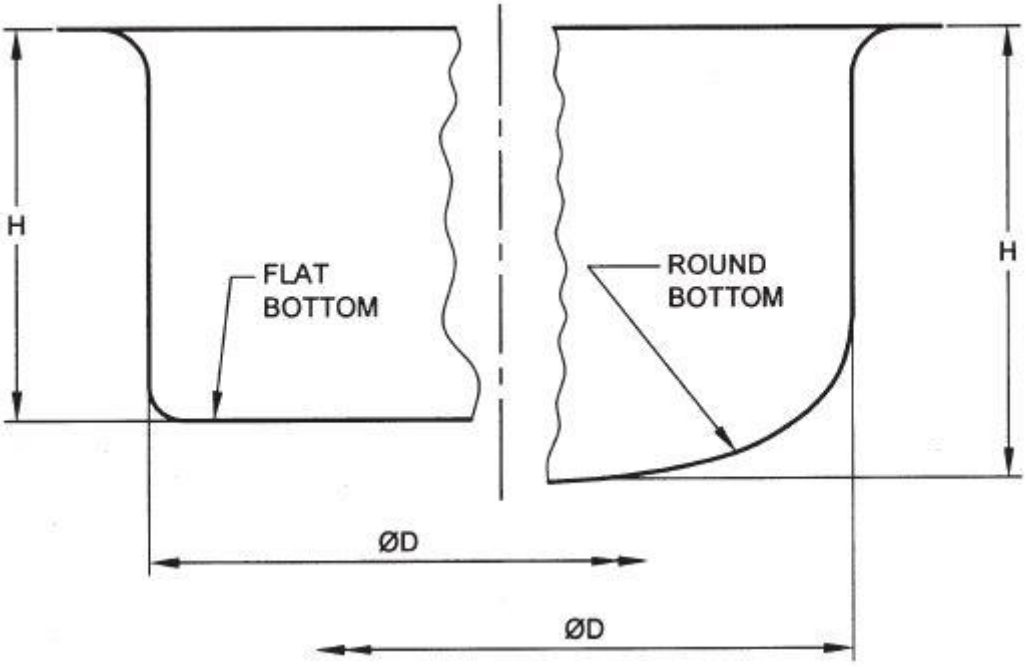
ANNEX H

DIAGRAMMATIC SHAPE OF DIFFERENT TYPES OF UTENSILS

A-1 Diagrammatic shape of different types of utensils shall be as shown in Fig. 1 to Fig. 14. In these figures '*H*' is the height and '*D*' is the diameter.



