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SRI LANKA STANDARD 353:1975

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SPECIFICATION FOR STEEL ENAMELWARE

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BUREAU OF CEYLON STANDARDS

SPECIFICATION FOR STEEL ENAMELWARE

SLS 353:1975

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COLOMBO 3.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This Standard does not purport to include all the necessary provisions of a contract.

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SRI LANKA STANDARD SPECIFICATION FOR STEEL ENAMELWARE

This Sri Lanka Standard Specification has been prepared by the Drafting Committee of the Bureau on Enamelware. It was approved by the Mechanical Engineering Divisional Committee of the Bureau of Ceylon Standards and was authorised for adoption and publication by the Council of the Bureau on 1975-07-02.

Until such time as a Sri Lanka Standard on dimensions and capacity of enamelware is available all requirements relating to them have been left to the agreement between the purchaser and supplier. All values except for those of area given in this standard are in SI units.

This standard requires reference to the following Sri Lanka Standards :

CS 91 Method for tensile testing of steel sheet and strip

CS 93 Method for simple bend testing of steel sheet and strip.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the results of a test shall be rounded off in accordance with CS 102 Presentation of Numerical Values. The number of significant places to be retained in the rounded off value should be the same as that of the specified value in this standard.

The assistance gained from the publications of the Indian Standards Institution and the British Standards Institution in the preparation of this standard is gratefully acknowledged.

1. SCOPE

This standard covers requirements for enamelware such as wash bowls, mugs, kettles, plates and pans generally used in homes and institutions.

2. TERMINOLOGY

2.1 For the purpose of this standard the following definitions shall apply :

2.1.1 Abrasion resistance — The degree to which an enamel coating will resist abrasion.

2.1.2 **Acid resistance** — The degree to which an enamel coating will resist attack by acid solution.

2.1.3 **Alkali resistance** — The degree to which an enamel coating will resist attack by alkali solution.

2.1.4 **Crack** — A defect in the enamel surface due to fracture or separation.

2.1.5 **Crazing** — A defect appearing as fine cracks or fracture in the enamelware.

2.1.6 **Flaking off** — The breaking away of conchoidal slivers of the enamel layer.

2.1.7 **Impact resistance** — The degree of resistance of an enamel coating to a fracture caused by sudden blow.

2.1.8 **Pin-hole** — An enamel surface defect characterised by a small depression as though made by a pin, resulting from the breaking of a gas bubble, and frequently reaching the base metal.

2.1.9 **Vitreous enamel** — A glazed surface finish produced by application of a powdered inorganic glass, dry or suspended in water, to metal parts, and its subsequent fusion.

2.1.10 **Warping** — Change in the original contour of the enamelware.

2.1.11 **Water resistance** — The degree to which an enamel coating will resist attack by boiling water.

3. REQUIREMENTS

3.1 **Dimensions of wares and capacity** — The dimensions and capacity of wares shall be as agreed to between the purchaser and the supplier.

3.2 **Material** — Steel enamelware shall be made from cold reduced carbon steel sheet specially prepared for vitreous enamelling and shall conform to the requirements laid down in Clauses 3.2.1 and 3.2.2. It shall be of a thickness as agreed to between the purchaser and supplier and shall be determined in accordance with the method prescribed in Appendix A.

3.2.1 Chemical composition — The steel shall contain:

Element	Per cent	
	Min	Max
Carbon	0.075	0.12
Manganese	0.45	0.50
Sulphur	0·030	0.050
Phosphorus	0·025	0.050

3.2.2 Mechanical properties

3.2.2.1 Tensile strength — The tensile strength of steel used shall have a minimum value of 270 MPa* (28 kgf/mm^2) and a maximum value of 360 MPa (36 kgf/mm^2) when tested in accordance with CS 91**

Note : The tensile strength values measured shall be rounded off to an accuracy of 10MPa*.

3.2.2.2 Bend test — The bend test shall be carried out in accordance with CS 93***. The outer convex surface of the steel test piece shall remain free of cracks after the test piece has been bent through 180° in the cold state.

3.3 Workmanship and finish — The suface of the ware shall not have any defects like pin-holes, cracks or crevices which are harmful for its use as a container. Further the enamel shall not have flaked off from any part of the surface of the ware. The ware shall be reasonably free from warpage.

3.4 Colour and Surface — The surface of the ware shall have a glossy, semi-glossy or matt finish, as agreed to between the purchaser and the supplier. The colour, texture and thickness of enamel coating shall be evenly matched.

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*1MPa = 10^6Pa (pascal). 1MPa = 0.10 kgf/ mm^2 (approx.)
**CS 91 Method for tensile testing of steel sheet and strip.
***CS 93 Method for simple bend testing of steel.

