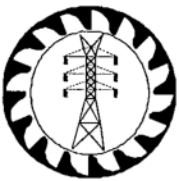


015-1: 2015

CEB
SPECIFICATION

GALVANIZED STAY ASSEMBLY



**CEYLON ELECTRICITY BOARD
SRI LANKA**



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GALVANIZED STAY ASSEMBLY

1.0 SCOPE

This specification covers the Design, Manufacture and Testing of Galvanized Stay Assembly for using in the CEB Power Distribution System.

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage	230V/400 V	33 kV
(b)	System highest voltage	240V/440V	36 kV
(c)	System frequency	50 Hz	50 Hz
(d)	Method of earthing	Effectively earthed	Non Effectively earthed
(e)	System faults level	25 kA	13.1 kA

3.0 SERVICE CONDITIONS

(a)	Annual average ambient temperature	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)	Isokeraunic (Thunder days) level	100 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)	BS 16:1974	Specification for telegraph material (insulators, pole fittings, etc.)
(b)	BS 3643-1,2:2007	ISO metric screw threads.
(c)	BS EN 10025:2004	Hot rolled products of structural steels.
(d)	BS EN 13411-1:2002+A1:2008	Terminations for steel wire ropes. Safety. Thimbles for steel wire rope slings
(e)	BS EN 10293:2015	Steel castings. Steel castings for general engineering uses
(f)	BS EN ISO 1461:2009	Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods
(g)	SLS 949-1:2006	Dimensions of hot rolled, steel bars for structural and general engineering purposes Part 1 - Round bars

5.0 BASIC FEATURES

5.1 General

A Stay Assembly shall consist of the following.

- (a) Stay Rod with Ratchet Nut.
- (b) Stay Tightener (with forged steel/channel iron cross head).
- (c) Stay Plate.
- (d) Two (2) Thimbles.
- (f) Stay Clamp

The attached Drawing no. DS&S/2015/15-1a and DS&S/2015/15-1b show the general arrangements of the Stay Assembly. The dimensions given in the drawing are in accordance with BS16 (except for stay clamp).



All items shall be smooth, corners rounded and free from sharp edges. All burrs shall be removed after shearing, drilling or punching and bending operations. The cut ends of the channel iron cross head (stay tightener) shall be rounded off.

5.2 Stay Rods with Ratchet Nuts

5.2.1 General

The rods shall comply in all respects with the dimensions specified in Table 3 of BS16 for pattern 1.

5.2.2 Material

The rods shall be of steel suitable to give a minimum breaking strength of 62 kN and 96 kN for 1.8 m and 2.4m Stay Rods respectively as required in Clause 4.4 of BS 16.

The screw threads of the rods and ratchet nuts shall conform to British Standard 3643 course series free fit. The head of the Stay rods shall be forged of the same material and not welded. The nut should match the locking device provided to the cross-head.

5.3 Stay Tightener (Stay Buckle)

5.3.1 General

Stay Tightener shall be manufactured to comply with the Drawing No. DS&S/2015/15-1a and Table 3 and Figure 4 of the BS16 in all respects.

5.3.2 Material

The Bow of the Tightener shall be of same material described in clause 5.2.2 above complying with the requirements of BS EN 10025. The cross-head shall be made of forged mild steel or channel iron. The sides of each bow shall be well riveted into the cross-head and shall not get pulled-out from the cross-head when the tightener is tested for fracture by tensile tests.

The ratchet nuts, and the ratchet face of each cross head shall be well formed, so that any nut and cross-head of the appropriate size shall provide a good ratchet action.

5.4 Stay Plates and Washers

5.4.1 General

Stay Plates shall comply in all respects with Table 6 and Figure 5 of BS 16. Washers for Stay Rods shall comply in all respects with the Drawing No. DS&S/2015/15-1a and Table 5 and Figure 5 of the BS 16.

5.4.2 Material

Plates shall be of Mild Steel. Stay Plates and washers shall be cleanly cut off and shall be free from cracks after punching.

5.5 Thimbles

5.5.1 General

The Thimbles shall be neatly formed and shall be free from roughness and sharp edges liable to injure the Stay wire. The Thimbles specified are intended for wire ropes used for general engineering purposes. The proportions and dimensions of the specified thimbles have been determined with regard to the strength and rigidity essential for such purposes. Thimbles shall be manufactured strictly in compliance with the dimensions given in Drawing No. DS&S/2015/15-1a.



5.5.2 Material

Material should conform to Clause 5.2 of BS EN 13411.

5.5.3 Dimensions and Tolerances

The form of the Thimbles shall be as shown in Figure 01 of BS EN 13411 and the nominal size of the Thimbles shall be suitable to accommodate 7/3.15 mm and 7/4.06 mm Stay Wire for 1.8 m and 2.4 m Stay Assemblies respectively. The dimensions of the Thimbles are given in Drawing No. DS&S/2015/15-1a and Figure 1 given in BS EN 13411. All dimensions except for shown in the drawings shall be subjected to a tolerance of $\pm 5\%$.