Saucepan Cover



Saucepan

Fig. 7 Deep Saucepan

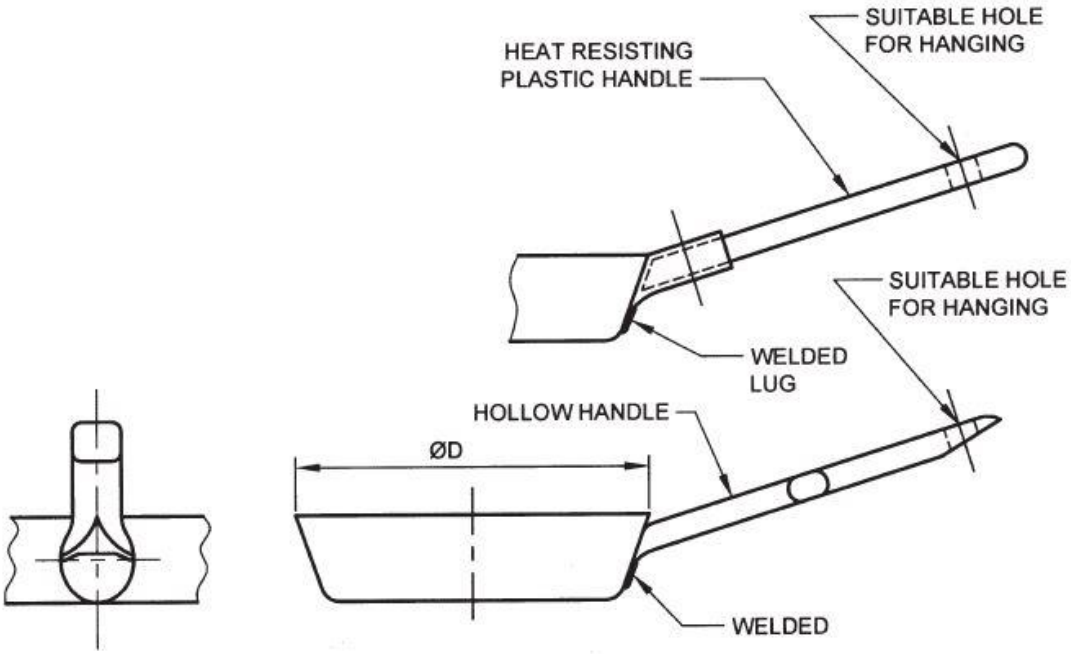


Fig. 8 Frying-Pan

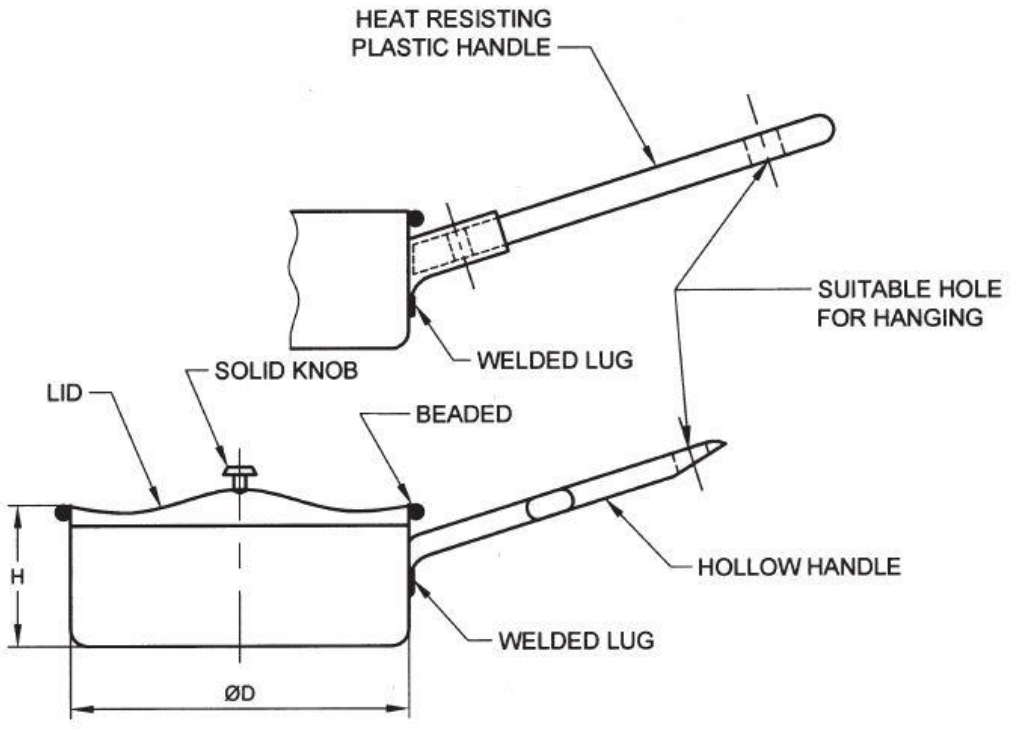


