



**MEGHALAYA ENERGY CORPORATION LIMITED**  
**OFFICE OF THE ADDITIONAL CHIEF ENGINEER**  
**MATERIAL MANAGEMENT**  
**LUM JINGSHAI; SHORT ROUND ROAD; SHILLONG-793001**  
**CIN:U40101ML2009GC008374**

Phone – 0364-2591930

[ace.mm.meecl@gmail.com](mailto:ace.mm.meecl@gmail.com)



***TECHNICAL SPECIFICATION FOR HARDWARE ITEMS***

***Tender No. ACE(MM)/02/2023***

***Prepared by the Office of the Additional Chief Engineer (MM),  
MeECL, Lum Jingshai, Shillong.***



**MEGHALAYA ENERGY CORPORATION LIMITED**  
**OFFICE OF THE ADDITIONAL CHIEF ENGINEER (EL)**  
**MATERIAL MANAGEMENT**  
**LUM JINGSHAI; SHORT ROUND ROAD; SHILLONG-793001**  
**CIN : U40101ML2009SGC008274**

Phone – 0364-2591930

✉: ace.mm.meecl@gmail.com

**General Terms & Conditions**

**1. Scope:**

- i.** Notwithstanding the quantity indicated in Price schedule the scope of work of this tender is to establish the unit rate of Hardware Items.

**2. Accepting of Tender:**

- i.** MeECL has the right to reject the Tender/ Tenders which do not comply with the Tender specification. The Tender/ Tenders which comply in all respect to the requirement as stipulated in the Tender Specification shall be wholly accepted by MeECL.

Name & Address of the tenderer should be indicated in a distinct manner

- iii.** All the pages of the downloaded documents to be submitted to this office should be signed by the tenderer with date signifying acceptance of the relevant terms & conditions,

- iv.** The equipment shall conform in all respect to the relevant IS codes (where applicable) except where otherwise mentioned in the technical specification as enclosed. The Tenderer shall assume full responsibility for adequate design and shall ensure that procedures/ Techniques conforming to the best modern engineering practices for the operating condition specified are used by the manufacturer.

- v. Delivery :** Delivery shall be strictly within the time to be specified in the purchase order. Delivery refers to delivery at destination including unloading and placement on plinth unless otherwise stated.

- vi.** MeECL reserves the right to accept/ reject any/all tenders without assigning any reason thereof and is not bound to accept the lowest rate.

- vii.** Bid validity of the rate offered should be for a minimum of 2 (two) years with effect from the date of opening of tender.

- viii.** L-1 Bidder will be expected to be able to supply the items when ordered at their quoted rates, failing which they may be penalized.

- ix. The tenderer shall note that the MeECL is not bound to place the purchase order with the firm quoting the lowest rates but reserves the right to split the order without assigning any reasons thereof to place the order partially or wholly on one or a number of suppliers. The offer of these items shall be on individual merit for bid evaluation purposes.
- x. Sample of items will have to be furnished when deemed necessary during the tendering process.
- xi. Make of equipment such as Insulators, GOAB, GO-DO, GO Switches on offer should have been tested at CPRI or national Test Houses. Type Test Certificate must be enclosed along with the Tender as support for the make on offer. Make of Stay sets, Hardware fittings should be specified in the offer and should conform as per specification in the tender document.
- xii. The Bid shall be submitted in 1 (one) seal Envelop containing 3 (Three) separate sealed envelopes properly super scribed as follows.

**3 (i) Envelop-I :**

**Tender fee**

Tender fee in a form of Demand Draft/ Banker's Cheque pledged in favour of the "Principal Account of MeECL, Shillong". The cost of the tender downloaded from MeECL website shall be INR 2000.00 (Rupees two thousand) only (inclusive of GST).

Tender without proper tender fee as indicated at (i) above shall be summarily rejected.

**4. (ii)Envelop-II :**

**Qualification of Bidder.**

The Tenderer shall submit the following documents, failing which the bids shall be considered as non responsive.

- i. The local Bidders has to produce the Schedule Tribe Certificate and Electoral Photo Identity Card (EPIC) issued by the Election Commission to establish his/ her Indigenous identity along with GST Registration and PAN Card. This however does not apply to the Bidders already registered with MeECL.
- ii. In case of Non-Tribal, the Bidder has to produce the Trading License issued by any of the District Councils (viz. KHADC, JHADC & GHADC) of the State of Meghalaya. However, the Residential Certificate, the Electoral Photo Identity Card (EPIC), to establish the identity as the Indian Citizen along with GST Registration and PAN Card & other relevant documents are also to be submitted. This however does not apply to the Bidders already registered with MeECL.

- iii. The Bidder/ Tenderer should have experience as per the Scope of this Tender for a minimum of 5(five) accounting year, ie, 17-18, 18-19, 19-20, 20-21, 21-22. Copy of the purchase order should be submitted along with the Bid.
- iv. Minimum average annual turnover (MAAT): The average annual turnover of the Bidder for the last 5(five) years should not be less than **Rs 70.25 lakhs**. Certified copy of the same should be submitted with the Bid.

**5. (i) Envelop-III**

**Offered Bid :** Break-up of Tender rates. The tender rates shall be furnished in detailed break-up viz. Ex-work, FOR Destination, Taxes, Freight and Insurance, etc. up to Shillong, Sumer. Rates are to be invariable quoted in the Schedule Format as Price Schedule.

**6. Submission of Tender:**

- i. The Envelop I, II, III, stated above can be submitted in One Big Envelop properly sealed and should be addressed to : “The Additional Chief Engineer (MM),MeECL, Lumjingshai, Shillong”.

**7. Date of Submission of Tender :**

- i. The last date of submission of tender shall be 29/05/2023 (14:00 hrs)

**8. Opening of Tender:**

- i. The opening of Tender shall be in presence of the Bidder/ Bidders or their authorized representative. The opening of Tender shall be on the 29<sup>th</sup> May 2023 at 15:00hrs. The venue of the Tender opening shall be in the office chamber of the Additional Chief Engineer(MM), MeECL, Lumjingshai, Shillong. At the time of opening of Bid, only the envelop (i) Tender fee will be opened. Bidders are requested to note the same.

**9. Address of Communication:**

- i. **The Additional Chief Engineer (MM), MeECL, Lumjingshai, Shillong.**

Additional Chief Engineer(MM)  
MeECL, Shillong.

**HARDWARE ITEMS****PRICE SCHEDULE - A**

SI No	ITEMS	Unit	Total Qty	Unit Ex-Works (Price in Rs)	Total Ex-Work (Price in Rs)	Unit (F&I in Rs)	Total (F&I in Rs)	GST	Total
1	<b>HT Stay set Complete, HTL make</b>	Set	545						
2	<b>LT Stay set Complete, HTL make</b>	Set	546						
3	<b>GI Stay Wire</b>								
	i) 7/10 SWG	Kg	1570						
	ii) 7/12 SWG	Kg	170						
	iii) 7/14 SWG	Kg	1434						
4	<b>GI wire</b>								
	i) 6 SWG	Kg	1						
	ii) 8 SWG	Kg	222						
	iii) 10 SWG	Kg	1						
	iv) 12 SWG	Kg	1						
5	<b>GI Barbed wire 12 SWG</b>	Kg	190						
6	<b>CI Earthing pipe 6' * 3" ISI</b>	Set	206						
7	<b>CI Earthing pipe 6' * 2" ISI</b>	Set	55						
8	<b>GI Earthing pipe 40mm dia.</b>	Set	50						
9	<b>GI Pipe</b>								
	i) 25 mm dia	Mts	1						
	ii) 40 mm	Mts	1						
10	<b>GI Through Nuts &amp; Bolts with washers</b>								
	i) 5/8" * 6"	Each	98						
	ii) 5/8" * 8"	Each	1802						
	iii) 5/8" * 10"	Each	1447						
	iv) 5/8" * 12"	Each	697						
11	<b>MS Nuts &amp; Bolts</b>								
	i) 5/8" * 2½"	Each	1						
	ii) 5/8" * 3"	Each	238						
	iii) 5/8" * 4"	Each	1901						
12	<b>Danger Plates</b>								
	i) LT	Each	1						
	ii) 11KV	Each	1						
	iii) 33KV	Each	1						
	iv) 132 KV	Each	1						
13	<b>Phase Plate for 132KV Drawing</b>	Set	1						
14	<b>Number Plate for 132KV Drawing</b>	No	1						
15	<b>M.S. Rod</b>								
	i) 16 mm	Kg	1						
	ii) 20 mm	Kg	1						
	iii) 40 mm	Kg	1						
	iv) 50 mm	Kg	1						

	v) 60 mm	Kg	1						
16	<b>GI Bend</b>								
	i) 25 mm dia	Each	1						
	ii) 40 mm	Each	1						
17	<b>GI Socket</b>								
	i) 25 mm dia	Each	1						
	ii) 40 mm	Each	1						
18	<b>Shackle Insulator</b>								
	i) 11.5 KN (Type -I)	Each	476						
	ii) 16.0 KN (Typr -II)	Each	2640						
19	<b>Shackle Insulator Straps Complete with N/B</b>								
	i) 11.5 KN (Type -I)	Each	1						
	ii) 16.0 KN (Typr -II)	Each	1709						
20	<b>GI Pin for 33KV Pin insulator</b>	Each	2507						
21	<b>GI Pin for 11KV Pin insulator</b>	Each	1707						
22	<b>GI Pin for LT Pin insulator</b>	Each	1235						
23	<b>H/W Fitting for Disc insulator B/S type with tension fitting</b>								
	i) Squirrel, 2- Bolted	Set	186						
	ii) Weasel, 2- Bolted	Set	1059						
	iii) Raccoon, 3- Bolted	Set	649						
	iv) Wolf, 3 Bolted	Set	351						
	v) Rabbit, 3- Bolted	Set	1						
24	<b>11 KV DO Fuse unit channel base type, HTL/Ruma make</b>								
	i) 100 Amp	Set	102						
	ii) 200 Amp	Set	213						
	iii) 400 Amp	Set	23						
25	<b>11 KV DO Fuse unit Bracket base type, HTL/Ruma make</b>								
	i) 100 Amp	Set	1						
	ii) 200 Amp	Set	1						
26	<b>33 KV DO Fuse unit channel base type, HTL/Ruma make</b>								
	i) 200 Amp	Set	91						
	ii) 400 Amp	Set	83						
27	<b>11KV GOAB Switch, HTL/Ruma make</b>								
	i) 100 Amp	Set	1						
	ii) 200 Amp	Set	44						
	iii) 400 Amp	Set	121						
28	<b>11KV GO-DO Switch, HTL/Ruma make</b>								
	i) 100 Amp	Set	1						
	ii) 200 Amp	Set	94						
29	<b>33KV GOAB Switch, HTL/Ruma make</b>								
	i) 100 Amp	Set	1						
	ii) 200 Amp	Set	22						
	iii) 400 Amp	Set	8						