5.6 Stay Clamp

5.6.1 General

Stay Clamp shall be made out of 50 mm x 10 mm flat iron. There shall be no sharp edges, and corners rounded. All burrs shall be removed after shearing, drilling or punching and bending are completed. The cut ends of the Stay Clamp and Strut Bracket shall be rounded off.

The Stay Clamp shall be suitable to give minimum breaking load of 96 kN.

5.6.2 Material

The steel used for fabricating Stay Clamp shall be of grade S235JR in accordance with BSEN 10025.

5.6.3 Dimensions

Dimensions shall be in accordance with DS&S/2015/15-1b.

5.7 Galvanizing

All Components of the Stay Assemblies shall be hot dip galvanized in accordance with BS EN ISO 1461.

The preparation for galvanizing and the galvanizing itself shall not distort or adversely affect the mechanical properties of the material.

All components shall be effectively galvanized in accordance with BS EN ISO 1461. Galvanize coating thickness shall be in accordance with Table 3 and Table 4 of BS EN ISO 1461.

5.7.1 Finish

Appearance of the galvanizing coating on all components of the item shall be in accordance with the clause 6.1 of BS EN ISO 1461.

6.0 ADDITIONAL REQUIREMENTS

6.1.1 Manufacturing Experience

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

6.2 Marking

Every item shall be clearly embossed with the mark "C.E.B." – Year of Manufacture together with the manufacture's identification mark before galvanizing.



6.3 Packing

Twenty five nos. of Stay rods with Ratchet Nuts, Stay Tighteners with Thimbles, Stay Plates, Stay Clamps with Thimbles and Washers shall be packed separately in pelletised wooden boxes. The name of the item and quantity shall be marked on each box.

6.4 Sample

One Sample (non returnable sample) of a complete stay assembly of each size shall be provided together with the Bid.

6.5 Technical Literature and Drawings

The selected Bidder shall supply relevant dimensional drawings along with the equipment supplied.

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 Galvanized Stay Assembly for the plant where the Galvanized Stay Assemblies 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 shall be provided with the offer.

- (a) Breaking Load test on Assembled Stay Rod and Stay Tightener.
- (b) Breaking Load test on Stay Clamp.
- (c) Breaking Load test on Thimble in accordance with BS EN 13411.

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

Following Routine Tests 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) Proof load test (40% of Breaking Load) shall be performed on Stay Rods and Stay Tighteners containing welded joints
- (b) Tolerance on dimensions
- (c) Galvanising

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 witness 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 shall be witnessed by the representative of the purchaser.

- (a) Breaking Load test on Assembled Stay Rod and Stay Tightener
- (b) Breaking Load test on Stay Clamp
- (c) Tolerance on dimensions
- (d) Galvanising test of each part of the assembly.

Each batch of items supplied will be subjected to the following sampling Tests at the place of dispatch:

- i) Checking whether the items are galvanizes to the specified standard.
- ii) Checking of the specified dimensions and the ratchet action.
- ii) Whether the surfaces are smooth and burr free.

Tests shall be carried out on 10 Nos. of Stay Assemblies selected randomly from a batch of every 1000 numbers, at the place of dispatch (or at the Purchaser's Stores). If two or more numbers of Stay Assemblies are found defective then a second Sampling Test shall be carried out on the same basis. If two or more Stay Assemblies are also found defective then the whole batch shall be rejected.

Sample selection for Galvanizing test shall be in accordance with the clause 5 of BS EN ISO 1461.

9.0 INFORMATION TO BE FURNISHED WITH THE OFFER

The following shall be furnished with the offer.

- (a) Constructional features, materials used for components and relevant technical literature.
- (b) Complete dimensional drawings.
- (c) Completed Schedule of Particulars, Annex A
- (d) Type Test certificates in accordance with clause 8.1

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
- Annex B1 - Drawing No DS&S/2015/15-1a
- Annex B2 - Drawing No DS&S/2015/15-1b
- Annex C - Non Compliance Schedule



Schedule of Guaranteed Technical Particulars
(Following Information shall be furnished with the offer)