Fig. 9 Saucepan

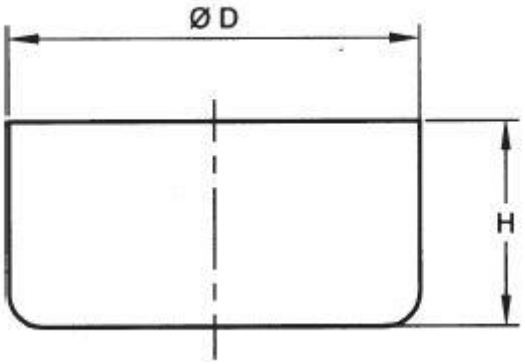


Fig. 10 Bowl

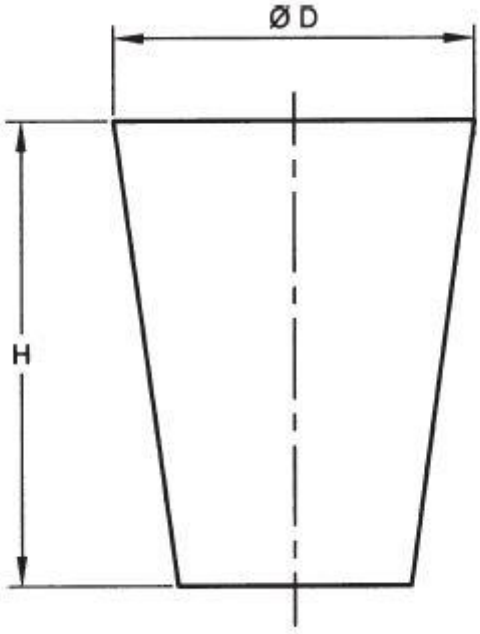


