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SRI LANKA STANDARD 361 : 1975

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SPECIFICATION FOR PORCELAIN INSULATORS FOR TELEGRAPH AND TELEPHONE LINES

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BUREAU OF CEYLON STANDARDS

SPECIFICATION FOR PORCELAIN INSULATORS FOR TELEGRAPH AND TELEPHONE LINES

SLS 361 : 1975

Gr. 6

BUREAU OF CEYLON STANDARDS
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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 PORCELAIN INSULATORS FOR TELEGRAPH AND TELEPHONE LINES

FOREWORD

This Sri Lanka Standard for Porcelain Insulators for Telegraph and Telephone lines has been prepared by the Drafting Committee on Telegraph Insulators. It was approved by the Electrical Engineering Divisional Committee of the Bureau of Ceylon Standards and was authorised for adoption and publication by the Council of the Bureau on 1975-11-05.

This standard has been prepared primarily to meet the requirements of the Department of Posts and Telecommunications and the insulators covered by this specification should also be suitable for telegraph and telephone lines of the Ceylon Government Railway.

This standard deals with only the porcelain cup of the insulator and the material performance requirements of spindles for use with these cups will be covered fully by a different standard.

Dimensions have been given in metric units only, in view of the future changeover to the metric system.

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, shall be rounded off in accordance with CS 102 : 1971*.

The publications of the British Standards Institution, Indian Standard Institution, South African Bureau of Standards and the Japanese Standards Association were consulted in the preparation of this standard, and the assistance gained therefrom is acknowledged.

1. SCOPE

1.1 This specification applies to the pin type porcelain insulators intended for use in supporting telegraph and telephone lines.

* CS 102 : 1971 Presentation of numerical values.

1.1.1 This specification does not cover insulators for communication lines running in close proximity to power transmission lines.

1.1.2 This specification does not cover composition of insulators such as those made of thermoplastic material.

2. TERMINOLOGY

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

2.1 **Pin Insulator** — An insulator consisting of one or two porcelain parts and intended to be mounted rigidly on a supporting structure by a pin which passes up inside the insulator. Unless otherwise stated, the term excludes the insulator pin.

2.2 **Telephone Insulator** — A pin insulator designed for use on telecommunication lines.

2.3 **Pot-head Insulator** — An insulator for making a sealed joint between an insulated conductor and an uninsulated conductor.

2.4 **Spindle** — A mild steel pin threaded at one end for screwing on the insulator and the other end so shaped as to fit into the spindle holes of different types of brackets, bracket attachment transposition or other support mounted on any suitable fixture or driven into the wall, window sill or any other fixture.

2.5 **Crazing** — Cracks in the glaze of an insulator.

2.6 **Lot of Insulator** — All the insulators of the same type and design manufactured under similar conditions of production offered for acceptance ; a lot may consist of the whole or part of the quantity ordered.

2.7 **Type Tests** — Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of insulator.

2.8 **Acceptance Tests** — Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

2.9 **Routine Tests** — Tests carried out on each insulator to check requirements which are likely to vary during production.

3. GENERAL REQUIREMENTS

3.1 **Glaze** — The glaze shall be leadless. Apart from the screw thread, the top and the base horizontal surface of the skirt which may be unglazed, the insulators shall be efficiently glazed throughout and shall present a smooth and regular surface free from crazing.

3.2 **Colour** — Unless specified otherwise by the purchaser, the finished insulator shall be ivory white in colour.

3.3 **Threading** — The threads on the insulator shall pass the gauge test for screw thread specified in Clauses 7.3.1.1 and 7.3.1.2.

3.3.1 In the case of pot-head insulator no sealing compound shall be applied, but the threaded portion of the cap and the corresponding threads on the insulator shall be lightly brushed with pure paraffin wax so as to enable the cap to be easily screwed on and off without damage to the threads.