1.	Name of the Manufacturer	
2.	Country of Origin	
3.	Stay Rods with Ratchet Nuts	
	I. Grade of steel	
	II. Tensile strength	kN
	III. Dimension	
	IV. Galvanizing coating thickness	μm
4.	Stay plates and Washers	
	I. Grade of steel	
	II. Dimension of Plate	
	III. Dimension of Washer	
	IV. Galvanizing coating thickness	μm
5.	Stay Tightener	
	I. Type of Cross head	Channel Iron/ Forged steel
	II. Dimension	
	III. Tensile strength	kN
	IV. Galvanizing coating thickness	μm
6	Stay Clamp	
	I. Grade of steel	
	II. Minimum Tensile Strength of the clamp	kN
	III. Minimum Elongation of the clamp	%
	IV. Galvanizing coating thickness	μm
7	Thimbles	
	I. Grade of Steel	
	II. Galvanizing coating thickness	μm
8.	Breaking Load test on Assembled Stay Rod and Stay Tightener	kN
9.	Whether the Quality Assurance Certification conforming to ISO 9001:2008 furnished with the offer?	Yes/No

.....
Signature of the Manufacturer and seal

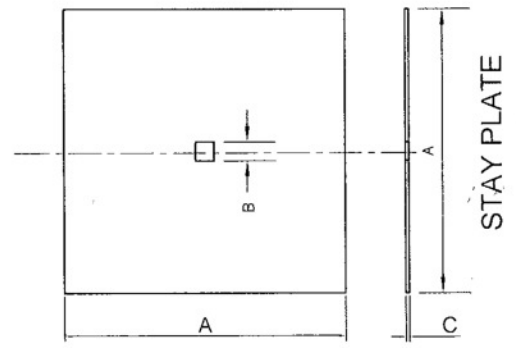
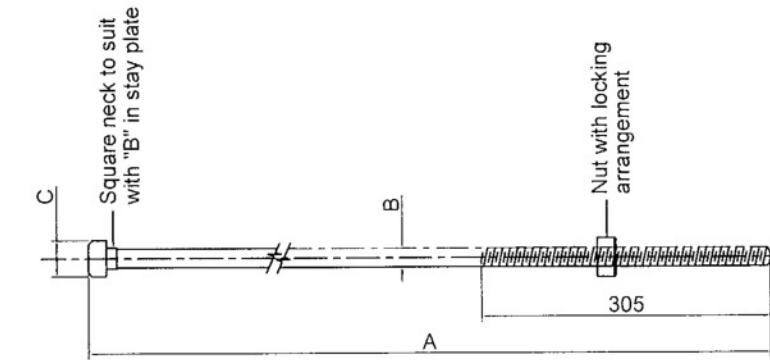
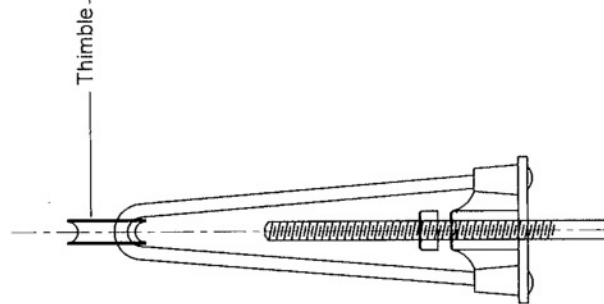
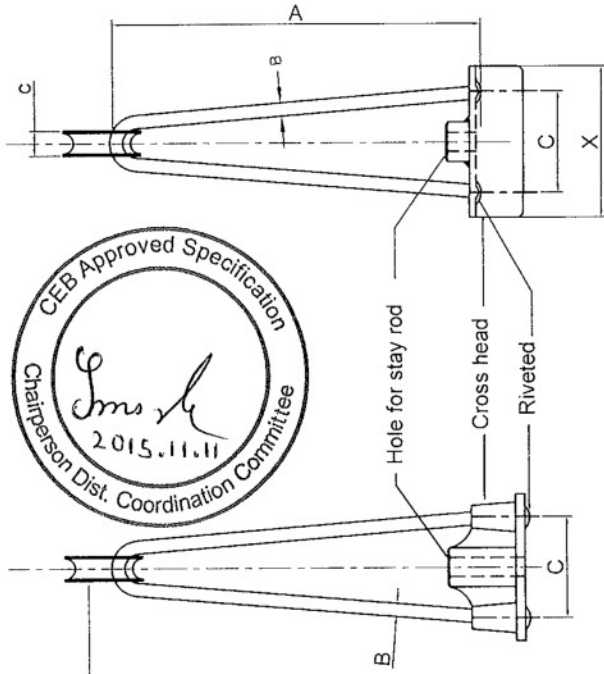
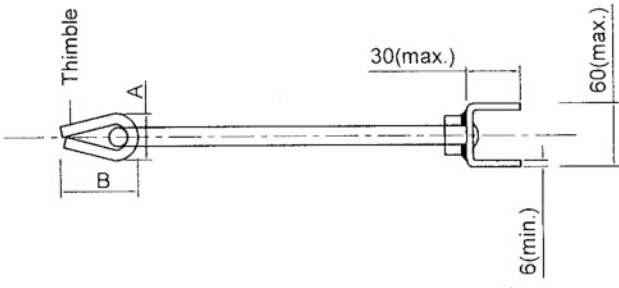
.....
Date

I/We certify that the above data are true and correct

.....
Signature of the Bidder and seal

.....
Date





TYPE 2

CHANNEL IRON CROSS HEAD
STAY TIGHTENER

TYPE 1

FORGED STEEL CROSS HEAD
STAY TIGHTENER

STAY ASSEMBLY

ALL DIMENSIONS ARE IN mm.