Fig. 11 Tumbler

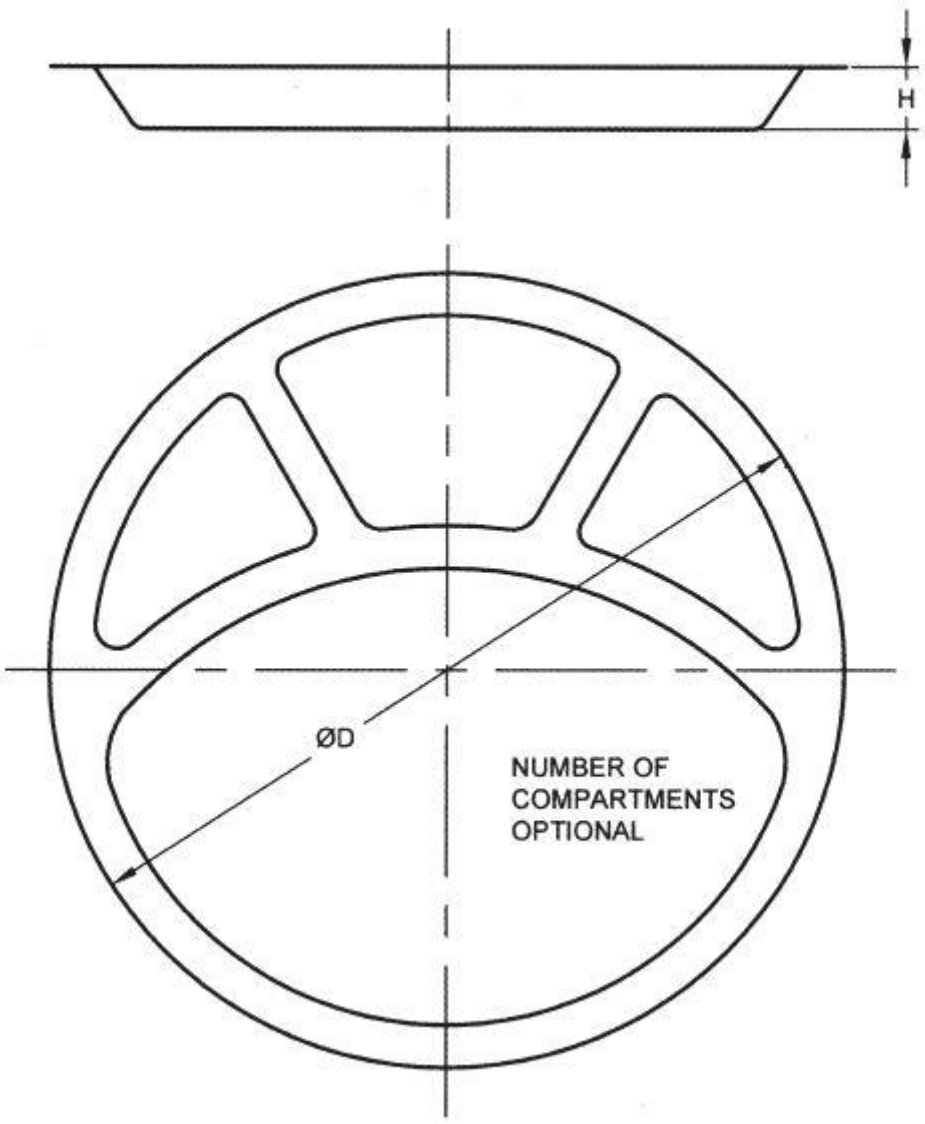


Fig. 12 Compartmental Tray, Round

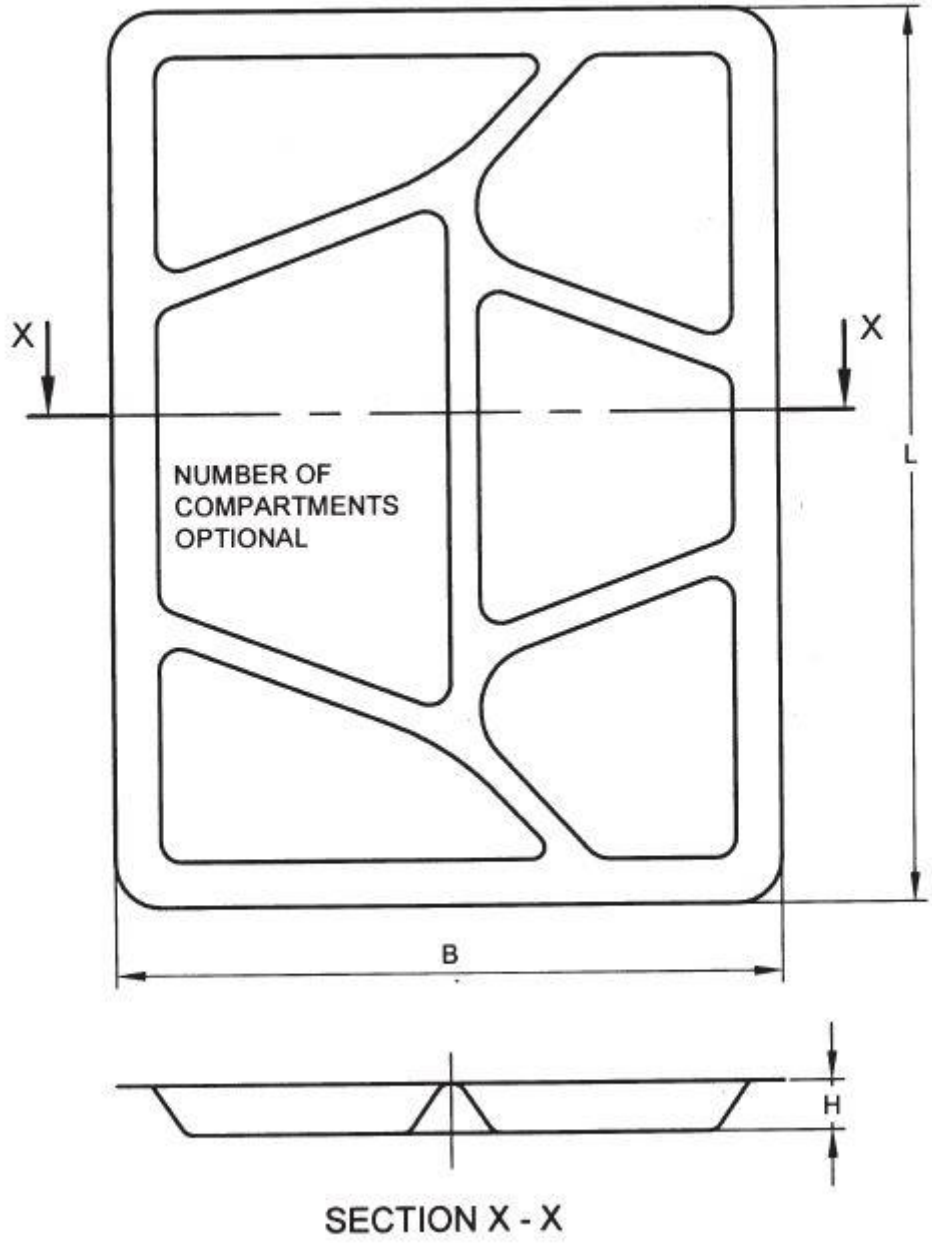