30	<b>33KV GO-DO Switch, HTL/Ruma make</b>								
	i) 200 Amp	Set	7						
	ii) 400 Amp	Set	15						
31	<b>UPG Clamp Bolted type</b>								
	i) Raccoon	Each	348						
	ii) Wolf	Each	283						
	iii) Squirrel	Each	1						
	iv) Weasel	Each	117						
32	<b>Aluminium Jointing Sleeves</b>								
	i) Raccoon	Each	1						
	ii) Wolf	Each	1						
	iii) Squirrel	Each	1						
	iv) Weasel	Each	1						
33	<b>Chain Link fencing made from 8SWG, GI Wire 2" mesh &amp; 2.4 m height</b>	Sqm m	1						
34	<b>Chain Link fencing made from 10SWG, GI Wire 3" mesh &amp; 1.8 m height</b>	Sqm m	212						
35	<b>Aluminium Binding Wire, 8 SWG</b>	Kg	1						
36	<b>Pin Insulators</b>								
	i) LT	Each	1890						
	ii) 11KV	Each	2533						
	iii) 33KV, RRI make	Each	1						
	iv) 33KV, ABI make	Each	1248						
37	<b>Disc Insulator</b>								
	i) 45KN, RRI/ABI make	Each	2049						
	ii) 70KN, ABI make	Each	1766						
	iii) 90 KN (Normal)	Each	164						
	iv) 120 KN (Normal)	Each	1						
	v) 90 KN (semi-fog)	Each	1						
	vi) 120 KN (semi-fog)	Each	1						
	v) 90 KN (Anti-fog)	Each	1						
vi) 120 KN (Anti-fog)	Each	1							
38	GI Angle (Different Standard Sizes)	MT	0.1						
39	<b>Guy Insulator</b>								
	44KN	Each	564						
	88KN	Each	416						
40	Earth wire, 7/3.15 mm	KM	1						
41	LT Fuse wire, 1.5 A to 600 A	Kg	1367						
42	Aluminium Paint	Lts	28						
43	Red Oxide Paint	Lts	105						
<b>Total</b>									

Name and Signature of Bidder

6. MATERIAL OF THE BARBED WIRE:

- (i) The wire shall be manufactured from steel by the process and shall not contain sulphur and phosphorus exceeding 0.065 per-cent.
- (ii) The wire shall be coated with zinc of grade ZMSB in accordance with IS:209 and the wire shall be galvanized in accordance with IS:2029.

7. SIZE OF THE GALVANIZED STEEL BARBED WIRE:

The galvanized steel barbed wire shall be of the size given below:-

Nominal diameter of wire	Line wire/Point wire (mm)	Weight of the completed barbed wire		Distance between two barbs (mm)
		Maximum g/m	Minimum g/m	
2.75	2.00	106	99	75-12

8. TOLERANCES:

The permissible deviation from the nominal diameter of the line wire and the point wire shall not exceed ± 0.05mm.

9. OTHER PARTICULARS OF THE WIRE:

- (i) The number of lays between the two consecutive barbs shall vary between 7 to 9.
- (ii) The barbed wire shall be formed by twisting together two line wires, one or both containing the barbs.
- (iii) The barbs shall be so finished that the four points are set and locked at right angles to each other. The barbs shall have a length of not less than 15mm and not more than 18mm. The points shall be sharp and set at an angle not greater than 55° to the plane of the wire forming the barb.
- (iv) The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15m.

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SPECIFICATION FOR DESIGN, MANUFACTURE, SUPPLY AND TESTING OF GALVANIZED STEEL BARBED WIRE

1. SCOPE:

This specification covers the design, manufacture, supply and testing of galvanized steel barbed wire for the purpose of fencing.

2. CLIMATIC CONDITIONS:

The climatic conditions under which the material shall withstand are as follows:-

Average Annual rainfall days/year	- 1280mm/day to Sept.
Average No. of rainy days/year	- 5 months (May to Sept.)
Maximum dry bulb temperature	- 40°C
Minimum dry bulb temperature	- 2°C
Isoceraunic level	- 60
Relative humidity	- 71% to 93%
Maximum wind pressure	- 150q/m <sup>2</sup>

3. STANDARD:

The barbed wire shall comply in all respects with the requirements of the latest edition of IS: 278, where the item conforms to any other standard which ensures an equal or better quality than the standard mentioned above, the salient points of difference between the standard adopted and the above standard shall be clearly brought out in the tender.

4. COMPLETENESS OF THE TENDER:

The tender shall be complete in all respects. The tenderer shall quote separately the testing of the galvanized steel barbed wire.

5. DESCRIPTION OF THE BARBED WIRE:

a) TYPE:

The galvanized steel barbed wire shall be of either of the following two types.

Type A (IOGA Type)-The barbed shall have four points and shall be formed by twisting two point wires, each two turns, tightly around both line wires making altogether four complete turns.

Type B (Pillar Type)-The barbed shall have four points and shall be formed by twisting two point wires, each two turns, tightly around one line wire making altogether four complete turns.

Contd...22-

VI. TESTS:

Before despatch, the G.I. Wire shall be subjected to tests as per provision stipulated in IS:180, if the purchaser wishes to have a representative, test shall be performed in his presence to as to be witnessed by him.

All test reports shall be submitted and get approved by the purchaser before despatch of the materials.

VII. PACKING:

The wires shall be supplied in 50-75kg coils, each coil having single continuous length, each coil of wire shall be suitably bound and fastened compactly and shall be protected by suitable wrapping.

VIII. MARKING:

Each coil shall be provided with a label fixed firmly on the inner part of the coil bearing the following information.

- a. Manufacturer's name and trade mark.
- b. Lot number and coil number.
- c. Size.
- d. Grade.
- e. Mass.
- f. Length.
- g. ISI certification mark, if any.

IX. DEVIATION FROM SPECIFICATION:-

All deviation from specification shall be separately listed at per proforma given in Annexure-III in the absence of which it shall be presumed that the provision of the specification are complied by the tenderer.

X. GUARANTEED AND TECHNICAL PARTICULARS:

The guaranteed and other technical particulars are called for vide Annexure-1 shall be furnished alongwith the tender. Any tender lacking complete information in this respect is likely to be rejected.

XI. SCHEDULE OF REQUIREMENTS:

The following G.I. Wires are required to be supplied by the tenderer:-

Sl. No.	Description	Quantity
1.	G.I. Wire 6 SWG	
2.	G.I. Wire 8 SWG	
3.	G.I. Wire 10 SWG	
4.	G.I. Wire 12 SWG	

GRADE: \_\_\_\_\_

SPECIFICATION FOR THE SUPPLY OF G.I. WIRE

I. SCOPE:

This specification covers the design, fabrication and supply of solid G.I. wire of different sizes for various applications in general electrical engineering purpose.

II. STANDARDS:

The G.I. wire shall conform in all respects with the provisions of IS: 200-1978 and IS: 7887-1975 except wherein specified, otherwise if the product is as per any other standards, the salient point of difference between the standard adopted and relevant Indian Standard shall be clearly brought out in the tender.

III. MATERIALS OF THE G.I. WIRE:

a. The wire shall be drawn iron wire rods conforming to IS: 7887-1975 or the latest version thereof.

b. The requirement for chemical composition for the wires shall conform to IS: 7887.

c. The wires shall be sound, free from split surface flaws, rough legged and imperfect edges and other detrimental defects on the surface of the wires.

d. The wires shall be galvanized with "heavy coating" as per latest version of IS: 4820.

IV. CONSTRUCTION OF THE WIRES:

a. GRADE: The wires shall be of the following grades:

Sl. No.	GRADE	Tensile Strength(NB)
i.	Annealed	300-550
ii.	Hard	550-800

b. The G.I. wire shall be of solid type.

V. TOLERANCE:

a. The tolerance on nominal diameter at any section of wire shall not exceed (+) (-) 2.5%

b. The maximum difference between the diameters at any two cross-section of wires shall not exceed 2.5%.

Tend. .../...

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g) In cases where joints are permitted, they shall be made by welding or brazing. Joints in the same wire shall be separated by a length not less than that shown in clause IV c) and joints in different wires in a strand shall not be less than 10m apart.

FREEDOM FROM DEFECTS:

Each coil of the H.T. wire shall be warranted to contain no weld joints or splices other than in the rod before it is drawn. The wire shall be circular and shall be free from scale, freckles, lacerations, imperfections, flaws, splits & other defects, the wire coating shall be smooth, even and bright.

VI. MARKING:

Each coil shall be provided with a label, fixed firmly on the inner part of the coil, bearing the following information:

- i. Manufacturer's name and/or trade mark.
- ii. Lot numbers and coil numbers.
- iii. A brief description and quality of the material.
- iv. Weight.

VII. PACKING:

Each coil shall be wrapped in hessian or canvas and packed.

VIII. TESTS:

i. ROUTINE TEST:

Before despatch, the galvanised stay strand shall be subjected to routine tests as per provision stipulated in the relevant standards. If the purchaser wishes to have a representative test, shall be performed in his presence or as to be witnessed by him.

ii. TYPE TEST:

Reports of all type tests stipulated in the latest edition of IS:2141, shall be supplied.

All Test Reports shall be submitted and get approved by the purchaser before despatch of the equipment.

IX. QUANTIFIED AND TECHNICAL PARTICULARS:

The quantified and other technical particulars are called for vide Annexure-I shall be furnished along with that tender. Any tender lacking complete information in this respect is likely to be rejected.

X. DEVIATION FROM SPECIFICATION:

All deviation from specification shall be separately listed as per proforma given in Annexure-III in the absence of which it shall be presumed that the provision of the specification are complied by the tenderer.

SPECIFICATION FOR THE SUPPLY OF G.I. STAY WIRE

I. SCOPE

This specification covers the design, fabrication and supply of G.I. stranded staywire of different sizes for sub-transmission and distribution lines and for earthing in sub-transmission and distribution lines.

II. STANDARD

The G.I. stay wire shall conform in all respects to the relevant INDIAN Standard (where applicable) except wherein specified, otherwise if the product is as per any other standards; the salient point of difference between the standard adopted and relevant Indian Standards shall be clearly brought out in the tender.

III. MATERIAL OF THE G.I. STAY WIRE

- a) The wire shall be manufactured from steel, made by any suitable process and shall not contain sulphur and phosphorus exceeding 0.055 percent each.
- b) The wire shall be coated with zinc of grade IS 98 of IS: 209.
- c) The general requirement for the supply of galvanized stay wire strand shall be in accordance with latest edition of IS: 1383.

IV. CONSTRUCTION OF THE WIRES

- a) GRADES: The wires shall be of the following grades.
 

Grades	Tensile strength (N/mm <sup>2</sup> )
1	Above 89 upto and including 109 kg/cm <sup>2</sup>
2	Above 109
- b) The galvanized stay strand shall be of Twire construction. The lay of the strand shall be of the length given in Table I or 3 in IS: 2141-1908. The wires shall be so stranded together that when an evenly distributed pull is applied at the ends of the completed strand, each wire take an equal share of the pull.
- c) The gross length of strand which shall be supplied without joints in the individual wires, excluding welds made in the rod before drawing shall be as given below.