3.5 **Impact resistance** — The procedure to be followed is described in Appendix B. The mass of the steel ball shall be 100 g and the ball shall fall from a height of 570 mm above the test piece. The enamel coating of the ware when viewed by a normal eye from a distance of 440 mm shall not exhibit any chip or other damage in any of the tested points.

3.6 **Acid resistance** — The white and the coloured enamelware shall conform to classes AA and A and classes AA, A and B respectively when tested in accordance with the procedure described in Appendix C.

3.7 **Alkali resistance** — Two methods are specified in Appendix D, namely Method A (Qualitative method) and Method B (Quantitative method), subject to agreement between purchaser and the supplier, either test may be used. In case of dispute, the results of method B shall apply.

3.7.1 In the case of method A, the enamel shall show no sign of uniform colour stain over the whole of the alkali treated portion.

3.7.2 In the case of method B the loss of mass shall not exceed 3.1 g/m^2.

3.8 **Abrasion resistance** — This test shall be the subject of agreement between the purchaser and supplier. The method of test to be employed shall be as given in Appendix E.

3.9 **Water resistance** — The mass of enamel coating of ware lost due to attack by boiling water shall be not greater than 1.1 g/m^2 of the attacked surface, when tested in accordance with the procedure described in Appendix F.

3.10 **Quench test** — This test shall be carried out on cooking wares only. The enamel coating of such wares when tested in accordance with the method prescribed in Appendix G shall not show any signs of cracking, flaking off, crazing or any other damage.

3.11 **Leak test** — This test is applicable to kettles only. Dip the ware for more than 10 minutes in a bucket of water coloured with eosin. Any part of the kettle shall not show any leakage or presence of any red stain which indicates leakage.

4. MARKING

4.1 The enamelware shall be clearly and legibly marked at the bottom by pasting a label or by other means with the following information :

a) Name of manufacturer, and his registered trade-mark, if any

b) Nominal dimensions and capacity, and

c) Made in Sri Lanka.

5. PACKING

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

6. SAMPLING

6.1 The method of drawing representative samples of the enamelware and determining their criteria for conformity shall be in accordance with Appendix H.

APPENDIX A

METHOD OF DETERMINATION OF THICKNESS OF STEEL SHEET USED IN ENAMELWARE

A—1 Remove the enamel layer of the sample of enamelware or piece cut from it by immersing it, at least up to a depth of 10 mm in molten caustic soda (sodium hydroxide) at 530°C to 550°C in a stainless steel or nickel dish for a period of 15 to 30 minutes depending on the thickness of the enamel layer. After the enamel layer has been dissolved from a minimum area of 5 mm width and 35 mm length along the edge. Wash the sample with water sufficiently to remove the last adhering oxide layer below the enamel. Wipe the exposed metal with clean cloth and quickly dry in an air-oven to avoid rusting.

A—1.1 Measure the thickness of the exposed metal by means of a micrometer at three points, each point at a distance of at least 10 mm from the preceding one. The average of the three measurements shall be taken as the thickness of the metal.

Note 1 : For the purpose of this test, it is presumed that the thickness of the metal of the whole ware is the same.

Note 2 : In case an enamelware comprises two or more components of different thickness welded together, each such component shall be treated as a separate enamelware.

APPENDIX B

METHOD OF TEST FOR IMPACT RESISTANCE

B—1 Apparatus

Impact test machine of the falling-weight type as shown in Fig. 1.