Fig. 13 Compartmental Tray, Rectangular

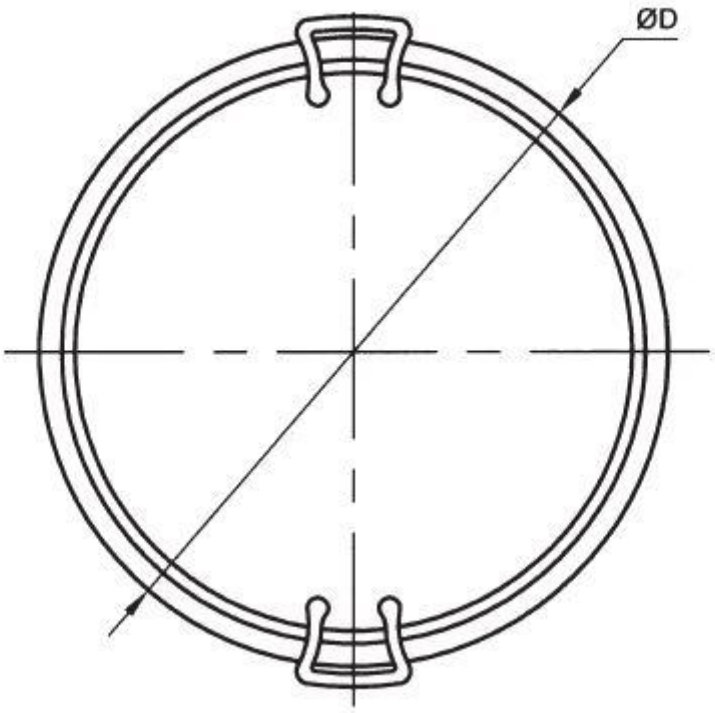


Fig. 14 Entree Dish, Round

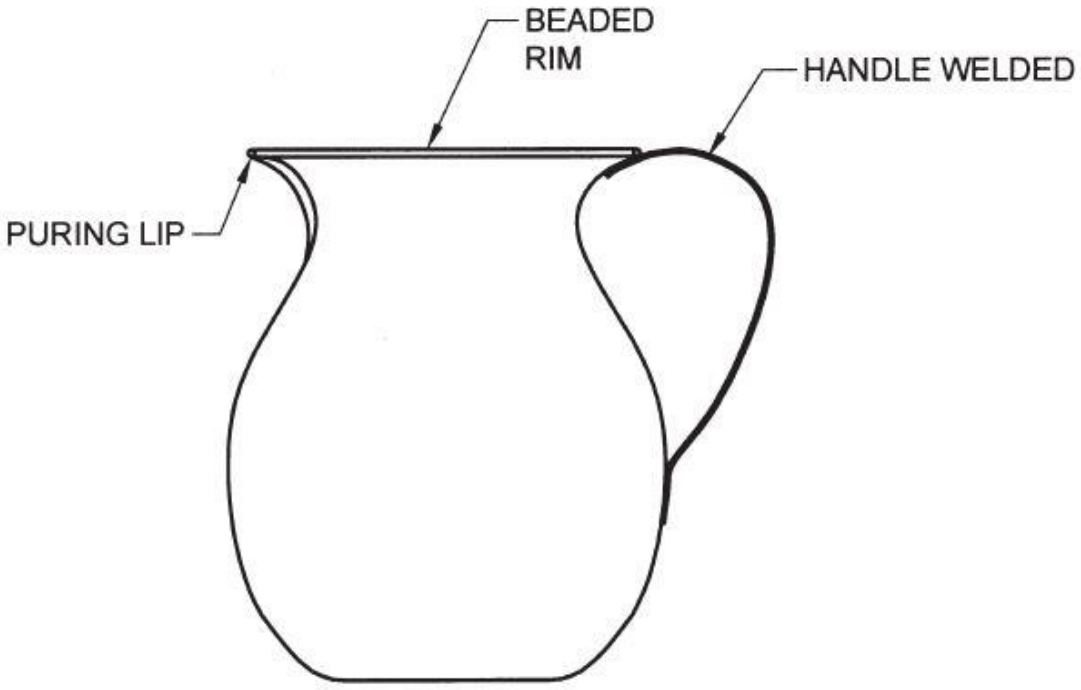


