065: 2015

CEB
SPECIFICATION

OPERATING RODS (DETACHABLE TYPE)

CEYLON ELECTRICITY BOARD
SRI LANKA

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CONTENTS

SPECIFICATION FOR OPERATING RODS (DETACHABLE TYPE)

1.0 SCOPE

This specification covers the general requirements of design, manufacture and testing of Operating Rods suitable for operating expulsion fuse cutouts and other overhead activities in the medium voltage distribution system of the CEB.

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage	33 kV
(b)	System highest voltage	36 kV
(c)	System frequency	50 Hz
(d)	Method of earthing	Non Effectively earthed Neutral at Substation
(e)	System faults level	13.1 kA

3.0 SERVICE CONDITIONS

(a)	Annual average ambient tempeature	30 °C
(b)	Maximum ambient temperature	40 °C
(c)	Maximum relative humidity	90%
(d)	Environmental conditions	Humid tropical climate with polluted atmosphere
(e)	Operational altitude	From M.S.L. to 1900 m above M.S.L.
(f)	Isokeruanic (Thunder days) level	90 days

4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest editions of the standards specified below and amendments thereof.

(a)	IEC 61235:1993	Live working insulating hollow tubes for electrical purposes
(b)	IEC 60832:1998	Insulating poles (Insulating sticks) and universal tool attachments (fittings) for live working

5.0. BASIC FEATURES

5.1 Design

The operating rods shall conform to IEC 61235 and shall be of extensible type, made of light-weight insulating material suitable for operating medium voltage expulsion fuse cutouts. The insulating hollow tube used in the manufacture of operating rod shall be made of fiberglass reinforced epoxy resin conforming to IEC 61235.

The operating rod shall have mechanical characteristics to enable it to be easily used by one person in operating expulsion fuse cutouts installed at heights up to 8 meters from ground level and shall be strong enough to lift and operate up to 2.0kg weight.

The length of the operating rod shall not be less than 7m and the external diameter of the operating rod shall not be more than 40 mm. The operating rod shall have 5 or 6 detachable sections including top and bottom sections.

The operating rod shall be easily assembled by interlocking clips made of Copper alloy / stainless steel. All sections shall be of approximately equal length and shall be fully interchangeable.

Top section of the operating rod shall have a metal cap with universal joint permanently fixed to rod in such a way to prevent ingress of water or other contaminant in to the fitting. The hook with universal joint (adapter) shall be of such design so as to hold the fuse carrier as shown in the drawing no DS&S/2015/065. This should be able to hold the fuse carrier without any risk of falling when lifting and transferring it to the fuse cutout for closing in operation. Also the fuse carrier shall be easily transferable into the operating rod head from the fuse switch for lowering the carrier.

Suitable weather proof rubber/PVC rain-shield shall be provided in the bottom section so that no rain water will drip along the rod while in operation and no water shall run along inner surface of any section.

The insulation characteristics shall be such as to enable the rod to be used safely under damp, tropical climatic conditions.

(a) Mechanical Category - fiberglass reinforced epoxy resin tube

(b) Colour - The operating rod shall be Yellow, Red or in any other bright colour.

(c) Finish - Slightly ribbed or smooth surface.

(d) Weight - The total weight shall not exceed 7kg.

(e) The hook with universal joint (adapter) - Made of aluminum alloy or any other suitable rust free light metal as per IEC 60832

(f) Insulating Tube dielectric strength, mechanical strength and mechanical fatigue characteristic shall conform to the requirements of the clauses 9, 10 and 11 of IEC 61235.

6.0 ADDITIONAL REQUIREMENTS

6.1 Manufacturing Experience

The manufacturer shall have at least 5 years experience in manufacturing and supply of operating rods and manufacturer shall furnish documentary evidence with the offer to prove his manufacturing experience.

6.2 Marking

Each insulating tube of operating rod shall be clearly marked in a durable manner with the following particulars conforming to IEC 61235

(a) Manufacturer's name or Trade mark
(b) Type reference
(c) Year of Manufacture
(d) Applicable Standard & Number
(e) Code of mechanical category
(f) The letters "CEB"

Hook with universal joint shall be clearly marked in a durable manner with the following particulars conforming to IEC 60832

(a) Manufacturer's name or Trade mark
(b) Type reference
(c) Year of Manufacture

The marking shall not affect the performance of the tube; if a removable label is used the performance shall not be affected by its removal.

6.3 Packing

Each Unit comprising of all the components shall be supplied in a suitable weather resistance canvas bag of length not less than 1.75m.

6.4 Sample

One sample of the operating rod shall be provided with the offer. Samples of the unsuccessful Bidders will be returned once the award is made.