4. DIMENSIONS

4.1 The shapes and dimensions of insulators are indicated in Figs. 1 to 4.

5. MARKING

5.1 Each insulator shall be legibly and indelibly marked to show the following :

a) Name or trade mark of the manufacturer.

b) Year of manufacture (abbreviated if necessary).

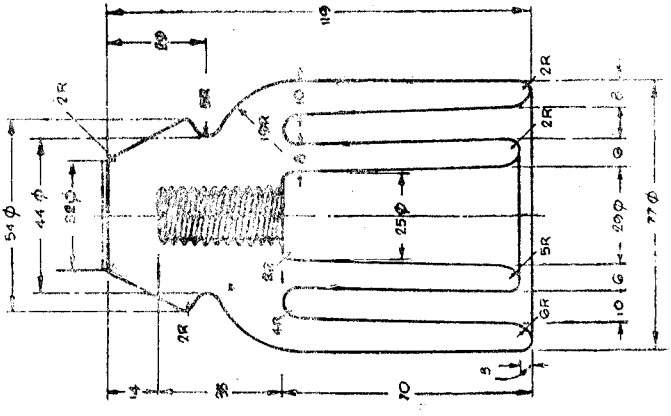
6. PACKING

6.1 All insulators shall be packed in crates or boxes suitable for rough handling.

7. TESTS

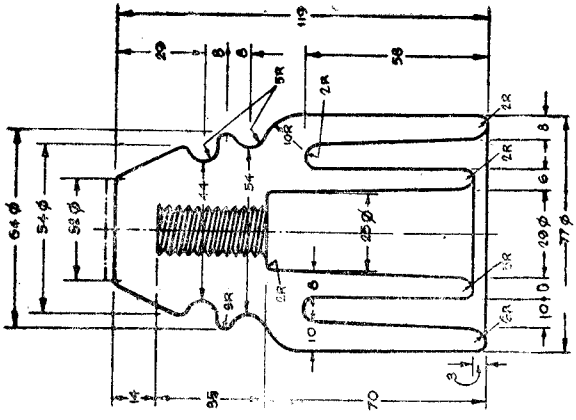
7.1 Classification of Tests and Conformity

7.1.1 **Type Tests** — The following shall be carried out as type tests on selected samples of insulators drawn preferably at



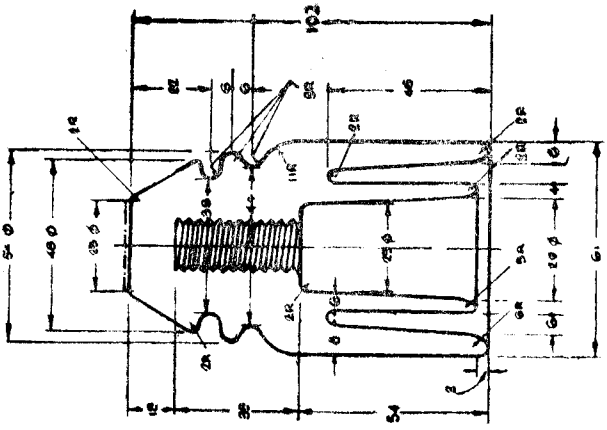
All dimensions in millimetres

Fig. 1 (L - 1)