Sl. No.	Diameter of wire in strand (mm)	Normal length without joints or welds (m)
1.	4.0	1000
2.	3.15	1500
3.	2.50	2250
4.	2.24	3000
5.	2.00	3000
6.	1.60	3000
7.	1.25	3000
8.	0.80	3000

## TECHNICAL AND GUARANTEED PARTICULARS FOR L1 STAY SET

### 1. ANCHOR PLATE

- a) Thickness 6mm or above
- b) Size not below 230 \* 230 mm with smooth edges
- c) Well galvanized
- d) Materials MS Rolled Plate
- e) About 19mm square hole at center for locking the plate with the Anchor rod

### 2. ANCHOR ROD

- a) Length 1870 mm or above
- b) Threaded length 300 mm or above
- c) Diameter 16mm or above
- d) Anchor plate and head Square size 30 mm \* 30 mm with thickness 25 mm having matching square size flange for locking the Anchor Plate
- e) One ratchet lock nut, grooves must match the grooves at bow flange
- f) One check nut
- g) Materials MS
- h) Components well galvanized with extra care for threaded portion
- i) Size not below 10.5 \* 10.5 cm with smooth edges
- j) Both lock and check nuts should be matching to the Anchor Rod thread such that punching of thread after assembly at site safeguards them against removal

### 3. BOWBOLT

- a) match bow diameter and head should be well galvanized

### 4. BOW

- a) Rod diameter 16mm or above, overall length 37 cm or above; flange with well formed locking grooves matching the locking nut. Bow ends will be riveted securely with the flange. All items to be galvanized

## TECHNICAL AND GUARANTEED PARTICULARS FOR HT STAY SET

### 1. ANCHOR PLATE

- a) Thickness 5mm or above
- b) Size not below 30.5 \* 30.5 cm with smooth edges
- c) Well galvanized
- d) Materials MS Rolled Plate
- e) About 22mm square hole at centre for locking the plate with the Anchor rod

### 2. ANCHOR ROD

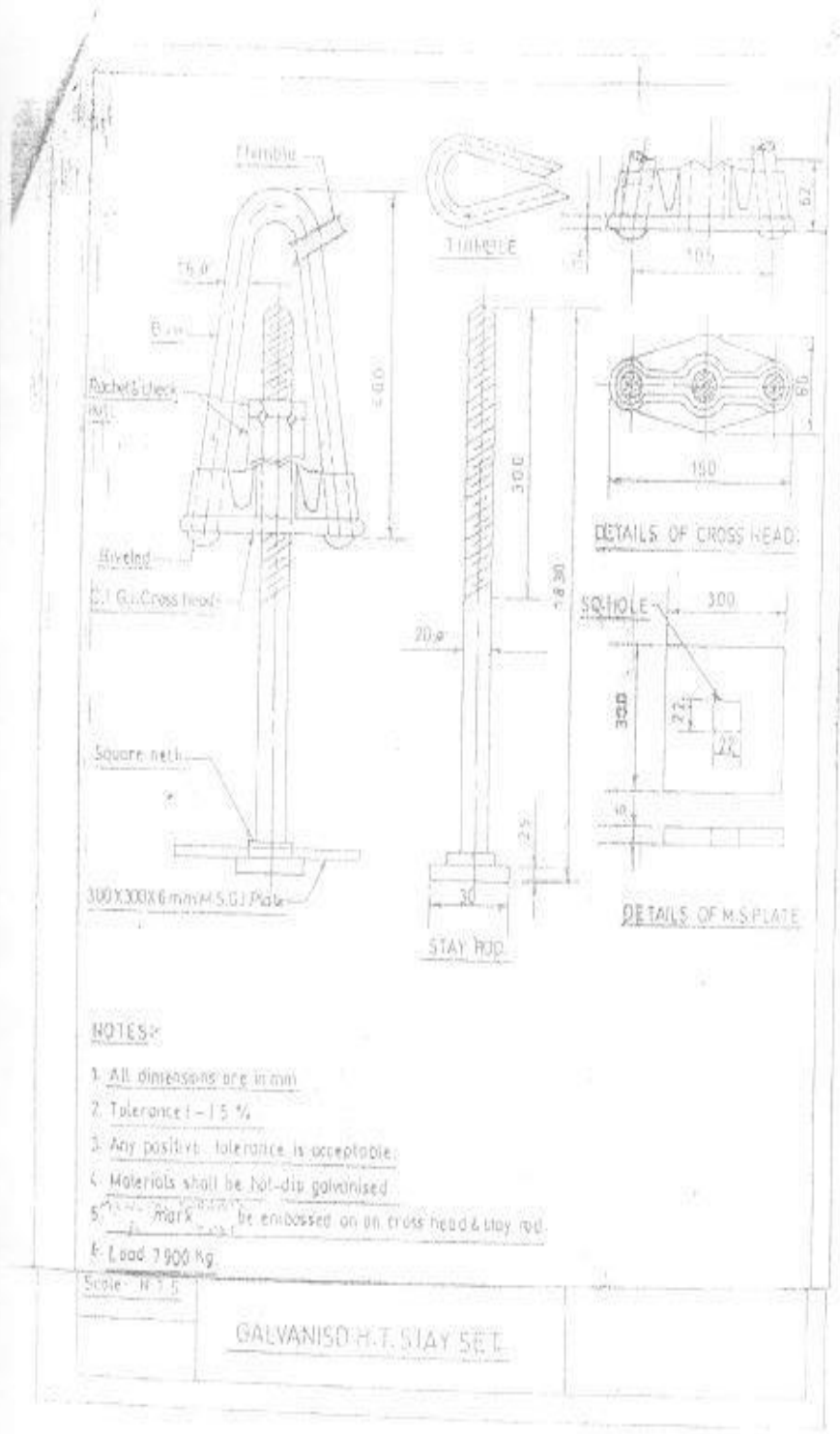
- a) Length 1830 mm or above
- b) Threaded length 300 mm or above
- c) Diameter 19mm or above
- d) Anchor plate and head Square size 30 mm \* 30 mm with thickness 25 mm having matching square size Shank for locking the Anchor Plate
- e) One ratchet lock nut, grooves must match the grooves of bow flange
- f) One check nut
- g) Materials MS
- h) Component well galvanized with extra care for threaded portion
- i) Both lock and check nuts should be matching to the Anchor Rod thread such that punching of thread after assembly at site safeguards them against removal

### 3. TRIMBLE

- a) match bow diameter and bend should be well galvanized

### 4. BOW

- a) Rod diameter 19mm or above, overall length 40cm or above flange with well formed locking groove matching the locking nut. Bow ends will be riveted securely with the flange. All items to be galvanized



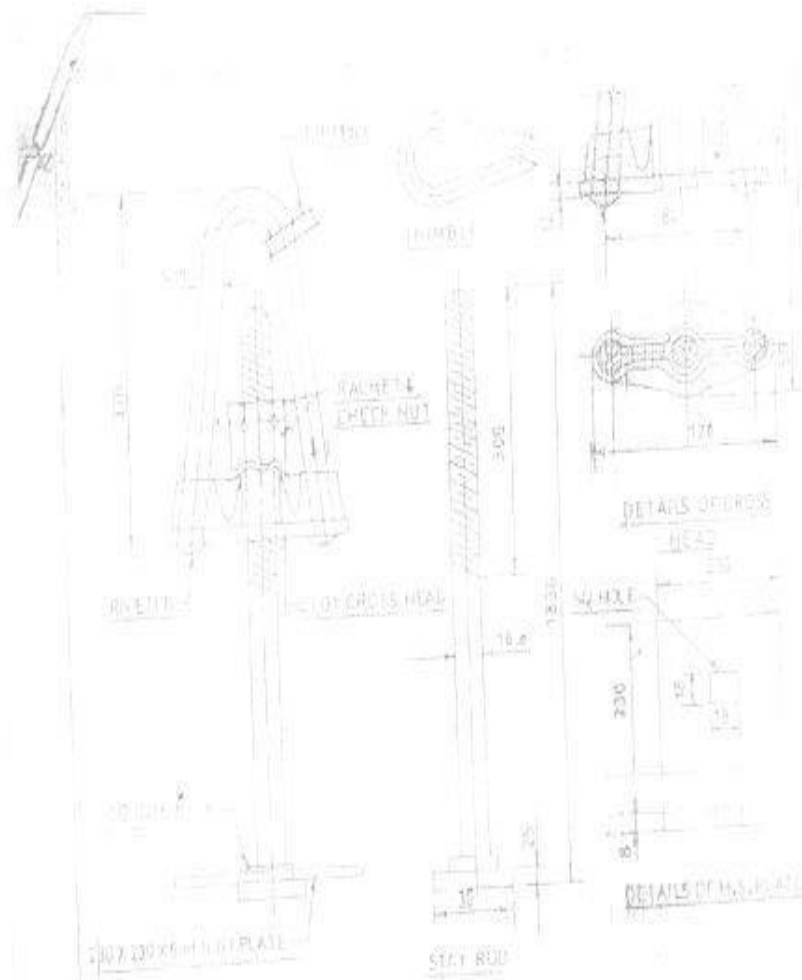
**NOTES:-**

1. All dimensions are in mm
2. Tolerance  $\pm 1.5\%$
3. Any positive tolerance is acceptable.
4. Materials shall be hot-dip galvanised.
5. "mark" be embossed on an cross head & stay rod.
6. Load 7900 Kg

Scale: 1:1

**GALVANISED H.T. STAY SET**

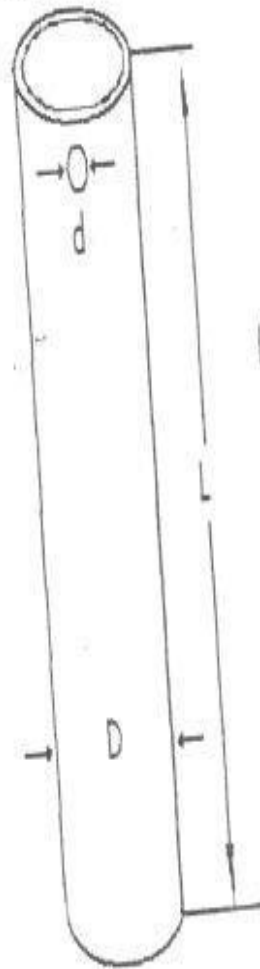




NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. TOLERANCE - 0.25.
3. ANY POSITIVE TOLERANCE IS ACCEPTABLE.
4. MARK  $\text{H3E}$  BE EMBOSSED ON CROSS HEAD & STAY ROD.
5. MATERIALS SHALL BE NOT-DIP GALV.
6. LOAD 5000 KG.