6.5 Technical Literature and Drawings

The selected Bidder shall supply relevant dimensional drawings, technical literature and routine test report along with the equipment.

7.0 QUALITY ASSURANCE

The manufacturer shall possess ISO 9001:2008 Quality Assurance Certification valid throughout the delivery period of this bid, for the manufacture of Operating Rods for the plant where the Operating Rods are being manufactured. The Bidder shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

8.0 INSPECTION AND TESTING

8.1 Type Test

Following Type Test Certificates conforming to IEC 61235 shall be provided with the offer.

(a) Visual inspection and dimensional check
(b) Dielectric tests
    I. Dielectric test before and after exposure to humidity
    II. Dielectric wet test
(c) Mechanical tests
    I. Bending test
    II. Torsion test
    III. Crushing test
(d) Mechanical fatigue tests
    I. Bending test
    II. Dielectric test

Test certificates referred to shall be from an **accredited independent testing laboratory acceptable to the purchaser**. Proof of accreditation by a national/ international authority shall be forwarded with the offer. Test reports shall be complete including all the pages as issued by the testing authority. Parts of test reports shall not be acceptable.

8.2 Routine Test

Routine Tests as per IEC 61235 shall be carried out on all units and test report shall be furnished for the observation of the inspector appointed by the purchaser at the time of inspection.

(a) External visual inspection
(b) Dielectric Test

8.3 Inspection

The Successful bidder shall make necessary arrangements for inspection by an Engineer appointed by the CEB and also to carry out in his presence necessary Acceptance tests on equipment and material. CEB may waive off the inspection with the condition of carrying out the acceptance tests by an independent testing authority acceptable to CEB. In such a situation a notice of waive off will be issued in advance to the supplier.

8.4 Acceptance Test

The following Acceptance Test as per IEC 61235 shall be witnessed by the representative of the purchaser.

(a) External visual inspection
(b) Dielectric test
(c) Dimensional check
(d) Mechanical test (Bending test)
(e) Hand operation of the equipment

9.0 INFORMATION TO BE FURNISHED WITH THE OFFER

The following shall be furnished with the offer;

(a) Construction features and relevant technical literature (materials used for components, mechanical strength, weight, electrical characteristics etc.)
(b) Complete Dimensional Drawings
(c) Duly filled schedule of guaranteed technical particulars (Annex A)
(d) Duly filled non-compliance schedule (Annex B). Even if there is no non-compliance, a nil report shall be submitted
(e) List of utilities outside the country of manufacture with contact details (name, email address, telephone number, etc), to whom the manufacturer has supplied operating rods during past 5 years
(f) Type Test certificates for insulating tube.
(g) ISO 9001:2008 quality assurance certification.

Failure to furnish the above information and sample in accordance with clause 6.4 will result in the offer being rejected.

10.0 ANNEX

Annex A - Schedule of guaranteed technical Particulars - To be filled by the manufacturer.
Annex B - Non Compliance Schedule
Annex C - Drawing No DS&S/2015/065

Annex- A

SCHEDULE OF GURANTEED TECHNICAL PARTICULARS

(Following Information shall be furnished with the offer)

1.	Manufacturer's name		
2.	Country of origin		
3.	Model no.		
4.	Applicable Standard		
5.	Design Operating Voltage	kV	
6.	Number of Section	nos	
7.	Length of each Section	mm	
8.	Length of complete operating rod	mm	
9.	Insulating tube		
	i) External Diameter	mm	
	ii) Thickness	mm	
	iii) Code of mechanical category		
	iv) Colour		
10.	Material used in the manufacture of		
	i) Hollow Insulating tubes		
	ii) The hook with universal joint		
	iii) locking arrangement		
	iv) Rain shield		
11.	Length of canvas bags	mm	
12.	Weight of the complete operating rod	kg	
13.	Whether dielectric strength conform to the standard	Yes/No	
14.	Whether mechanical strength conform to the standard	Yes/No	
15.	Whether the quality assurance certification conforming to ISO 9001:2008 furnished	Yes/No	
16.	Whether the type test certificates from an accredited independent testing laboratory furnished	Yes/No	
17.	Whether the operating rods are supplied in weather resistance canvas bags	Yes/No	
18.	Whether the acceptance tests as per clause 8.4 will be carried out at the time of inspection	Yes/No	