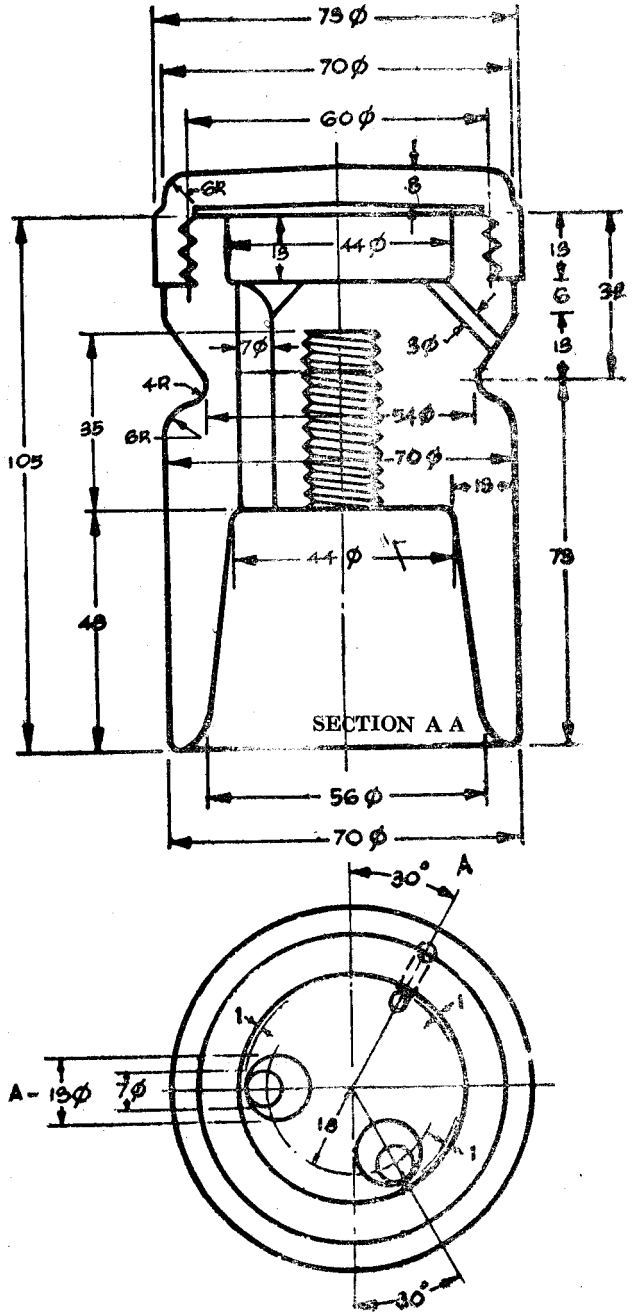
All dimensions in millimetres

Fig. 2 (L - 7)



All dimensions in millimetres

Fig. 3 (L - 8)



All dimensions in millimetres

Fig. 4 (L - 16)

random from a regular production lot :

a) Visual examination (Clause 7.2)

b) Verification of dimensions (Clause 7.3)

c) Temperature cycle test (Clause 7.4)

d) Insulation resistance test (Clause 7.5)

e) Mechanical strength test (Clause 7.6)

f) Porosity test (Clause 7.7)

7.1.1.1 Sample for Type Tests — The number of insulators to be subjected to type tests shall be three.

7.1.1.2 Criteria for Acceptance — All insulators subjected to these type tests shall pass all the tests for proving conformity with the requirements of this standard.

7.1.2 Acceptance Tests — The number of insulators to be selected at random from the lot for these tests shall be in accordance with Table 1. If required (see Clause 7.1.2.2) additional insulators shall also be selected at random.

Table 1 — Number of Insulators to be Selected

Lot Size	Sample size of insulators
Upto 500	To be agreed between the purchaser and the supplier
501 to 800	24
801 to 3 200	32
3 201 to 8 000	36
8 001 and above	40

7.1.2.1 The acceptance tests shall be as follows :

a) Visual examination (Clause 7.2)

b) Verification of dimensions (Clause 7.3)

c) Temperature cycle test (Clause 7.4)

d) Insulation resistance test (Clause 7.5)

e) Mechanical strength test (Clause 7.6)

f) Porosity test (Clause 7.7).

The insulators selected in accordance with Clause 7.1.2 shall be divided into two equal parts and subjected to

tests as indicated below.