Fig. 15 Jug Typical

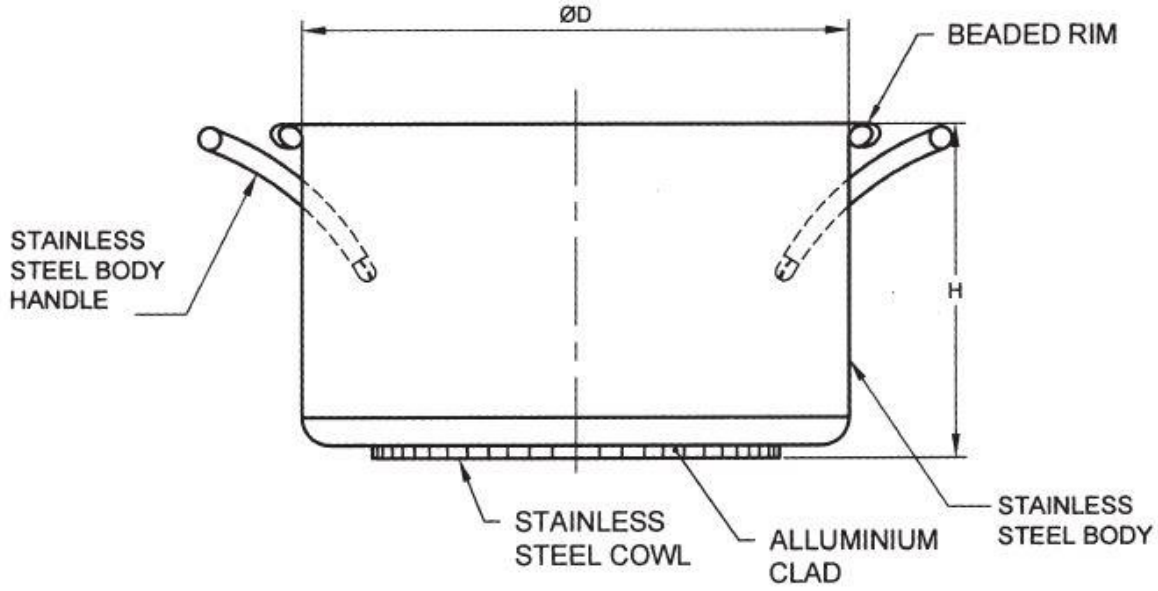


Fig. 16 Cassrole with Cladded Base

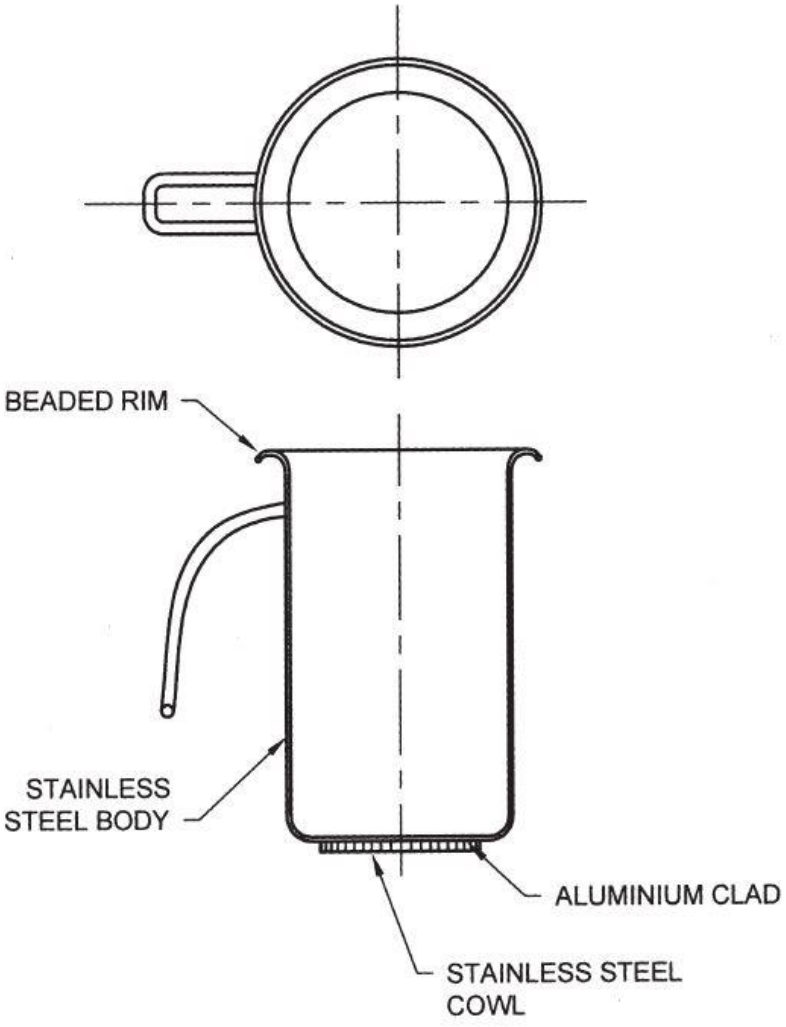