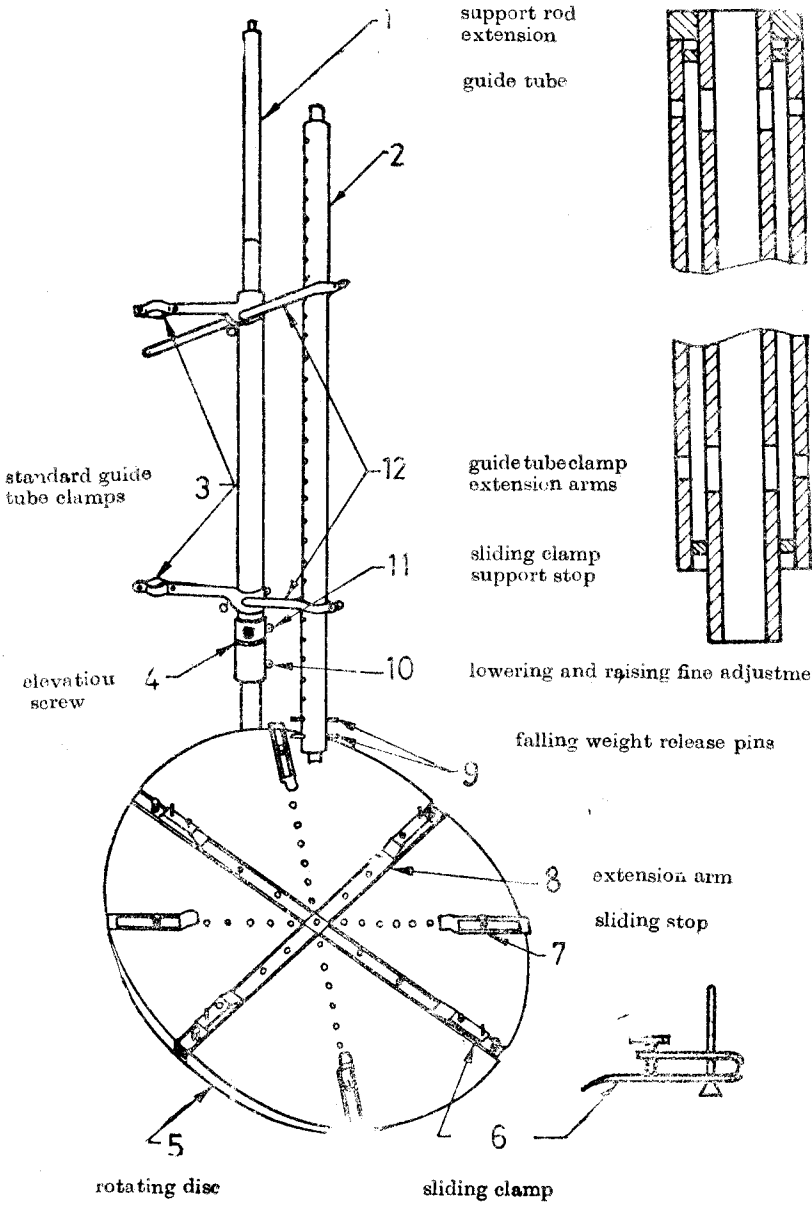

Fig 1 — Impact Test Machine

-2 Assembly of apparatus and specimen

B—2.1 Levelling impact machine — Place the impact machine on a firm foundation and using the bubble level as a guide, level the machine by means of the three levelling screws, tighten the nuts on the levelling screws against the machine base to lock the levelling screw in position.

B—2.2 Adjustment of guide-tube — Rotate the 910 mm guide tube (after loosening the clamps) until the two notches at the bottom of the tube are in a line parallel to the front of the machine. Raise or lower the guide-tube if necessary, so that two clamps fall between perforations in the tube, then tighten the clamps to hold the guide-tube in position. Raise the guide tube assembly by lifting the bottom clamp support and moving to one side. This operation places the guide-tube out of the way of the operator when clamping test specimens onto position and also when changing specimens without adjustment of the guide-tube for every ware of any one set.

B—2.3 Centering and clamping specimen in position — Place the inverted test specimen on the rotating disc and centre approximately by means of the circles scribed thereon. Bring the four sliding stops in contact with the ware and tighten. Then bring the four sliding clamps into position and set to hold the ware firmly against the rotating disc (see Note). Move the disc until one of the ten evenly spaced grooves is directly in front of the guide-tube support rod.

Note : Care should be taken in tightening both sliding stop and clamps as errors may be introduced if the ware is not held firm against the base plate.

B—2.4 Locating falling-weight contact point — Loosen the three set screws that are located on the right side of the guide-tube support rod base, so that the guide-tube support rod can be moved to and away from the front of the machine. Swing the guide-tube back into its normal or working position, using caution as the lower clamp support settles down over its guide key, so that it is not allowed to rest upon the ware under test (see Note). In case the guide-tube does touch the ware, it may be raised by turning the elevation screw (see Fig. 1) until clearance is obtained. It may be necessary to move the guide-tube to or away from the support rod until guide-tube is approximately centred above the bottom radius of the ware. This is done by loosening

the set screw holding the guide-tube clamp extension arms, moving the guide-tube, checking to see that the guide-tube is vertical, and tightening the set screws. To permit both the backward or forward, and the raising or lowering, fine adjustment movements of the guide-tube assembly, loosen the set screws in the support rod base and in the sliding clamp support stop. The correct point of impact on wares which have a bottom radius of less than 13 mm and a bottom diameter of not over 178 mm may be obtained by either one of the following two methods.

(*a*) Place the impact locater across the bottom of the ware, with the short arm resting upon the bottom radius directly below the guide-tube. Lower the guide-tube by the fine adjustment setter until it nearly touches the bottom radius of the ware, move the guide-tube to or away from the front of the machine as required until the notches in the bottom of the guide-tube are in line with the point of contact between the bottom radius of the ware and the short arm of the impact point locator. Tighten the set screws on the guide tube support rod base to lock the support rod in position then raise the guide-tube to a point 3 mm above the point of impact on the ware and lock in a position by tightening the set screws in the sliding clamp support stop. Tighten the set screw in the lower clamp support to prevent a sideways motion of the guide-tube.