Test (see Clause 7.1.2.1)	Part of Sample
Clause 7.2, 7.3, 7.4 and 7.5	First part
Clause 7.2, 7.6 and 7.7	Second part

7.1.2.2 If only one insulator fails to comply with any one of the tests given in Clause 7.2 to Clause 7.7 a fresh quantity equal to twice the first quantity shall be subjected to re-testing. The re-testing shall comprise the test in which the failure occurred preceded by those tests which may be considered to have influenced the results of the original tests. If no failure occurs, the lot shall be accepted.

7.1.2.3 If two or more insulators fail to comply with any of the tests given in Clause 7.2 to Clause 7.7, or if any failure occurs on insulators subjected to re-testing described in Clause 7.1.2.2 the complete lot shall be withdrawn for further examination by the manufacturer after which the lot or any part thereof may be re-submitted for tests. The number then selected shall be three times the first quantity chosen for tests. This re-testing shall comprise the test in which the failure occurred preceded by those tests which may be considered to have influenced the results of the original tests. If any failure occurs the lot shall be rejected.

7.1.2.4 No part of the lot withdrawn as described in Clause 7.1.2.3 shall constitute part of any other lot submitted for the first time.

7.1.3 The following shall be carried out as routine tests:

a) Visual examination (Clause 7.2)
b) Routine verification of dimensions (Clause 7.3.2).

7.2 Visual Examination

7.2.1 A visual examination of the insulator shall be made. The insulators shall be free from physical distortion of shape and the vitrified glaze shall be hard and smooth, free from cracks or any other defect likely to be prejudicial to satisfactory performance in service.

7.2.2 With the exception of screw thread and those areas which serve as supports during firing, the area of unglazed or defectively glazed parts shall not exceed 25 mm^2 per insulator.

7.3 Verification of Dimensions

7.3.1 The accuracy of these dimensions of any insulator, including the screw thread, which cannot be readily measured shall be determined by means of the appropriate gauges.

7.3.1.1 The gauges shall be as indicated in Table 2 and specified in Figs. 5 and 6 and Table 4.

7.3.1.2 The gauges shall be used in the manner indicated in Figs. 5 and 6.

7.3.2 **Routine Verification of Dimensions** — In the case of routine verifications of dimensions the insulators shall be tested with the ' Go ' Screw gauge (see Fig. 3 a).

Table 2 — Gauges for Insulators
(Clause 7.3.1.1)

Description of Gauge	Fig. No.
' Go ' Screw	5 (a)
' Not go ' screw	5 (b)
Plug	5 (c)
Tell tale	5 (d)
Additional gauge for Pot-head Insulator	
' Go ' Plug ' Not go ' plug	For cap of pot-head insulator 6 (a)
' Go ' ring ' Not go ' ring	For top of body on pot-head insulator 6 (b)

7.4 Temperature Cycle Test

7.4.1 The insulators shall be quickly and completely immersed in a water bath maintained at a temperature of 70°C above that of the cold water and left submerged for a period of 15 minutes. They shall be withdrawn and quickly and completely immersed, without being placed in an intermediate container, in a bath of cold water for the same period of 15 minutes.

7.4.2 The complete test shall comprise five transfers, namely cold to hot, hot to cold, cold to hot, hot to cold, cold to hot. The time taken to transfer the insulators from one bath to the other shall be as short as possible and shall not exceed 30 seconds. The quantity of water in the test tanks shall be large enough not to cause a temperature variation of more than 5°C in the water, when the insulators are immersed.

7.4.3 After the completion of the immersion, the insulation shall be examined to verify that it is not cracked and the glaze is undamaged.

7.5 Insulation Resistance Test

7.5.1 The insulators shall be kept immersed, as described below, inside a chamber maintained at a constant humidity of 80 $\pm$ 2 per cent and a temperature of 29 $\pm$ 1°C for at least half an hour.

a) **Large and Small Double Shed Insulators**

1) **Method of Setting up for Test** — Each insulator shall be clean and dry be inverted in a metal lined tank and immersed in water to a level of 25 mm below the lip of the outer shed; water shall also be placed within the insulator so that, in the screw thread cavity, its level is 25 mm below the lip of the inner shed and in the annular cavity between the sheds, 25 mm below that lip which is nearer the surface of the water.