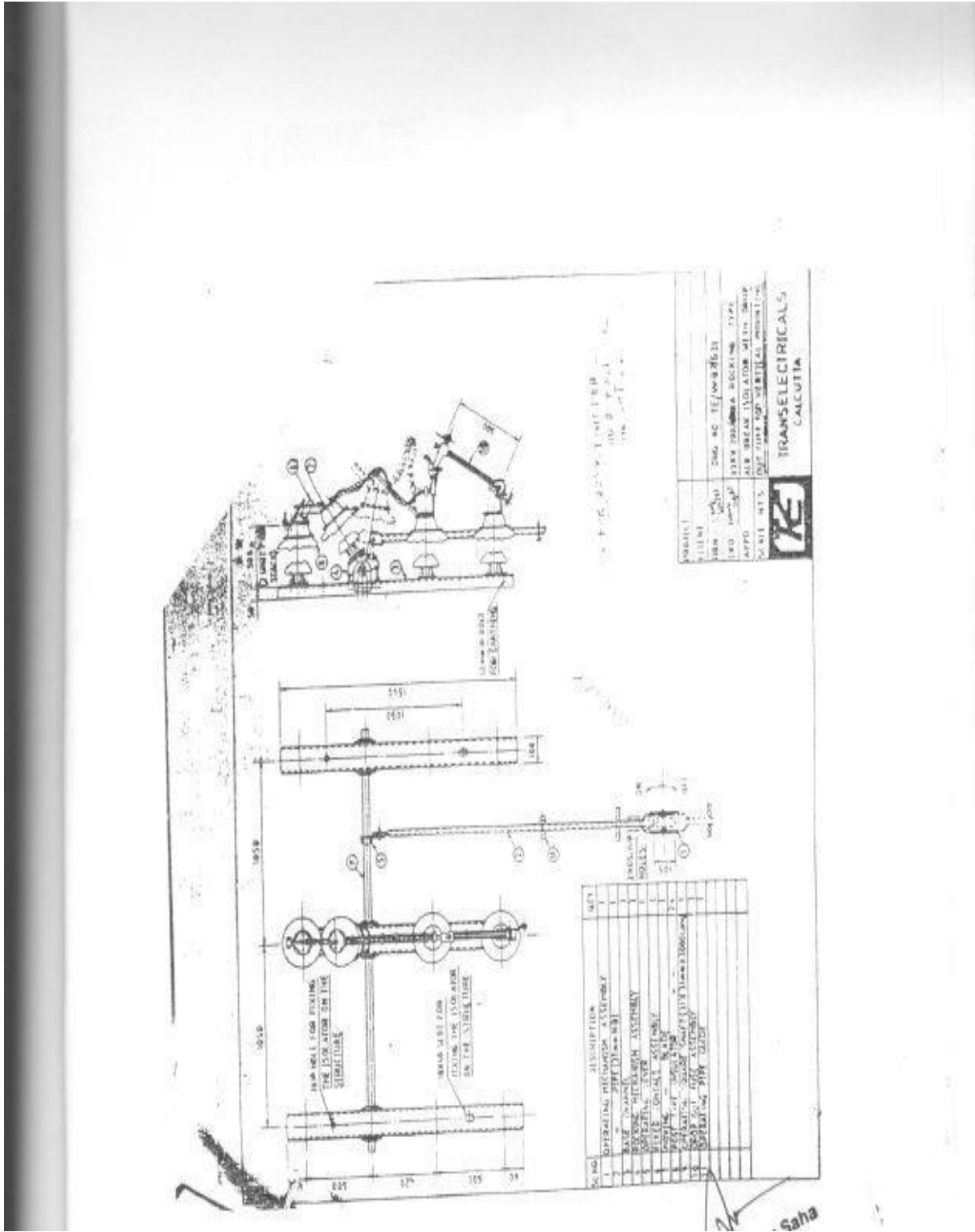
NO. 1011 WALNUT & CHECK NUT 5/8

C.I. EARTHING PIPE

$$L = 6\text{ft}$$

$$D = 2'' \text{ or } 3''$$

$$d = 5/8'' \text{ (hole)}$$

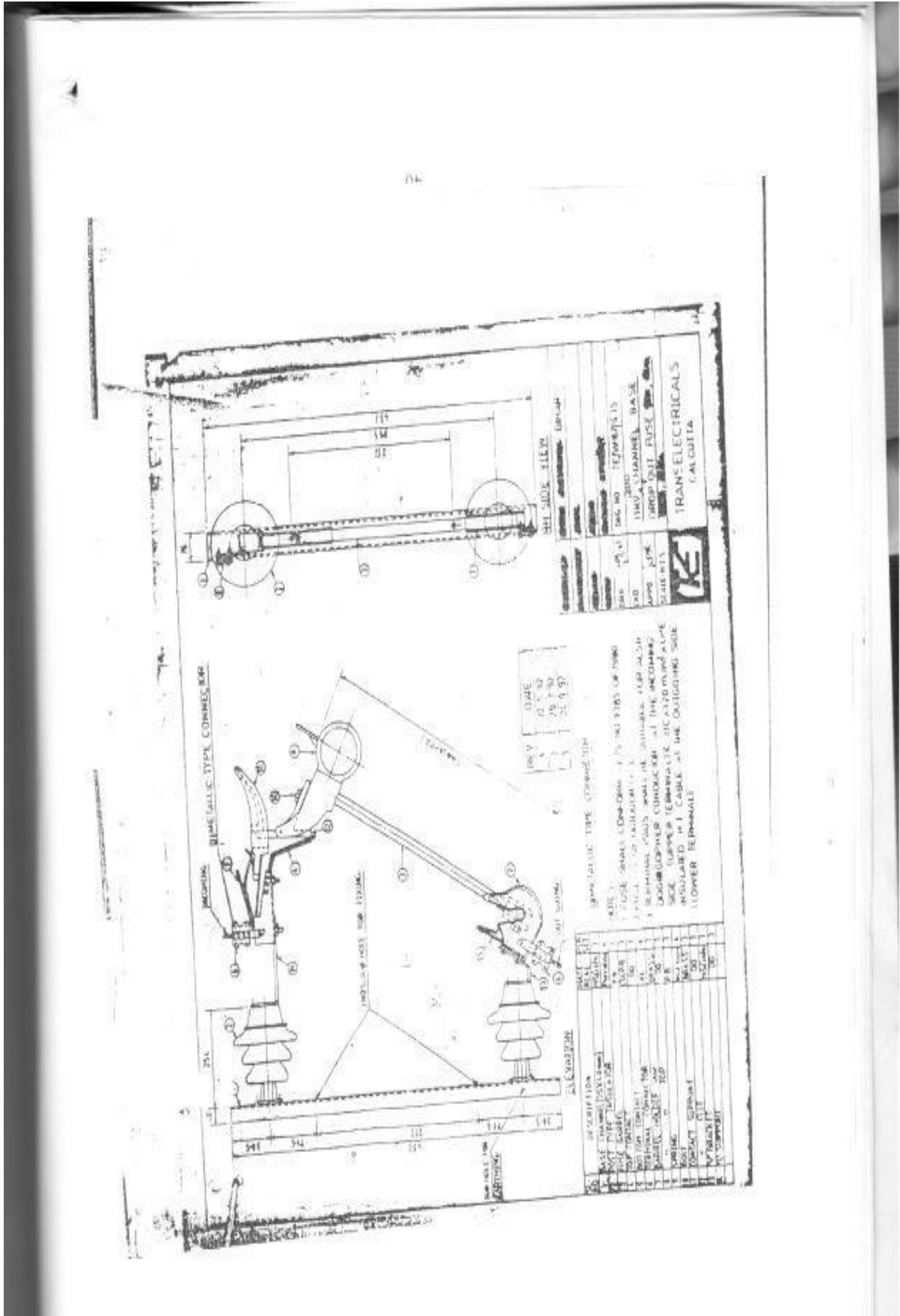


PROJECT	111101
DATE	1964
NO. OF SHEETS	2
NO. OF PARTS	1
SCALE	1:1
DESIGNED BY	S. SAHA
CHECKED BY	
APPROVED BY	
DATE	
PROJECT TITLE	DESIGN OF AIR BREAK ISOLATOR WITH OPERATING MECHANISM

TRANSELECTRICALS  
CALCUTTA

NO.	DESCRIPTION	QTY
1	OPERATING MECHANISM (STEEL)	1
2	BASE (CAST IRON)	1
3	BRASS WELDED ASSEMBLY	1
4	ISOLATOR (CERAMIC)	1
5	FIXING PIN (STEEL)	1
6	WASHER (STEEL)	1
7	NUT (STEEL)	1
8	SPACER (STEEL)	1
9	WASHER (STEEL)	1
10	NUT (STEEL)	1
11	SPACER (STEEL)	1
12	WASHER (STEEL)	1
13	NUT (STEEL)	1
14	SPACER (STEEL)	1

Saha

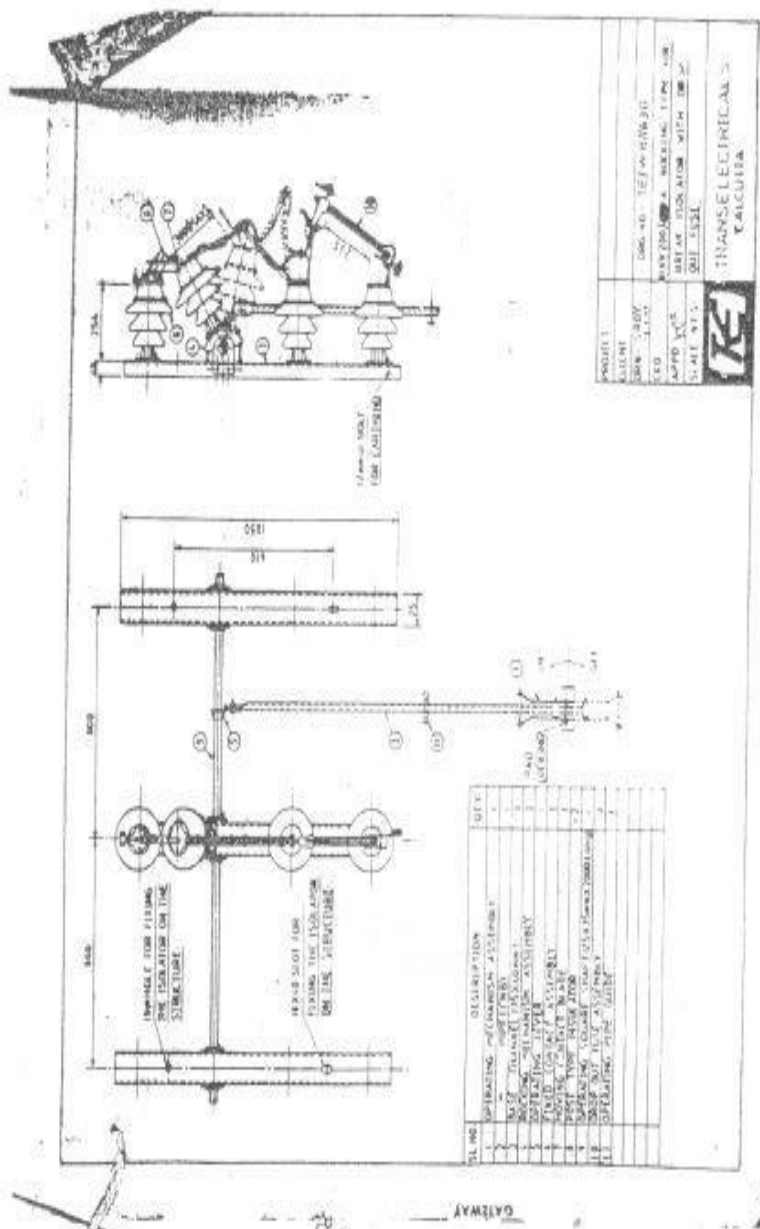


REV	DATE
1	12-13
2	7-7-50
3	5-1-51

DESCRIPTION: BIRMINGHAM TYPE CONNECTOR  
 DATE: 12-13  
 7-7-50  
 5-1-51

NO.	DESCRIPTION	QTY	UNIT
1	BASE (TRANSFORMER)	1	PC
2	INSULATION	1	PC
3	TOP TANK	1	PC
4	INSULATION	1	PC
5	INSULATION	1	PC
6	INSULATION	1	PC
7	INSULATION	1	PC
8	INSULATION	1	PC
9	INSULATION	1	PC
10	INSULATION	1	PC
11	INSULATION	1	PC
12	INSULATION	1	PC
13	INSULATION	1	PC
14	INSULATION	1	PC
15	INSULATION	1	PC
16	INSULATION	1	PC
17	INSULATION	1	PC
18	INSULATION	1	PC
19	INSULATION	1	PC
20	INSULATION	1	PC

TRANS ELECTRICALS  
 L. ALBERTA



PROJECT: TRANSELECTRICAL CALCUTTA

CLIENT: BSNL

DESIGN NO: TEF/WH/30

DESIGNER: B.S. CHAKRAVARTY

DATE: 10/11/2011

APPROVED BY: B.S. CHAKRAVARTY

SCALE: AS SHOWN

DATE: 10/11/2011

PROJECT: TRANSELECTRICAL CALCUTTA

GATEWAY

### 17. TYPE TESTS

The cutout shall be subjected to the following type tests:-

- i) Dielectric tests (rated impulse withstand and rated one minute power frequency withstand test voltages)
- ii) Temperature rise test

The above tests shall be carried out in accordance with IS:9387 Parts I & II.