(*b*) Raise the guide-tube to a point 3 mm above the point of impact on the ware and tighten both the set screw in the sliding clamp support stop and the set screw in the lower clamp support. Place the impact weight on the bottom radius of the ware directly below, and inside the bottom of the guide-tube. Move the guide-tube to or away from the front of the machine until the impact weight just remains in place. Then tighten the support rod base set screws to lock the guide-tube in position.

When round-shaped wares are tested, move the guide-tube to or away from the front of the machine and raise or lower the guide-tube a small amount to obtain the correct point of impact. For each test point, this adjustment is necessary as the

test specimen is centered only approximately on the rotating disc and some wares are not fine in shape. When oval, square or rectangular wares are tested, move the ware itself for nearly every test point and adjust the guide-tube for the correct point of impact, at each test point.

Note : When returning the guide-tube to its normal or working position do not force the lower clamp support down upon the guide key, but let it settle into position of its own accord.

B—2.5 **Positioning the falling weight** — Place the falling weight release pin through the set of perforations at a level of 570 mm above the point of contact on the ware and drop the falling weight into the tube.

B—3 **Procedure**

B—3.1 Begin the test by pulling the release pin which allows the falling weight to strike the bottom radius of the ware at the correct point of contact.

B—3.2 Moving the rotating disc until the next groove lies in front of the guide-tube support rod, adjust the guide-tube if necessary to provide the correct point of impact and again follow the above procedures always starting the test by releasing the falling weight from the set of perforations at a level of 570 mm above the point of contact on the ware. Repeat the procedure until ten points on the bottom radius of the ware have been tested.

B—3.3 One complete impact test consists in testing each of the five identical wares as directed above for a total of 50 tested points.

APPENDIX C

METHOD OF TEST FOR ACID RESISTANCE

C—1 **Principle**

The method consists of a 15 minute exposure of the test surface to a small pool of 10 per cent solution of citric acid and evaluation of the effect in terms of the change in appearance and 'relative cleanability' of the surface resulting from the treatment.

C—2 Reagents

C—2.1 Citric acid solution — Dissolve 10 g of anhydrous citric acid crystals ($H_3 C_6 H_5 O_7$) in 100 ml of water. Solution shall be prepared not more than 48 hours prior to use.

C—2.2 Cleaner solution— Dissolve 10 g of trisodium phosphate ($Na_3 PO_4$) in one litre of tap water.

C—3 Apparatus

C—3.1 Dropper bottle or medicine dropper.

C—3.2 Watch glass — 25 mm in diameter with fire-polished edge.

C—3.3 Towel — made of soft cotton.

C—3.4 Drafting pencil — conventional graphite degree 3B

C—4 Procedure

C—4.1 Thoroughly wash the area to be tested using a soft cotton towel moistened with a warm one per cent solution of trisodium phosphate. Rinse in warm running tap water and dry with a soft towel by blotting. Store the specimen at a temperature of 26 ± 1° C for a time sufficient to bring it within this range of temperature of prior to and during the test.

Note : If, when rinsing, water gathers in drops on the surface, repeat washing treatment until water spreads evenly.

C—4.2 Select areas on the specimen that remain horizontal or nearly horizontal in service. Place the specimen in a position such that a flat area at least 40 mm in diameter is horizontal with the specimen and the citric acid solution at 26 ± 1° C; place several drops of the solution on the test area to form a pool and, immediately cover with a clean watch glass in inverted position. Use a quantity of solution that is just sufficient to fill the inverted watch glass except for a small air bubble (three to six drops are usually required depending upon the dropper and the curvature of the watch glass). After 15 minutes of treatment, remove the watch glass and immediately rinse the spot of solution from the surface. Dry the specimen with a dry, clean, soft cotton towel by blotting (not by rubbing).

Note : The test surface shall be thoroughly dry before grading. The presence of a slight film of water on the surface may change the rating of specimens near the border line between classes.

C—5 Grading

Grade the test specimen within two hours after exposure to the test solution using the procedure outlined in Fig. C—1. Assign the specimen to one of the five classes designated AA, A, B, C and D on the basis of criteria given in Table C—1. The criteria referred to in Fig. C—1 and Table C—1 are described as follows :