2) **Test Conditions** — A direct current e.m.f. of not less than 250 volts or not more than 500 volts shall be applied

a) between water in the inter-shed cavity and the screw thread cavity, and

b) between water in the inter-shed cavity and the tank, and the insulation resistance measured.

The insulation resistance obtained shall not be less than 10,000 megaohms.

b) **Pot-head Insulator**

1) **Method of Setting up for Test** — After removing the cover the insulator shall be inverted in a metal lined tank and immersed in water to a depth of 44 mm ; water shall also be placed in the screw thread cavity to a depth of 22 mm, thus providing a clearance of 13 mm from the top of the cavity.

2) **Test Condition** — Insulation to be measured between tank and the screw thread cavity as prescribed in 2 (*a*) above. The insulation resistance obtained shall be not less than 10,000 megaohms.

7.6 Mechanical Strength Test — The insulators shall be mounted on a test pin with a head identical to the one which is used in actual service. The pin shall be fixed upright to a metal bracket on the testing machine. A flexible wire rope, about 6 mm in diameter, shall be looped round the tie-wire groove and shall be pulled at right angles to the axis of the insulator. The pull shall be increased gradually and evenly to the value shown in Table 3 and maintained for one minute. There shall be no fracture of the insulator.

Table 3 — Test Load on Insulators
(Clause 7.6)

Type	Test load to be applied N
Large, double shed	9·0
Small, double shed	4·5
Pot head	9·0

7.7 Porosity Test

7.7.1 Freshly broken porcelain fragments from the insulators, having 50% of the surface area free of glaze shall be immersed in one per cent alcoholic solution of fuchsin (1 g fuchsin in 100 g of methanol) under a pressure of not less than 15 MPa for a period of 6 hours.

7.7.2 The fragments shall then be removed from the solution, washed dried and broken. Examination with naked eye of the freshly broken surface shall not reveal any dye penetration. Penetration into small cracks formed during the initial breaking shall be neglected.

7.7.3 Caps of Pot Head Insulator — After 24 hours immersion in water, the caps shall not have increased in weight by more than 0·5 per cent after all moisture has been removed from the surface.

Table 4 — Dimensions for Insulator Gauges

See Figs. 5(a) (b) (c) and (d)

All dimensions in millimetres

Insulator		Gauge					Gauge Thread			Plug			Tell-tale gauges								
Size	Description	A	B	C	D	E	F	G	H	J	P	K	B	L	M	N	P	Q	R	S	T
	Large		68·26										68·25								
15·875	Small	15·94	52·39	31·75	22·23	19·5	6t. p. i.	2·16	17·01	11·68	22·23	13·16	52·39	9·53	7·14	34·93	22·23	7·94	9·53	10·32	188·91
	Pot Head	—0·02							+0·04			+0·01	30·16								+0·05

Note
Gauge must enter to first line but not beyond second line.