#### For Porcelain Fuse Base only

iii) Pull out test for embedded components of the fuse base.

iv) Beam strength of porcelain base

### 18. MOUNTING ARRANGEMENT

18.1. The cutouts shall be provided with a suitable arrangement for mounting these on 75x40mm or 100x50mm channel cross arm in such a way that the centre line of the fuse base is at an angle of 15° to 20° from the vertical and shall provide the necessary clearances from the supports. Mounting arrangement shall be made of high strength galvanneal steel flat and shall be robust enough to sustain the various stresses encountered during all operating conditions of the cutout. For more details see enclosed figure 2.

18.2. Strength of the component marked 1 (see figure) shall be determined by clamping the member with the shorter leg at the top to a rigid support by M-10 carriage bolts. A downward force shall be applied along the axis of M-14 carriage bolt parallel to the longer leg and in the direction of longer leg of the member under test. A load of 70 Kg. shall be applied and then removed to take up any slack in the mounting arrangement before the measurement of position is taken, the permanent set measured at the axis of the M-14 carriage bolt shall not exceed 10mm when a load of 425 Kg. is applied and removed.

18.3. The strength of the M-14 bolt shall in no case be less than 19.4 Kg and the strength of M-10 bolts not less than 1500 Kg.

### 19. TERMINAL CONNECTIONS

The cutout shall be provided with two aluminium alloy (alloy designation 2280 (A-1)) as per IS: 617-1979 terminal connectors at top and bottom of fuse base assemblies to receive aluminium conductors of diameters between 6.3mm to 13.0mm. These terminals shall be easily accessible irrespective of the cutout location with respect of the pole. The terminals shall meet the test requirements of REC Construction Standard E-10.

### INSPECTION

All tests and inspection shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer and the purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charge, to satisfy him that the material is being furnished in accordance with this specification.

The purchaser has the right to have the tests carried out at his own cost by an independent agency, whenever there is dispute regarding the quality of supply.

13.1. The fuse carrier top contact shall have a solid replaceable cap made from highly conductive, anti-corrosive copper alloy and the contact portion shall be silver plated to provide a low resistance current path from the Fuse Base Top Contact to the Fuse Link. It shall make a firm contact with the button head of the fuse link and shall provide a protective enclosure to the fuse link to check spreading of any fusing interruptions.

13.2. The fuse carrier shall be provided with a cast bronze lifting eye (pull ring) suitable for operation with a hook stick from the ground level to pull-out or close-in the fuse carrier by manual operation.

#### 14. FUSE CARRIER BOTTOM ASSEMBLY

14.1. The fuse carrier bottom assembly shall be made of bronze having a silver plating at the contact points to efficiently transfer current to fuse base. It shall make smooth contact with the fuse base bottom assembly during closing operations.

14.2. The bottom assembly shall have a lifting eye for the purpose of removing or replacing the fuse carrier.

14.3. The bottom assembly shall have a suitable means which shall perform the following functions:

(i) It shall keep the fuse link in the centre of fuse tube and keep it resistant under all operating conditions.

(ii) It shall be capable of absorbing the shock when the fuse link is pushed into the closed position and shall not allow the fuse link to be damaged. This is specially important when the fuse link is of low breaking rating.

(iii) The ejector at the instant of interruption shall retain the fuse carrier in the closed position long enough to ensure that the arc is extinguished within the fuse tube thereby excluding the possibility of arcing and subsequent damage at the contact surfaces.

(iv) The ejector shall help the fuse link separation in a fault interruption allowing the fuse carrier to drop out and clearing the path of the blown fuse link through the bore of fuse tube.

#### 15. FUSE BASE (PORCELAIN)

The fuse base shall be a bird-proof, single unit porcelain insulator with a creepage distance (to earth) not less than 120 mm. The top and bottom assemblies as also the middle clamping hardware shall be either embedded in the porcelain insulator with sulphur cement or suitably clamped in position. For embedded components, the pull out strength should be such as to result in breaking of the porcelain before pull out occurs in a test. For porcelain insulators, the beam strength shall not be less than 1990Kg.

#### 16. FUSE TUBE

The fuse tube shall be made of fibre glass coated with ultraviolet inhibitor on the outer surface and having an air quenching bone fibre liner inside. The tube shall have high bursting strength to sustain high pressure of the gases during fault interruption. The inside diameter of the fuse tube shall be 17.5 mm. The solid cap of the fuse carrier shall clamp the button head of the fuse link, closing the top end of the fuse tube and allowing only the downward venting during fault interruption.

10. GENERAL REQUIREMENTS/CONSTRUCTIONAL DETAILS.

- 10.1. The cutouts shall be of single-vent type (downward) having a freely connected fuse carrier suitable for angle mounting.
- 10.2. All ferrous parts shall be hot dip galvanized in accordance with the latest version of IS: 2633. Nuts and bolts shall conform to IS: 1346. Spring washers shall be electrogalvanized.
- 10.3. Typical constructional details of the fuse carrier are shown in Fig. 13.

11. FUSE BASE TOP ASSEMBLY

- 11.1. The top current carrying parts shall be made of a high strength electric copper alloy and the contact portion shall be silver plated for oxidation resistance and efficient current flow. The contact shall have a socket cavity for latching and holding firmly the fuse carrier and the full interruption is guaranteed when the fuse carrier is inserted.
- 11.2. The top contact shall be actuated by a strong steel spring which keeps it under sufficient pressure to maintain a firm contact with the fuse carrier during all operating conditions. The spring shall also provide flexibility and absorb most of the stresses when the fuse carrier is pushed into the closing position.
- 11.3. The current carrying parts of the assembly shall be protected from water and dust formation by a dust cover (refer clause 19).
- 11.4. The top contact assembly shall have a robust guide and steel guide to align and guide the carrier into the socket latch mechanism. When the fuse carrier is closed at an off-circuit angle.
- 11.5. The top assembly shall have an aluminium alloy terminal connector (refer clause 19).
- 11.6. The top assembly shall be robust enough to absorb most of the forces during the fuse carrier closing and opening operation and shall not impart stress on the other contacts. It shall also provide a suitable support for the fuse carrier in its open position (refer clause 19).

12. FUSE BASE BOTTOM ASSEMBLY

- 12.1. The conducting parts shall be made of high strength highly conductive copper alloy and the contact portion shall be silver plated for oxidation resistance and shall provide a low resistance current path from the bottom fuse carrier contact to the bottom terminal connector.
- 12.2. The bottom assembly shall have hinge contacts made from high strength anti-oxidative copper alloy and shall accommodate the fuse carrier in contact with the fuse carrier bottom assembly. The fuse carrier shall be placed easily in or lifted from the hinges without any manipulation. In addition, the bottom assembly shall perform the following functions:
- When opened manually or after fault interruption the fuse carrier shall swing through 180° to the vertical and its further travel shall be prevented by the fuse base bottom assembly.
  - The fuse carrier shall be prevented from slipping out of the self locking hinges during all operating conditions and only when the fuse carrier has reached its fully open position can it be removed from the hinge support.

12.3. The assembly shall have an aluminium alloy terminal connector (refer clause 19).

13. FUSE CARRIER TOP ASSEMBLY



## SECTION - II

## TECHNICAL SPECIFICATION FOR 33 KV DROP - OUT FUSE CUTOUTS

## 1. SCOPE:

- 1.1: This specification covers design, type, drop out type fuse cutouts suitable for installation in 33 KV distribution systems.

## 2. APPLICATION:

- 2.1: The distribution fuse cutouts are intended for use on distribution transformers and have no inherent load break capability.

## 3. STANDARD:

- 3.1: Unless otherwise modified in this specification, the design shall conform to IS: 9385 (Part I to III) as amended from time to time.

## 4. RATED VOLTAGE:

- 4.1: The rated voltage shall be 33 KV.

## 5. RATED CURRENT:

- 5.1: The rated current shall be 200 A.

## 6. RATED LIGHTNING IMPULSE WITHSTAND VOLTAGE VALUES FOR THE FUSE BASE

- 6.1: The rated lightning impulse withstand voltage for both positive and negative polarities shall not be less than:

- |    |   |               |
|----|---|---------------|
| a) | To earth and between poles                  | 175 KV (Peak) |
| b) | Across the isolating distance of cross bars | 150 KV (Peak) |