Fig. 17 Jug with Cladded Base

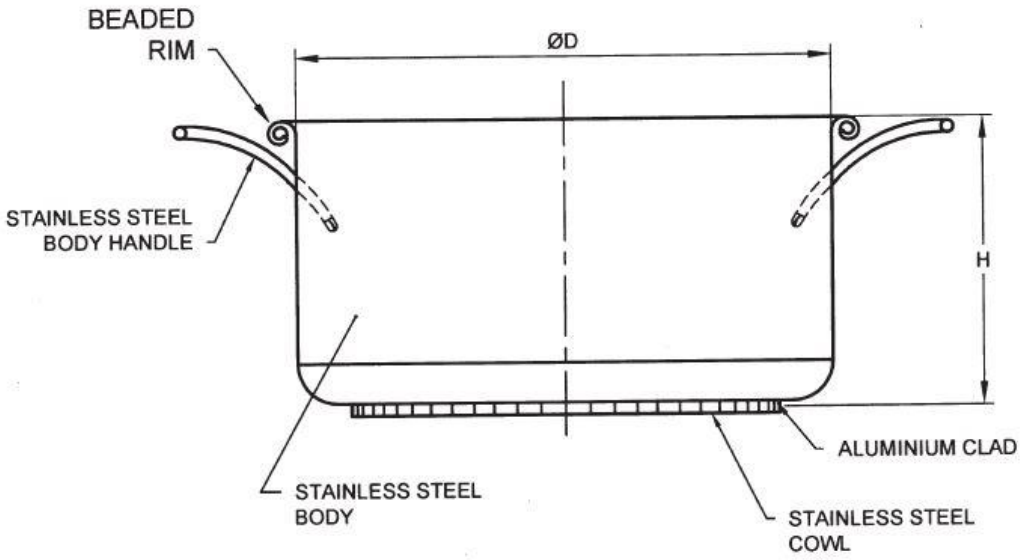


Fig. 18 Deep Pot with Cladded Base