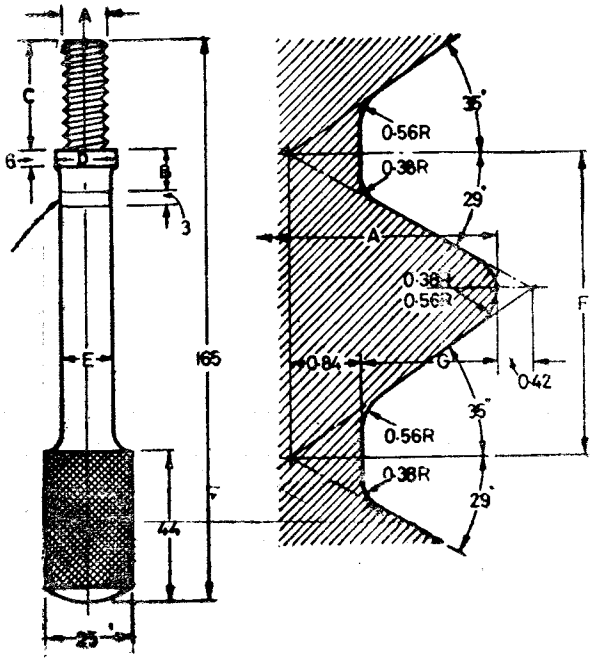
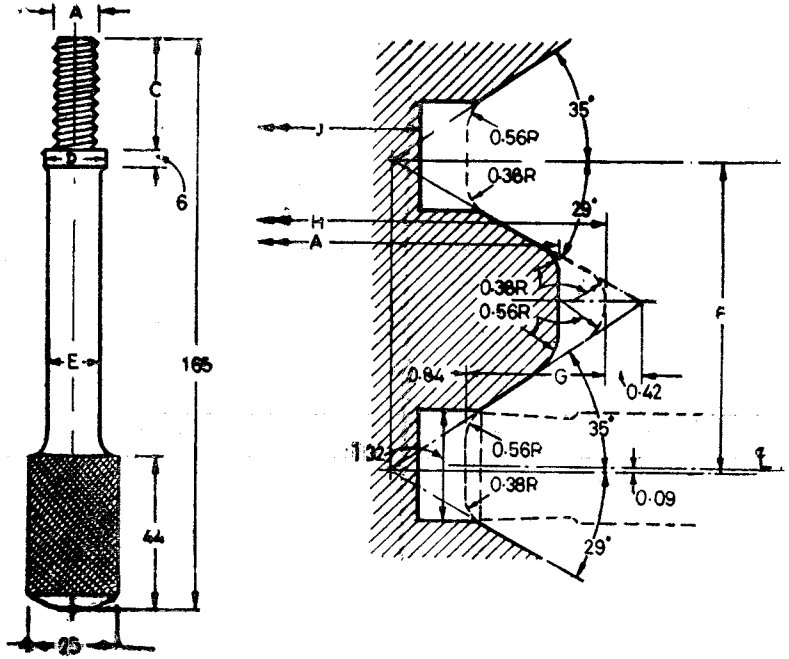


Fig. 5 (a)
GO-GAUGE FOR INSULATOR



All dimensions in millimetres

Fig. 5 (b) NOT - GO GAUGE FOR INSULATOR

Note on not-go gauge

The not-go screw gauge shall be permitted to enter the insulator screw for a distance equivalent to 3½ terns.

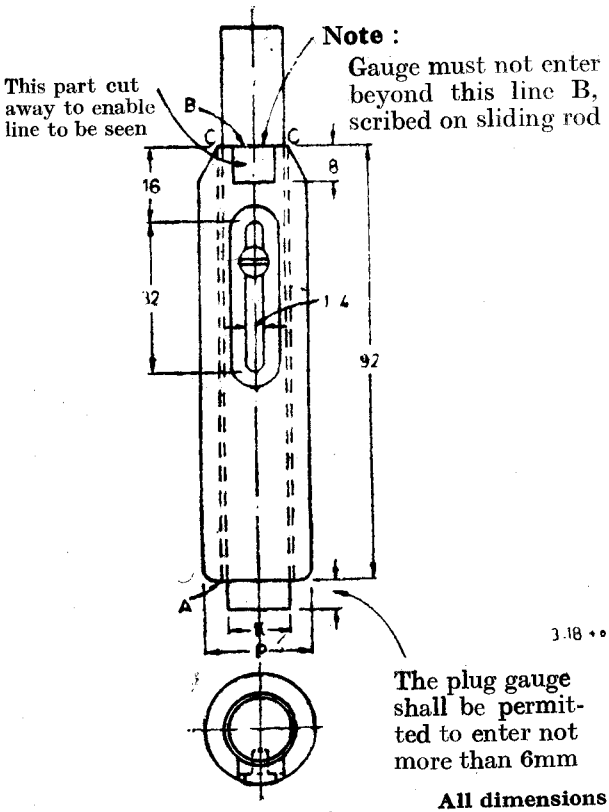
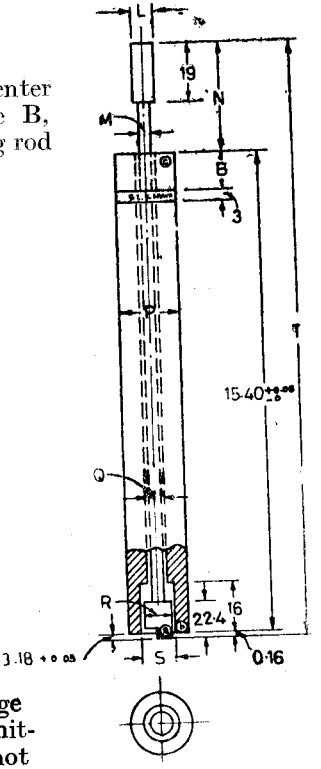