## 7. RATED ONE MINUTE POWER FREQUENCY WITHSTAND VOLTAGE (DRY &amp; WET) VALUES FOR THE FUSE BASE

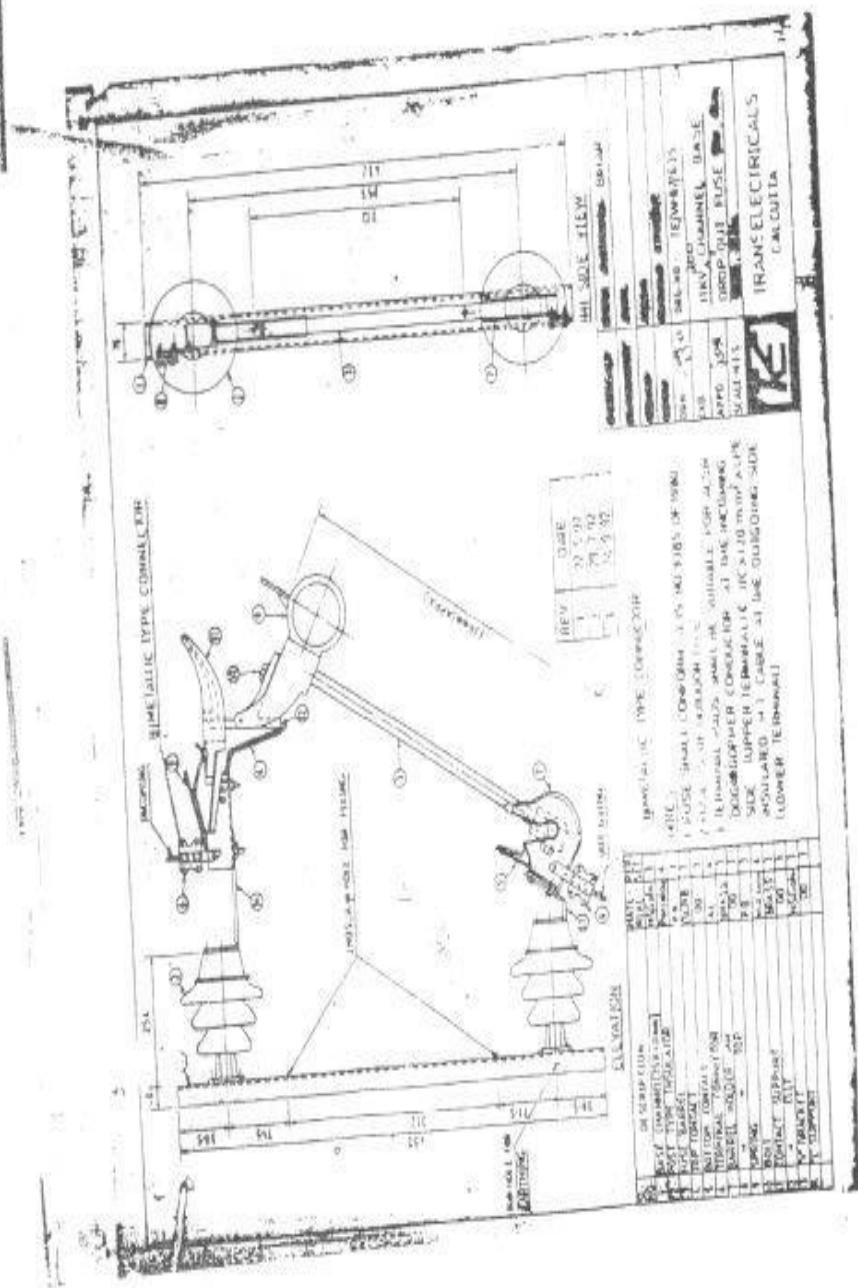
- |    |                               |                  |
|----|-------------------------------|------------------|
| a) | To earth and between poles    | 70 KV (50/60 Hz) |
| b) | Across the isolating distance | 55 KV (50/60 Hz) |

## 8. TEMPERATURE RISE LIMIT (In Air)

- |    |                               |   |
|----|-------------------------------|---|
| a) | Copper contacts silver faced  | 65°C  |
| b) | Terminals                     | 50°C  |
| c) | Metal parts acting as springs | Temp. (Temp. 55°C) not reach softening value that elasticity of the metal is changed. |

## 9. RATED BREAKING CAPACITY

- 9.1: The rated breaking capacity shall be 7 KA (Asymmetrical).



REV	Date
1	22.5.33
2	21.7.32
3	12.5.32

1926/10/12/16 (TYPE CONNECTOR)

NOTE: 1. SHALL COMPLY WITH THE RULES OF 1926.  
 2. FUSE SHALL BE AS SPECIFIED.  
 3. TERMINAL SHALL BE SUITABLE FOR 4.5mm dia. copper wire.  
 4. 1926/10/12/16 SHALL BE USED FOR ALL THE LOWER TERMINALS.  
 5. 1926/10/12/16 SHALL BE USED FOR ALL THE LOWER TERMINALS.  
 6. 1926/10/12/16 SHALL BE USED FOR ALL THE LOWER TERMINALS.

NO.	DESCRIPTION	QTY
1	CONNECTOR	1
2	TERMINAL	2
3	WIRE	1
4	SCREW	2
5	WASHER	2
6	NUT	2
7	BRACKET	1
8	WIRE	1

TRANSELECTRICALS  
CALCUTTA

1926/10/12/16 (TYPE CONNECTOR)

NOTE: 1. SHALL COMPLY WITH THE RULES OF 1926.  
 2. FUSE SHALL BE AS SPECIFIED.  
 3. TERMINAL SHALL BE SUITABLE FOR 4.5mm dia. copper wire.  
 4. 1926/10/12/16 SHALL BE USED FOR ALL THE LOWER TERMINALS.  
 5. 1926/10/12/16 SHALL BE USED FOR ALL THE LOWER TERMINALS.  
 6. 1926/10/12/16 SHALL BE USED FOR ALL THE LOWER TERMINALS.

### 17. TYPE TESTS

The cutout shall be subjected to the following type tests:-

i) Dielectric tests (rated impulse withstand and rated one minute power frequency withstand test voltages).

ii) Temperature rise test.

The above tests shall be carried out in accordance with IS: 993 Part I & II.

#### For Porcelain Fuse Base only

iii) Pull out test for embedded component of the fuse base.

iv) Beam strength of porcelain base.

### 18. MOUNTING ARRANGEMENT

18.1. The cutouts shall be provided with a suitable arrangement for mounting these on 75x50mm or 100x50mm (nominal cross-section) iron or steel. The centre line of the fuse base shall be at an angle of 15° to 20° from the vertical and shall provide the necessary clearance from any support. Mounting arrangement shall be made of high strength galvanized steel flat and shall be robust enough to sustain the various stresses encountered during all operating conditions of the cutout. For more details see enclosed figure 2.

18.2. Strength of the component raised (see figure) shall be determined by clamping the member with the shorter leg at the top to a rigid support by M-10 carriage bolts. A downward force shall be applied along the axis of M-14 carriage bolt parallel to the longer leg and in the direction of longer leg of the member under test. A load of 30 Kg. shall be applied and then removed to take up any slack in the mounting arrangement before the measurement of deflection is taken. The measurement of deflection at the axis of the M-14 carriage bolt shall not be less than that under a load of 425 Kg. is applied and removed.

18.3. The strength of the M-14 bolt shall not be less than 240 Kg. and the strength of M-10 bolts not less than 1500 Kg.

### 19. TERMINAL CONNECTIONS

The cutout shall be provided with two aluminium alloy (alloy designation 2280 (A-11) as per IS: 617-1974) terminal connectors at top and bottom of fuse base assemblies to receive aluminium conductors of diameters between 6.3mm to 10.05 mm. These terminals shall be easily accessible irrespective of the cutout location with respect to the pole. The terminals shall meet the test requirements of R.E.C. Construction Standard C-10.

### 20. INSPECTION

All tests and inspection shall be made at the place of manufacture unless otherwise especially agreed upon by the manufacturer and the purchaser at the time of purchase. The manufacturer shall afford the inspector representing the purchaser all reasonable facilities without charge, to satisfy him that the material is being furnished in accordance with this specification.

The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is dispute regarding the quality of supply.



## 10. GENERAL REQUIREMENTS/CONSTRUCTIONAL DETAILS.

- 10.1. The cutouts shall bear a single vent type (downward) having a front cornered fuse carrier suitable for angle mounting.
- 10.2. All ferrous parts shall be hot dip galvanised in accordance with the latest version of IS: 2633. Nuts and bolts shall conform to IS: 1166. Spring washers shall be electrogalvanised.
- 10.3. Typical constructional details of the fuse cutout are shown in Fig. 10.

## 11. FUSE BASE TOP ASSEMBLY

- 11.1. The top current carrying parts shall be made of a highly conductive copper alloy and the contact portion shall be silver plated for corrosion resistance and efficient current flow. The contact shall have a socket cavity for latching and holding firmly the fuse carrier until the fault interruption is completed within the fuse.
- 11.2. The top contact shall be actuated by a strong steel spring which keeps it under sufficient pressure to maintain a firm contact with the fuse carrier during all operating conditions. The spring shall also provide flexibility and absorb most of the stresses when the fuse carrier is pushed into the closing position.
- 11.3. The current carrying parts of the assembly shall be protected from water and dust formation by a stainless steel top cover.
- 11.4. The top contact assembly shall have a robust galvanised steel guide to align and guide the fuse carrier into the socket safely even when the fuse carrier is tilted at an off-center angle.
- 11.5. The top assembly shall have an aluminium alloy terminal connector (refer clause 19).
- 11.6. The top assembly shall be robust enough to absorb most of the forces during the fuse carrier closing and opening operation and shall not stress the prime contacts. It shall not prohibit or retard the sliding of the fuse carrier due to frictional impact.

## 12. FUSE BASE BOTTOM ASSEMBLY

- 12.1. The conducting parts shall be made of high strength highly conductive copper alloy and the contact portion shall be silver plated for corrosion resistance and shall provide a low resistance current path from the bottom fuse carrier into contact to the bottom terminal connector.
- 12.2. The bottom assembly shall have hinge contacts made from highly conductive anti-corrosive copper alloy and shall accommodate and maintain firm contact with the fuse carrier bottom assembly. The fuse carrier shall be placed easily, or lifted from the hinges without any maneuvering. In addition, the bottom assembly shall perform the following functions:
- When opened manually or after fault interruption the fuse carrier shall swing through 180° to the vertical and its further travel shall be prevented by the fuse base bottom assembly.
  - The fuse carrier shall be prevented from slipping out of the self locking hinges during all operating conditions and only when the fuse carrier has reached its fully open position can it be removed from the hinge support.

The assembly shall have an aluminium alloy terminal connector (refer clause 19).

## 13. FUSE CARRIER TOP ASSEMBLY

Λ

13.1. The fuse carrier top contact shall have a solid replaceable cap made from highly conductive, anticorrosive copper alloy and the contact portion shall be silver plated to provide a low resistance current path from the Fuse Base Top Contact to the Fuse Link. It shall make a firm contact with the button head of the fuse link and shall provide a protective enclosure to the fuse link to check spreading of arc during fault interruptions.

13.2. The fuse carrier shall be provided with a cast bronze opening eye (pull ring) suitable for operation with a link clip from the ground level to pull-out or close of the fuse carrier by manual operation.

#### 14. FUSE CARRIER BOTTOM ASSEMBLY

14.1. The fuse carrier bottom assembly shall be made of bronze castings with silver plating at the contact points to efficiently transfer current to fuse base. It shall make smooth contact with the fuse base bottom assembly during closing operation.

14.2. The bottom assembly shall have a lifting eye for the ease of pulling out or replacing the fuse carrier.

14.3. The bottom assembly shall have a suitable ejector which shall perform the following functions:

(i) It shall keep the fuse link in the centre of fuse tube and keep it centered under all operating conditions.

(ii) It shall be capable of absorbing the shock when the fuse carrier is pushed into the closed position and shall not allow the fuse link to be damaged. This is especially important when the fuse link is of low ampere rating.

(iii) The ejector at the instant of interruption shall retain the fuse carrier in the closed position long enough to ensure that the arc is extinguished within the fuse tube thereby excluding the possibility of arcing and subsequent damage at the contact surfaces.

(iv) The ejector shall help the fuse link separation after fault interruption, allowing the fuse carrier to drop out and clearing the circuit by the blown fuse link through the bore of fuse tube.

#### 15. FUSE BASE (PORCELAIN)

The fuse base shall be a bird proof, single unit porcelain insulator with a creepage distance (to earth) not less than 320 mm. The top and bottom assemblies as also the middle clamping hardware shall be either embedded in the porcelain insulator with sulphur cement or suitably clamped in position. For embedded components, the pull out strength should be such as to result in breaking of the porcelain before pull out occurs in a test. For porcelain insulators, the beam strength shall not be less than 1000Kg.