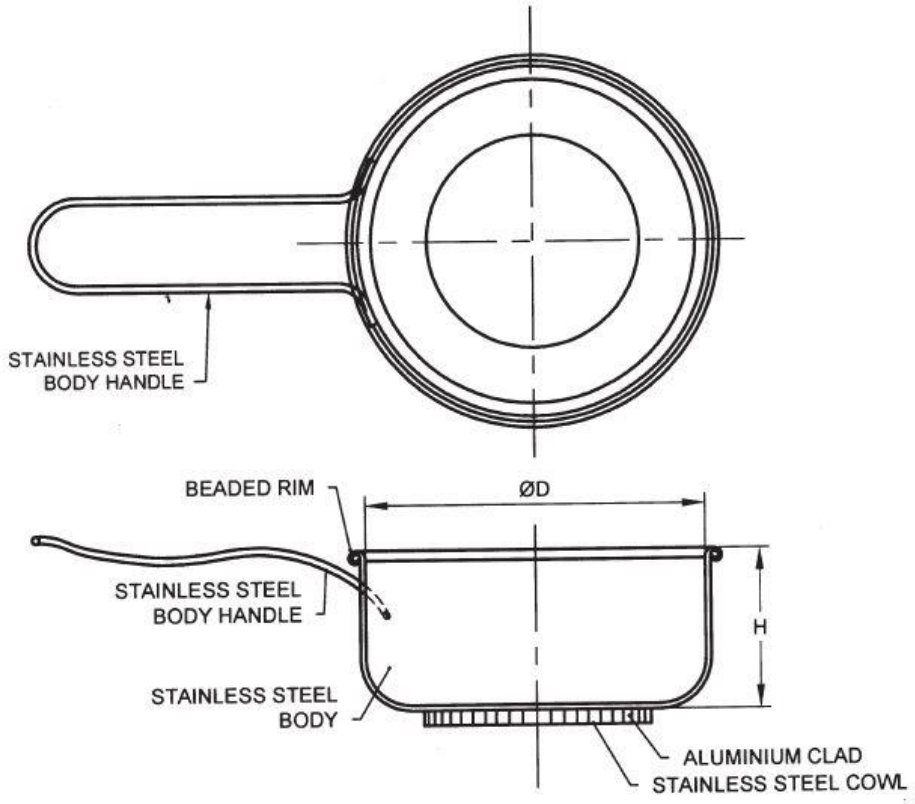


Fig. 19 Fry Pan With Cladded Base

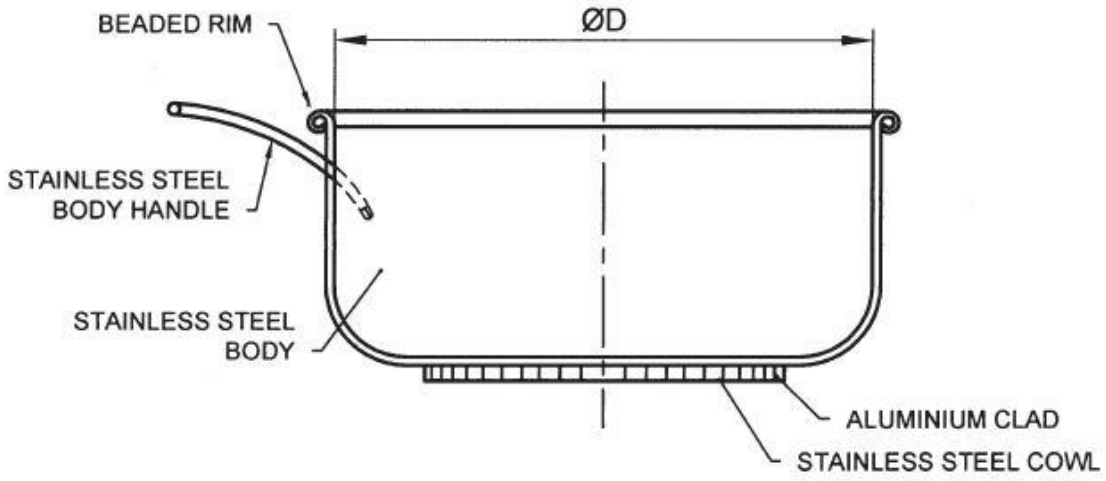


Fig. 20 Sauce Pan with Cladded Base