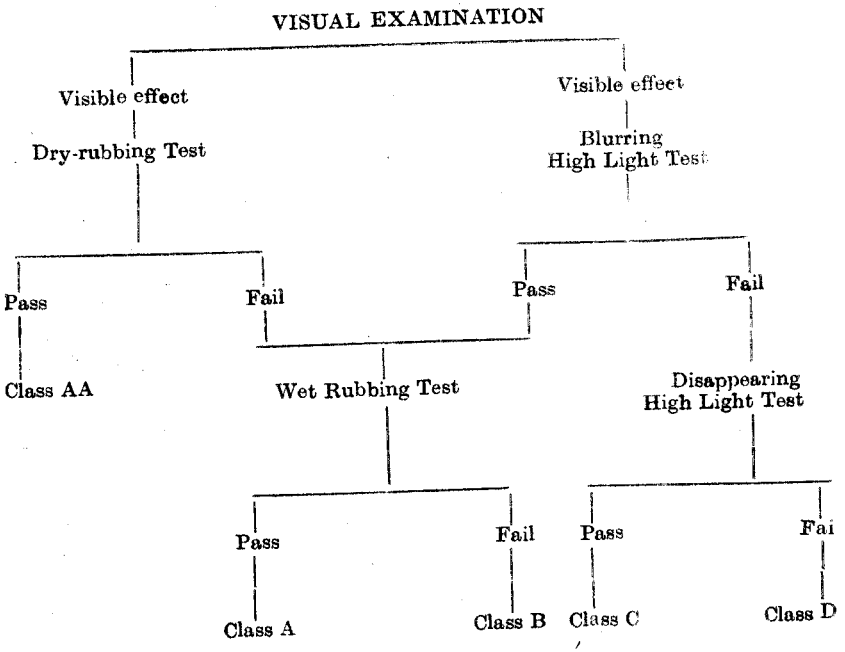

Fig. C—1 Flow Sheet of Test Procedure for Classification of Treated Specimens

TABLE C—1 — CRITERIA FOR RESPECTIVE CLASSES OF ACID RESISTANCE

Classification	Requirements
Class AA	No visible stain and pass dry-rubbing test.
Class A	Pass blurring-highlight test and pass wet-rubbing test.
Class B	Pass blurring highlight test and fail wet-rubbing test.
Class C	Fail blurring-highlight test and pass disappearing highlight test.
Class D	Fail disappearing-highlight test.

C—5.1 Visual Examination — View the specimen at various angles with respect to the light source and eye, in order to detect whether the treated area differs in any respect from the protected area, use partially diffused daylight supplemented if necessary by artificial light, the total intensity being approximately that available within a few feet of an outside window, but do not examine in direct sunlight. During observation hold the specimen not nearer the light source (such as a window) than the minimum diameter of the source.

Note : The term 'treated area' refers to that portion of the specimen which has been subjected to acid solution confined by the watchglass during treatment. The term protected (untreated) area refers to the area adjacent to the treated area.

C—5.2 Dry-rubbing test — Using the flat point of conventional graphite drafting pencil of degree 3B held in a normal writing position and applied with firm pressure, draw two or more approximately parallel lines extending across the treated area. Starting with gentle pressure and then applying gradually increasing pressure rub repeatedly across the lines with a dry, clear soft cotton towel as illustrated in Fig. C—2. If marks are completely removed from the treated area the specimen passes the test, otherwise, it fails.

Note : The pencil should be prepared by holding a sharpened pencil in a normal writing position and rubbing on abrasive paper (emery polishing or silicon carbide or aluminium oxide abrasive paper) until minimum diameter of the flat circular cross-section is half that of the full graphite core.

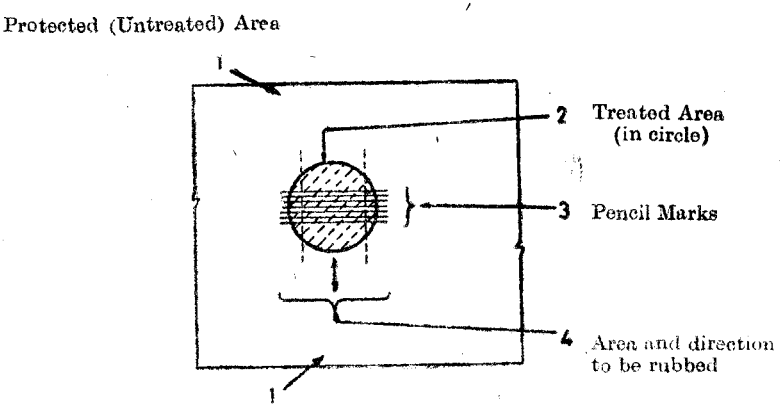

Fig. C—2 Method of Application and Rubbing Pencil Marks on the Treated Area

C—5.3 **Blurring highlight test** — In a well-lighted location hold the specimen so that the image of a small light source such as a frosted lamp bulb is observed as a highlight in the protected area, the line of vision being within 45° of perpendicular to the surface (a desk lamp with an incandescent bulb is recommended for this purpose). Focus the eyes on the image of the light source, then slowly shift the specimen just sufficiently to bring this image into the treated area observing it as it passes across the boundary line between the two areas. Ignore any colour difference in the enamel due to staining. If a definite blurring of the image is observed as it passes from the protected to the treated area the specimen fails the test, otherwise it passes.