#### FUSE TUBE

The fuse tube shall be made of fibre glass coated with ultraviolet inhibitor on the outer surface and having arc quenching bone fibre liner inside. The tube shall have high bursting strength to sustain high pressure of the gases during fault interruption. The inside diameter of the fuse tube shall be 17.5 mm. The solid top of the fuse carrier shall clamp the button head of the fuse link, closing the top end of the fuse tube and allowing only the downward venting during fault interruption.

## TECHNICAL SPECIFICATION FOR 11 KV DROP-OUT FUSE CUTOUTS

### 1. SCOPE:

- 1.1. This specification covers outdoor, open top air insulation type fuse cutouts suitable for installation in AC (50 Hz) 11 KV distribution systems.

### 2. APPLICATION:

- 2.1. The distribution fuse cutouts are intended for use in distribution transformers and have no inherent load break capacity.

### 3. STANDARDS:

Unless otherwise modified in this specification, the product shall conform to IS: 4185 (Part I) to III as amended from time to time.

### 4. RATED VOLTAGE:

The rated voltage shall be 12 KV.

### 5. RATED CURRENT:

The rated current shall be 100 A.

### 6. RATED LIGHTNING IMPULSE WITHSTAND VOLTAGE VALUES FOR THE FUSE BASE

The rated lightning impulse withstand voltages for the positive and negative polarities shall be as given below:

- |   |              |
|---|--------------|
| a) To earth and between poles                 | 15 KV (Peak) |
| b) Across the isolating distance of fuse base | 31 KV (peak) |

### 7. RATED ONE MINUTE POWER FREQUENCY WITHSTAND VOLTAGE (DRY & WET) VALUES FOR THE FUSE BASE

- |                               |             |
|-------------------------------|-------------|
| a) To earth and between poles | 28 KV (rms) |
| Across the isolating distance | 12 KV (rms) |

### 8. TEMPERATURE RISE LIMIT (In Air)

- |                               |   |
|-------------------------------|---|
| Copper contacts silver faced  | 65° C   |
| Terminals                     | 50° C   |
| Metal parts acting as springs | The temp. shall not reach such a value that elasticity of the metal is changed. |

### 9. RATED BREAKING CAPACITY

The rated breaking capacity shall be 8 KA (Asymmetrical).

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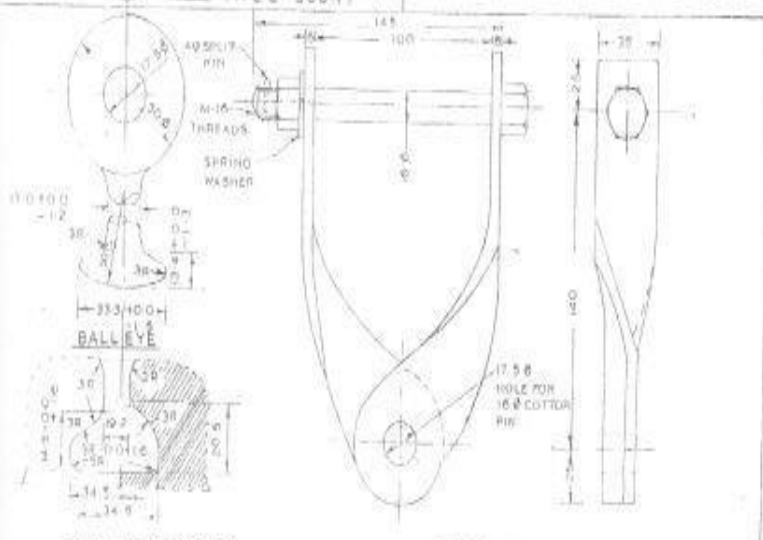
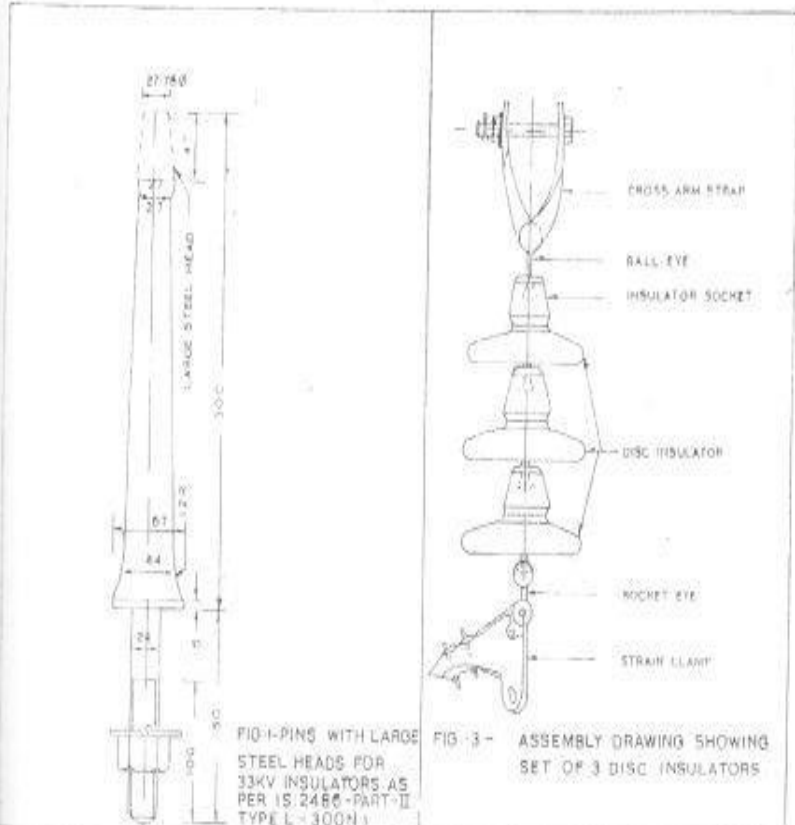
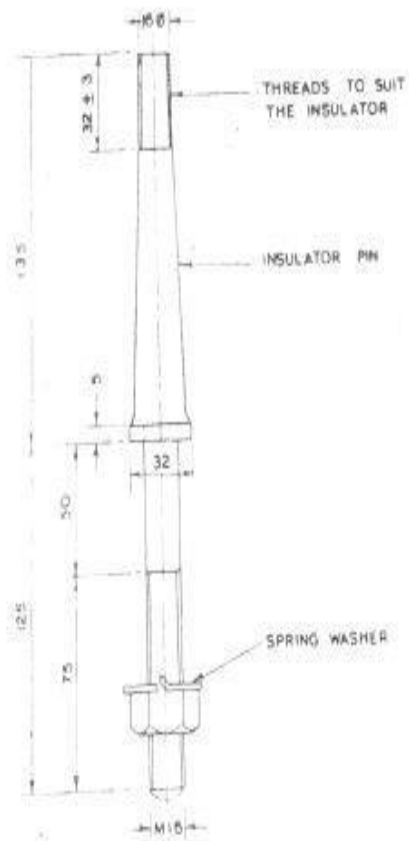