…….. ……..……

Signature of the Manufacturer/bidder and seal **Date**

Annex – B

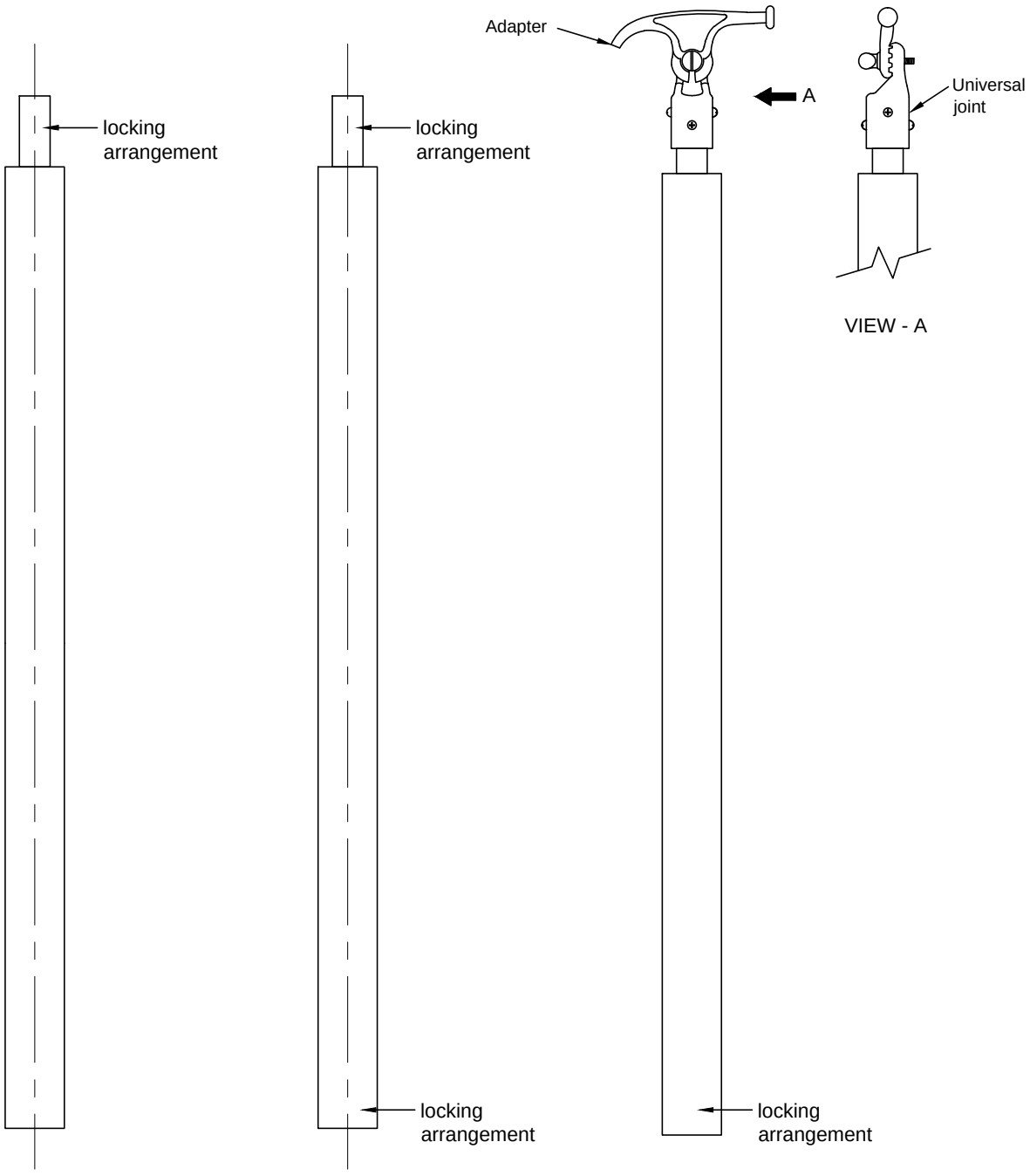
Non-Compliance Schedule

On this schedule the bidder shall provide a list of non-compliances with this specification, documenting the effects that such non-compliance is likely to have on the equipment life and operating characteristics. Each non-compliance shall be referred to the relevant specification clause.

Clause No.	Non-Compliance

……. ……..……

Signature of the Manufacturer/bidder and seal **Date**



BOTTOM SECTION **INTER MEDIATE SECTION** **TOP SECTION**

CEYLON ELECTRICITY BOARD	DISTRIBUTION STANDARDS & SPECIFICATION	SCALE : NOT TO SCALE
	OPERATING RODS (DETACHABLE TYPE)	DRAWN : LALANI
	DESIGNED BY / APPROVED BY	DATE : June, 2015
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DISTRIBUTION COORDINATION BRANCH	EE (DC-1) / CHAIRMAN, SPECIFICATION COMMITTEE	CAD NO :