C—5.4 **Wet-rubbing test** — Using the procedure specified in C—5.2 mark the treated area and rub the marks with a clean soft cotton towel which has been dipped in water and wrung to expel any excess. For this test make new marks in a location other than that used for the dry-rubbing test. Do not use soap, abrasive or similar cleaning material. If the marks are completely removed from treated area, the specimen passes the test otherwise it fails.

C—5.5 **Disappearing-highlight test** — This test is similar in all respects to the blurring-highlight test specified in C—5.3 except that the criterion in this case is the complete disappearance of the highlight in the treated area. If the highlight is visible in the treated area, the specimen passes the test. If the highlight disappears in the treated area, the specimen fails this test.

Note : If the citric acid treatment is performed at temperatures outside the stated tolerances, this variation should be reported.

APPENDIX D

METHOD OF TEST FOR ALKALI RESISTANCE

D—1 Method A — Qualitative Method

D—1.1 **Reagent** — The reagent used shall be a 5% solution of sodium carbonate made by dissolving 10 g of analytical reagent quality anhydrous sodium carbonate (Na_2CO_3) in distilled water and making up to 200 ml.

D—1.2 Apparatus — The following apparatus is required :

(1) A glass tube 100 mm long and 63 mm diameter with both ends flanged (see Fig. D—1 and D—2).

(2) A small immersion heater (see Fig. D—2)

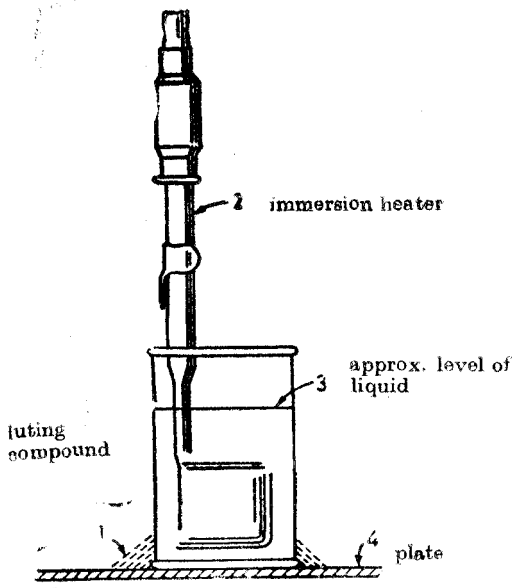

Fig. D—2 Test assembly

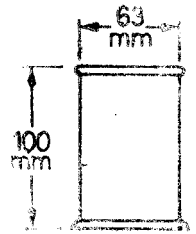

Fig. D—1 Glass tube

D—1.3 Procedure — Clean the surface to be tested with acetone or aqueous ammonia followed by hot water and then ensure that it is thoroughly dry. Lute the glass tube on to the surface to be tested with a suitable plastic cement. Introduce 200 ml of sodium carbonate* solution into the tube and insert the heater. Heat the solution to 80° C and maintain at 85 ± 5° C for 20 minutes, the solution being stirred continuously.After this time, empty the solution out of the tube and thoroughly wash the surface with water. Remove the tube and dry

*A fresh solution of sodium carbonate shall be used for each test.

the surface. Rub a small quantity of colloidal graphite* or manganese dioxide on to the dry enamel surface with a clean soft cloth, chamois leather or velvet. Examine the part of the surface which has been treated with alkali under good lighting conditions. For black and dark coloured enamels titanium oxide shall be used instead of graphite or manganese dioxide.

D—2 Method B — Quantitative Method

D—2.1 **Principle** — The enamelled ware is heated in contact with dilute sodium pyrophosphate solution and the amount of enamel dissolved is then estimated.

D—2.2 Reagent

D—2.2.1 **Sodium pyrophosphate solution** — Dissolve 10.0 g of sodium pyrophosphate decahydrate ($Na_4 P_2 O_7 . 10H_2 O$) in 1000 ml of water. The solution shall always be prepared freshly before testing.

D—2.3 **Procedure** — Clean the test specimen of all adhering dirt and grease by means of acetone immediately before test, dry at 105 ± 2° C, cool and weigh. Place a suitable volume of sodium pyrophosphate solution in the ware and cover it with clock glass. Heat it over a water-bath for four hours. Make up the water loss by evaporation of the pyrophosphate solution by adding small quantities of boiling distilled water from time to time. After completion of the heating, drain the alkali solution. Rinse the enamelware twice with small quantities of distilled water to completely remove any alkali solution adhering to the surface of the ware. Dry the ware in an air-oven at 105 ± 2° C, cool in a desiccator and weigh.