Fig. 5 (c)

Plug gauge



All dimensions in millimetres

Fig. 5 (d)

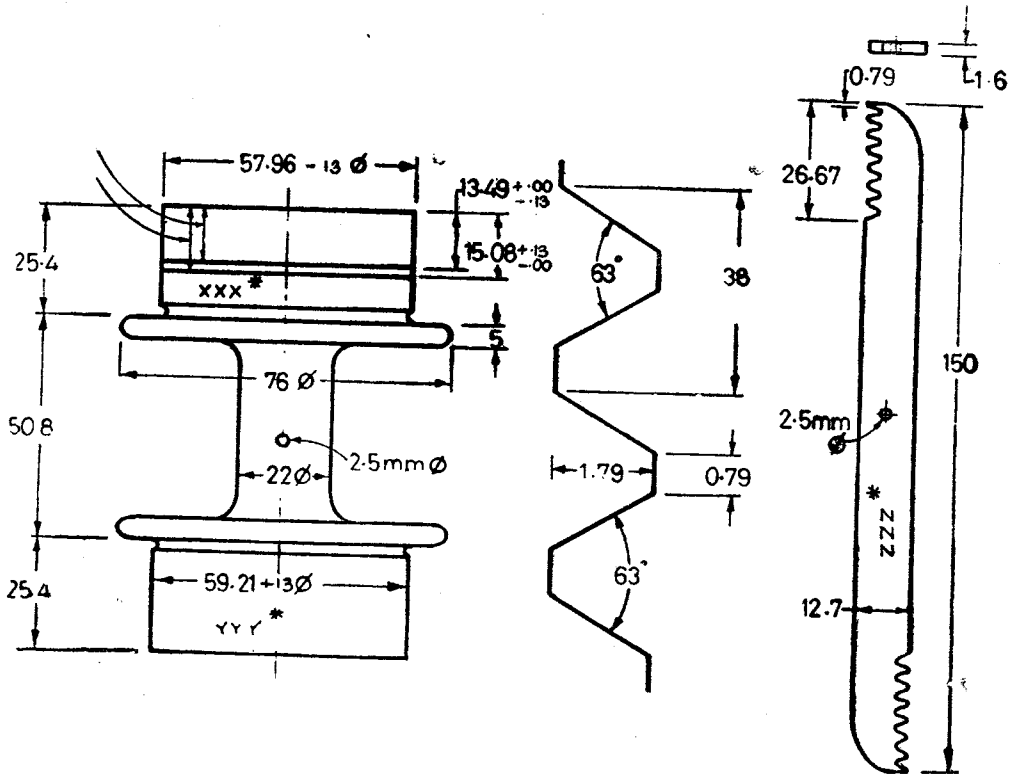
Tell-tale gauge

(Note on Plug gauge)

When the end 'A' of the gauge body rests on the shoulder of the inner cup with the sliding rod entering the screwed cavity as far as possible, the line 'B' on the sliding rod shall be at or above the top of the body of the gauge, i.e. at or above the level 'CC'.