	STAY TIGHTENER Table 3:B S:16(1974)		STAY PLATE Table 6:B S:16(1974)		STAY RODS Table 3:B S:16(1974)		THIMBLES	
	For 2400 Stay	For 1800 Stay	For 2400 Stay	For 1800 Stay	For 2400 Stay	For 1800 Stay	For 2400 Stay	For 1800 Stay
A	400 ± 1%	400 ± 1%	380 ± 1%	300 ± 1%	2400 ± 1%	1800 ± 1%	59 ± 2%	54 ± 2%
B	14 ± 2%	12 ± 2%	22 ± 2%	18 ± 2%	20 ± 2%	16 ± 2%	79 ± 2%	73 ± 2%
C	110 ± 2%	98 ± 2%	4 ± 2%	4 ± 2%	38.1 ± 2%	31.8 ± 2%	21 ± 2%	18 ± 2%
D	155 ± 2%	143 ± 2%						



CEYLON
ELECTRICITY
BOARD

DISTRIBUTION STANDARDS & SPECIFICATION

GALVANIZED STAY ASSEMBLY

SCALE : NOT TO SCALE

DRAWN : LALANI

DATE : March, 2015

DRG. NO : DS&S/2015/15-1a

CAD NO :

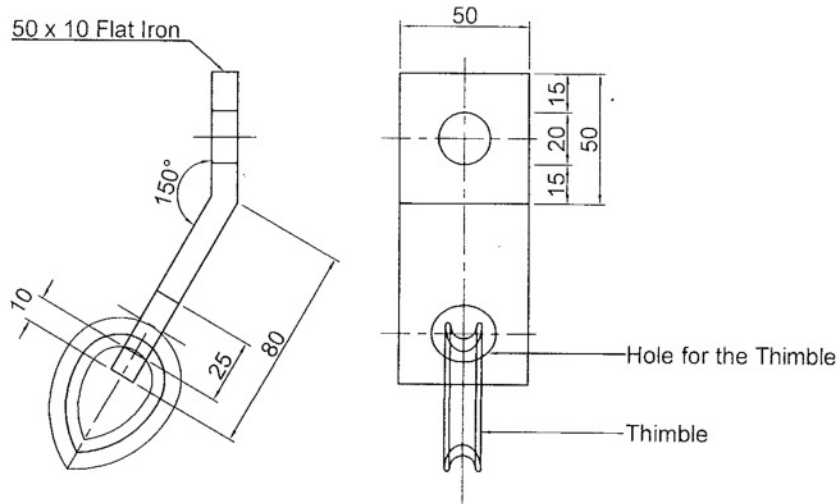
DESIGNED BY

APPROVED BY

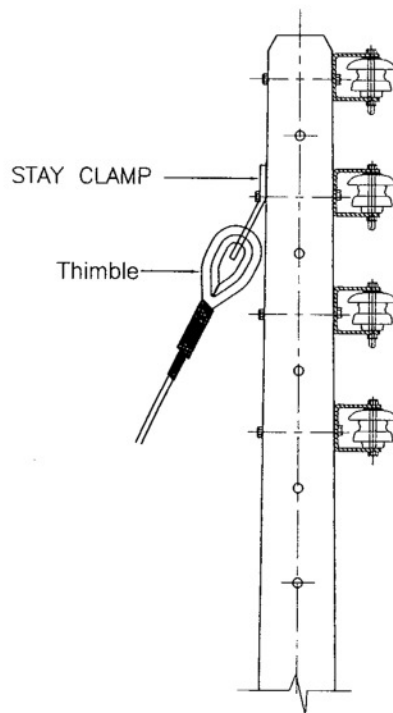
DISTRIBUTION COORDINATION
BRANCH

EE (DC) 1

CHAIRMAN, SPECIFICATION COMMITTEE




STAY CLAMP



METHOD OF INSTALLATION



ALL DIMENSIONS ARE IN mm.

 CEYLON ELECTRICITY BOARD DISTRIBUTION COORDINATION BRANCH	DISTRIBUTION STANDARDS & SPECIFICATION		SCALE : NOT TO SCALE
	GALVANIZED STAY ASSEMBLY		DRAWN : LALANI
	DESIGNED BY	APPROVED BY	DATE : March, 2015
			DRG. NO : DS&S/2015/15-1a
	EE (DC) 1	CHAIRMAN, SPECIFICATION COMMITTEE	CAD NO :

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