D—2.4 **Expression of results** — The loss in mass of the specimen is the same as the quantity of enamel dissolved. Express it as g/m^2 of the attacked surface.

*Acheson colloidal graphite is a suitable material.

APPENDIX E

METHOD OF TEST FOR ABRASION RESISTANCE

E—1 Apparatus

The apparatus (see Fig. E—1) shall consist of a table that oscillates at 300 cycles per minute with a traverse distance of 28.5 mm and to which an enamelled sample plate 120 mm x 120 mm can be clamped. The combined clamping ring and container for the abrading charge shall be 92.5 mm inside diameter by 25 mm deep. Over the clamping ring shall be fitted a cover plate or plates, of at least 5 mm total thickness for clamping the ring to the sample and both to the table, while also preventing spillage of the abrading charge; a hole shall be provided in the cover plate for adding water to the abrading charge. The clamping ring and cover plate shall be made of metal not subject to corrosion, such as stainless steel, or have a plated finish. A sealing ring of any suitably resilient non absorbent material shall be placed between the clamping ring and sample.

An electric motor rotating at 300^{+3}_{-3} rev/min shall be used to drive the oscillating table via an eccentric pin and lever mechanism.

E—2 Abrading Charge

The abrading charge shall consist of the following;

175 g stainless steel balls of 4 mm diameter.

3 g graded sand to pass through a 72 mesh test sieve but to be retained on a 100 mesh test sieve.

25 ml distilled water.

E—3 Procedure

Free the test specimen from dirt and grease immediately before testing by wiping with acetone, using a non fluffy material, and drying. When the specimen has attained room temperature a desiccator, weigh it to an accuracy of $\pm$ 0.1 mg.

Place the test specimen on the table of the apparatus, with the sealing ring and clamping ring located on it. Place the abrading charge of steel balls and sand on the specimen. Then put the cover plate in position and fix the assembly by tightening

the two nuts on to the cover plate, thus forming a water tight seal between the specimen and the clamping ring. Add 25 ml of distilled water through the hole in the cover plate and start the machine. At five minute intervals stop the apparatus, remove the abrading charge and wash the specimen and balls under running water. Then dry the specimen and balls and replace them on the apparatus together with fresh sand and water.

Weigh the specimen at regular intervals (five minutes or multiples thereof) during the test and continue the test until the relation between the loss of mass and time of abrasion can be determined in graphical form.

E—4 Expression of results

The degree of abrasion shall be obtained from the slope of the linear part of the graph drawn between cumulative mass loss and time of test.

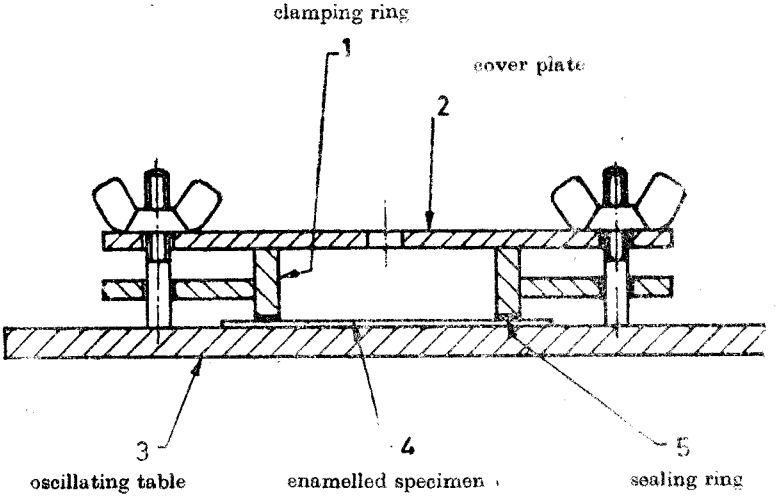

Fig. E—1 Section View of Apparatus

APPENDIX F

METHOD OF TEST FOR WATER RESISTANCE

F—1 Principle

The enamelled surface is subjected to the action of boiling water and the amount of enamel dissolved is estimated.

F—2 Reagent

F—2.1 Sodium bicarbonate solution — Prepare a solution by dissolving 400 mg of sodium bicarbonate in 1,000 ml of freshly boiled distilled water, before commencing the test.

F—3 Procedure

Clean the test specimen from any dirt and grease adhering to the surface by means of acetone, dry in an air-oven at 105 ± 2°C for 1 hour, cool and weigh. Place a suitable volume of sodium bicarbonate solution in the cleaned enamelware and cover it with a clock glass. Heat it over a water-bath for 4 hours. Make up the amount of water lost by evaporation by adding small quantities of boiling distilled water from time to time. After the heating is complete, drain the water from the ware. Wash it well with small quantities of distilled water. Dry in an air-oven at 105 ± 2°C for 1 hour and cool in a desiccator. Then weigh the ware.