(Note on Tell-tale gauge)

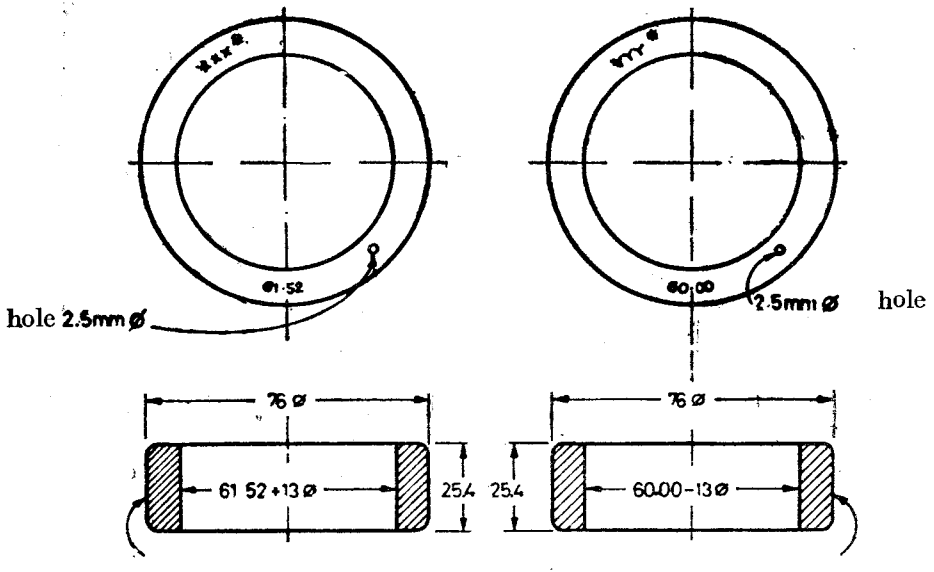
The depth of the screwed cavity of the insulator shall be such that when the end 'c' of the sauge body rests on the shoulder of the inner cup with the sliding rod resting on the bottom of the screwed cavity end 'b' of the gauge body shall lie between the stepped surfaces on 'a'.



XXX = Should go into cap
YYY = Should not go into cap
Z Z Z = Thread gauge for pot-head insulator

* To be engraved on the body as indicated
All dimensions in millimetres

Fig. 6 (a) Gauges for pot-head insulator cap.



XXX = Should go on body
YYY = Should not go on body

* To be engraved on the body as indicated.

All dimensions in millimetres

Fig. 6 (b) Gauges for pot-head insulator top.

BUREAU OF CEYLON STANDARDS

The Bureau of Ceylon Standards (BCS) is the national standards organization of Sri Lanka and was established by the Hon. Minister of Industries & Fisheries, as provided for by the Bureau of Ceylon Standards Act No. 38 of 1964.

The principal objects of the Bureau as set in the Act are to promote standards in industry and commerce, prepare national Standard Specifications and Codes of Practice and operate a Standardization Marks Scheme and provide testing facilities, as the need arises.

The Bureau is financed by Government grants and the sale of its publications. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The detailed preparation of Standard Specifications is done by Drafting Committees composed of experts in each particular field assisted by permanent officers of the Bureau. These Committees are appointed by Divisional Committees, which are appointed by the Council. All members of the Drafting and Divisional Committees render their services in an honorary capacity. In preparing the Standard Specifications, the Bureau endeavours to ensure adequate representation of all view points.

In the international field the Bureau represents Sri Lanka in the International Organization for Standardization (ISO) and will participate in such fields of Standardization as are of special interest to Sri Lanka.

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