F—4 Expression of results

The difference in the mass of ware is equal to the enamel lost due to attack by boiling water and is expressed in g/m^2 of the attacked surface.

APPENDIX G

METHOD OF QUENCH TEST

G—1 Principle

The specimen is heated to 185°C to 195°C and quenched immediately in water at 15°C to 20°C. The cycle of heating and quenching is repeated six times.

G—2 Apparatus

G—2.1 Pyrometer

G—3 Procedure

Subject about 320 cm^2 of the enamelled surface of the test specimen or the whole surface if less than 320 cm^2 in area to radiant heat, so as to reach a steady temperature of 185°C to 195°C in about 10 minutes. Measure the temperature by a pyrometer in contact with the top surface of the heated part of the test specimen. Remove the source of radiant heat and within 5 seconds quench the surface with 1000 ml of water at 15°C to 20°C directed

from an aspirator or other container through a 5 mm diameter tube the end of the tube being 150 mm above the centre of the heated portion of the test specimen, and the flow rate being adjusted to 10 ml/s (see note). Dry the specimen replace the same in position under the radiant heat source and repeat the procedure until six cycles have been completed.

Note : It is convenient to mark the test area to ensure that water for quenching is correctly applied.

APPENDIX H

SAMPLING

H—1 Scale of Sampling

H—1.1 Lot — In any consignment, all the enamelware of the same shape and size, produced from steel sheet of same thickness, under similar conditions of manufacture shall be grouped together to constitute a lot.

H—1.2 Each lot shall be considered separately for ascertaining conformity of the lot to the requirements of the specification. The number of enamelware to be selected for this purpose from the lot shall be in accordance with Table 2. The second sample shall be drawn only if required (see H—2.1 (c)).

TABLE 2 — **Sample Size and Criteria for Conformity**

Lot Size	For characteristics 3.1, 3.2, 3.3 and 3.4					No. of wares to be tested for each test in Clause 3.6, 3.7, 3.9, 3.10 and 3.11
	Sample	Sample size	Cumulative sample size	Acceptance number	Rejection No.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Up to 100	First	8	8	0	2	2
	Second	8	16	1	2	
101 to 300	First	13	13	0	3	3
	Second	13	26	3	4	
301 to 1000	First	20	20	1	4	4
	Second	20	40	4	5	
1001 and over	Frist	32	32	2	5	5
	Second	32	64	6	7	

H—1.3 The enamelware shall be selected at random from the lot. To ensure randomness of selection use shall be made of random number tables.

H—2 Criteria for Conformity

H—2.1 Requirements of Clauses 3.1, 3.2, 3.3 and 3.4 — The wares in the first sample shall be inspected for the requirements of dimensions (3.1), material (3.2), workmanship and finish (3.3), and colour and surface (3.4). Any ware which fails in any one or more of the requirements shall be regarded as a defective. The number of defectives in the first sample shall lead to one of the following three steps.

a) If the number of defectives in the first sample is less than or equal to the corresponding acceptance number the lot shall be considered as satisfying these requirements and shall be tested further in accordance with H—2.2.

b) If the number of defectives in the first sample is greater than or equal to the corresponding rejection number the lot shall be rejected without further testing.

c) If the number of defectives in the first sample is between the corresponding acceptance number and rejection number, the second sample shall be taken from the lot. The second sample shall also be inspected for these requirements. If the sum of defectives of the first and the second samples is less than or equal to the corresponding acceptance number the lot shall be accepted as satisfying these requirements and shall be tested further in accordance with H—2.2. If the sum of defectives is greater than or equal to the corresponding rejection number the lot shall be rejected without further testing.

H—2.2 Requirements of Clauses 3.6, 3.7, 3.9, 3.10 and 3.11 — The lot which has been declared satisfactory in H—2.1 shall be subjected to acid resistance (3.6), alkali resistance (3.7), water resistance (3.9), Quench test (3.10) and leak test (3.11). The number of samples to be subjected to

each test shall be in accordance with Column 7 of Table 2. They shall be chosen at random from those already inspected and found satisfactory in H—2.1.

H—2.2.1 The lot shall be declared as satisfying the requirements if all the wares tested pass the tests.

H—2.3 After the lot has been declared satisfactory in H—2.1 and H—2.2, it shall be tested for impact resistance (3.5). For this purpose, five wares shall be taken afresh from the lot at random. The lot shall be considered as satisfying this requirement if all the five wares pass the test.

H—2.4 The lot shall be declared as conforming to the requirements of this specification if it has been declared satisfactory in H—2.1, H—2.2 and H—2.3.

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