FIG-2- FITTINGS FOR BALL AND SOCKET TYPE 33KV INSULATOR STRING AS PER IS 2486-PART II

ALL DIMENSIONS ARE IN mm

REC  
CONSTRUCTION STANDARD  
D-2



## NOTE

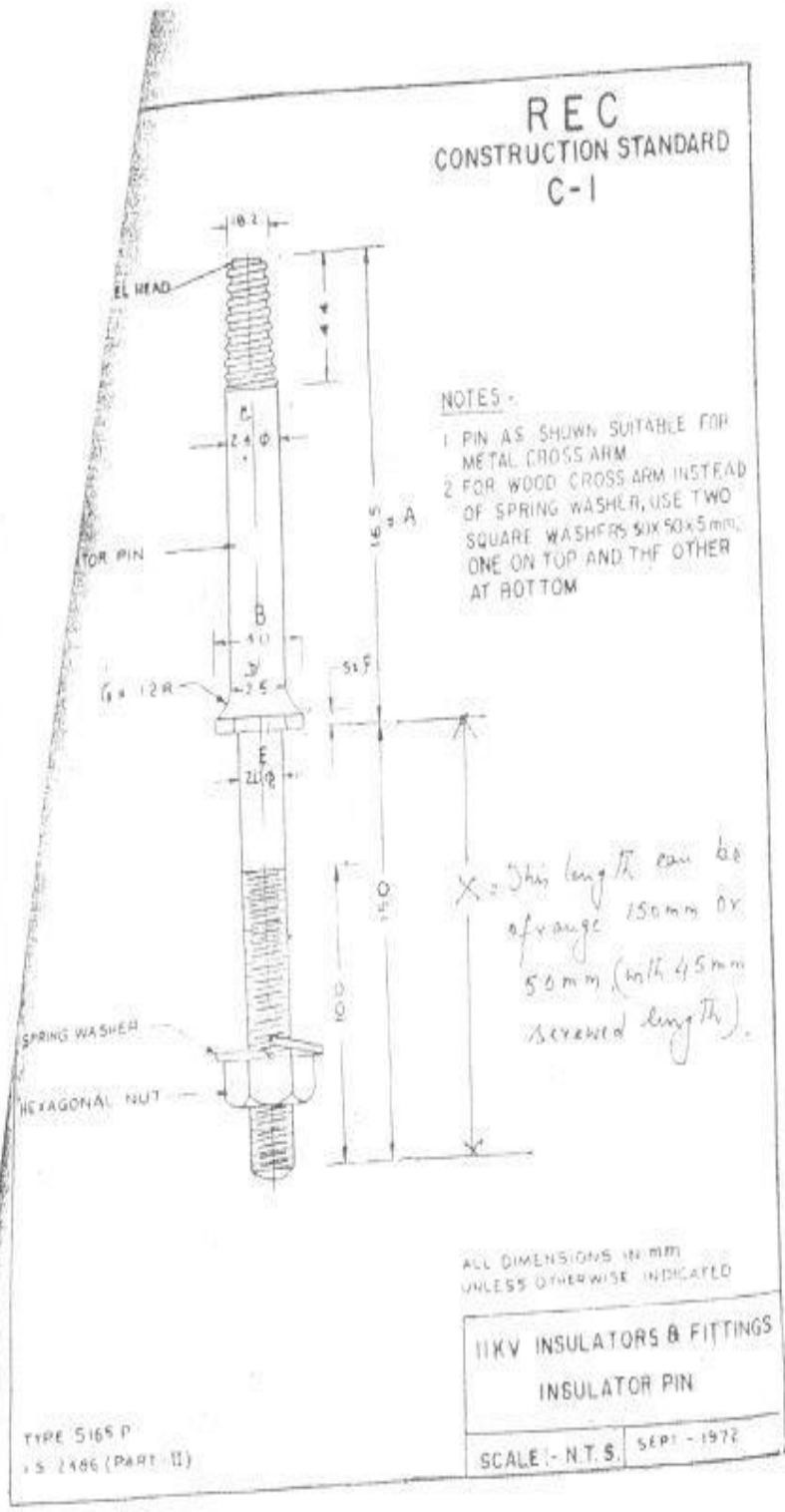
AS PER IS: 7935-1975

ALL DIMENSIONS IN mm

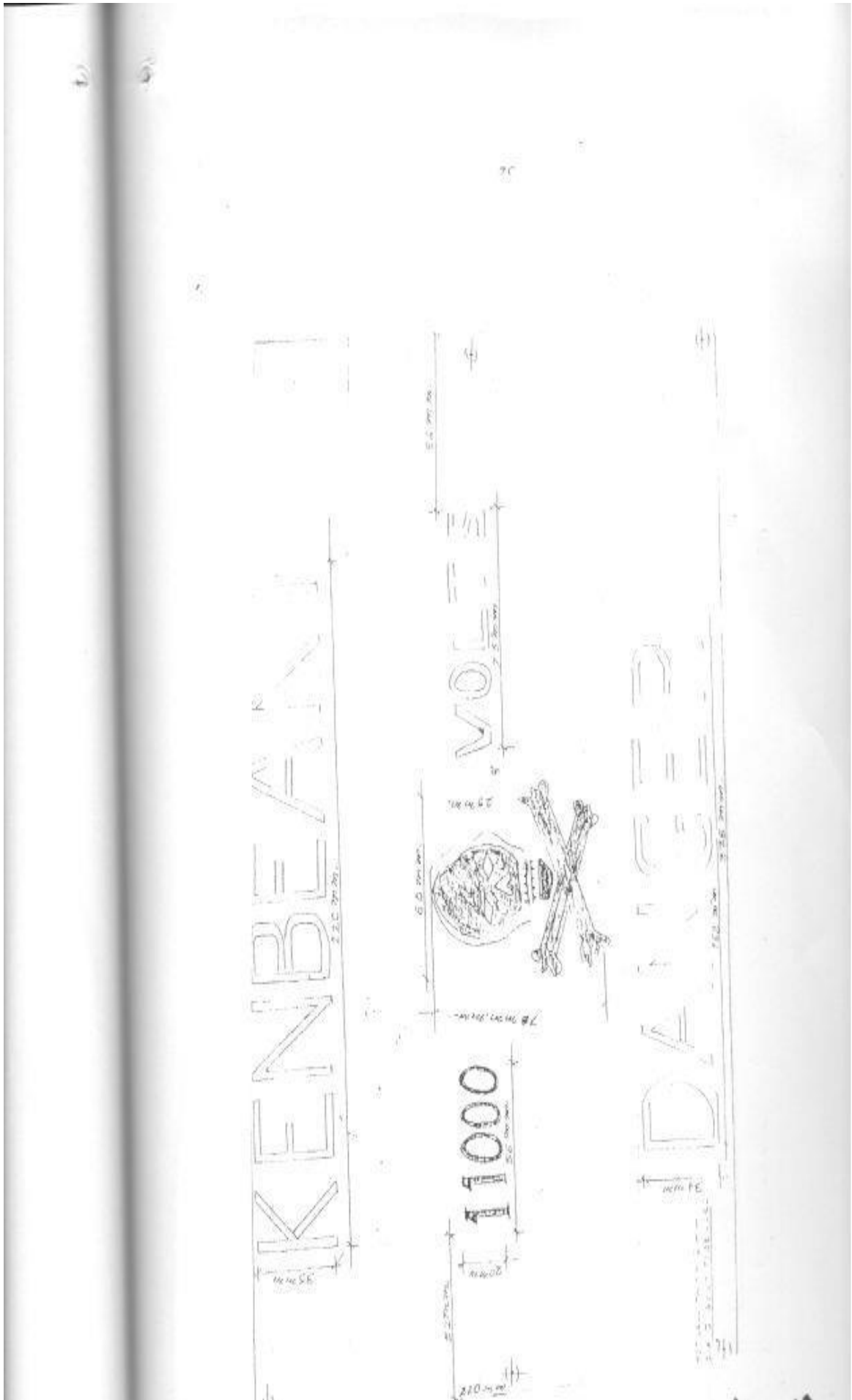
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विद्युत्सरोधी पिन  
415/240V INSULATORS & FITTINGS  
FORGED INSULATOR PIN

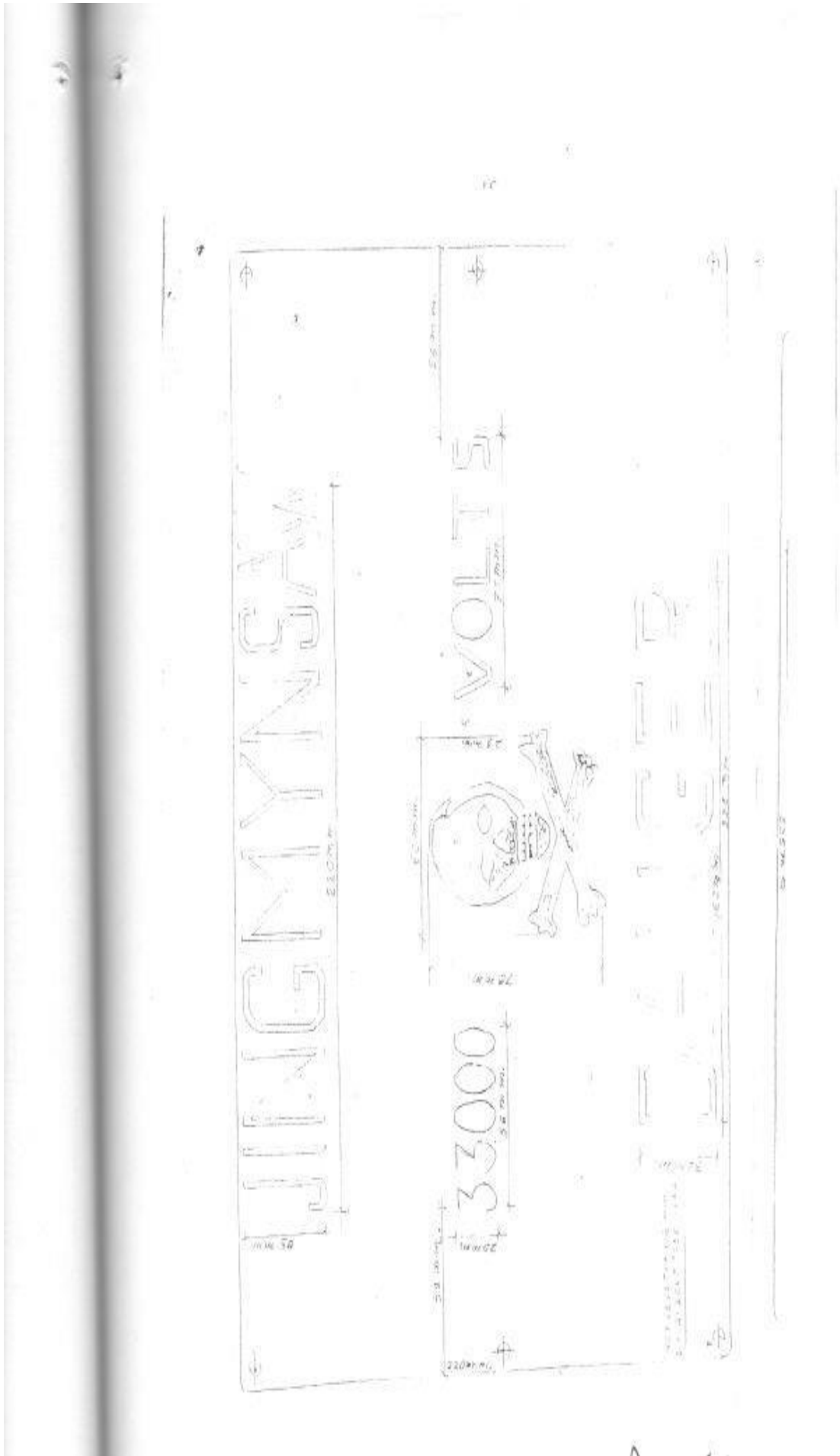
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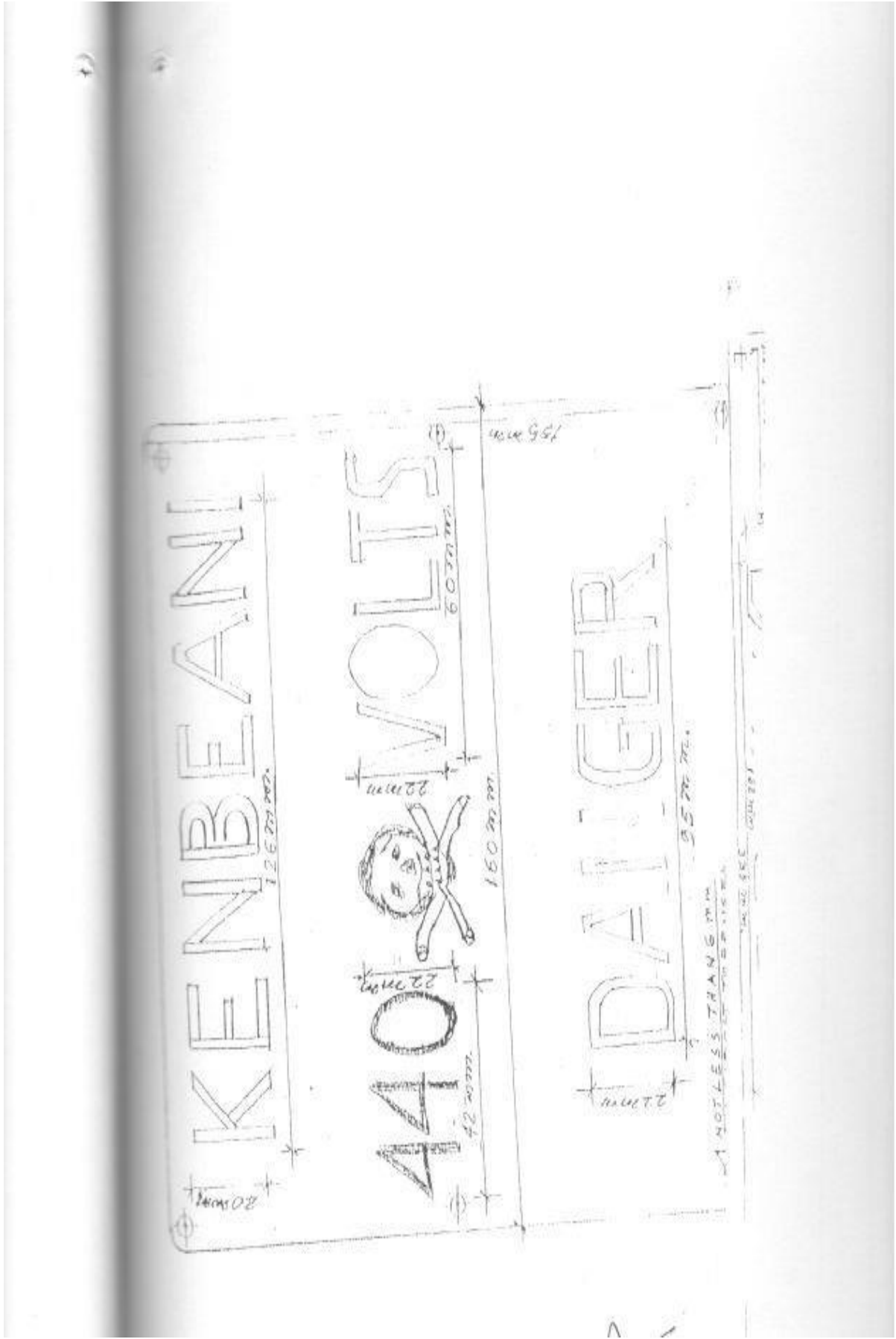


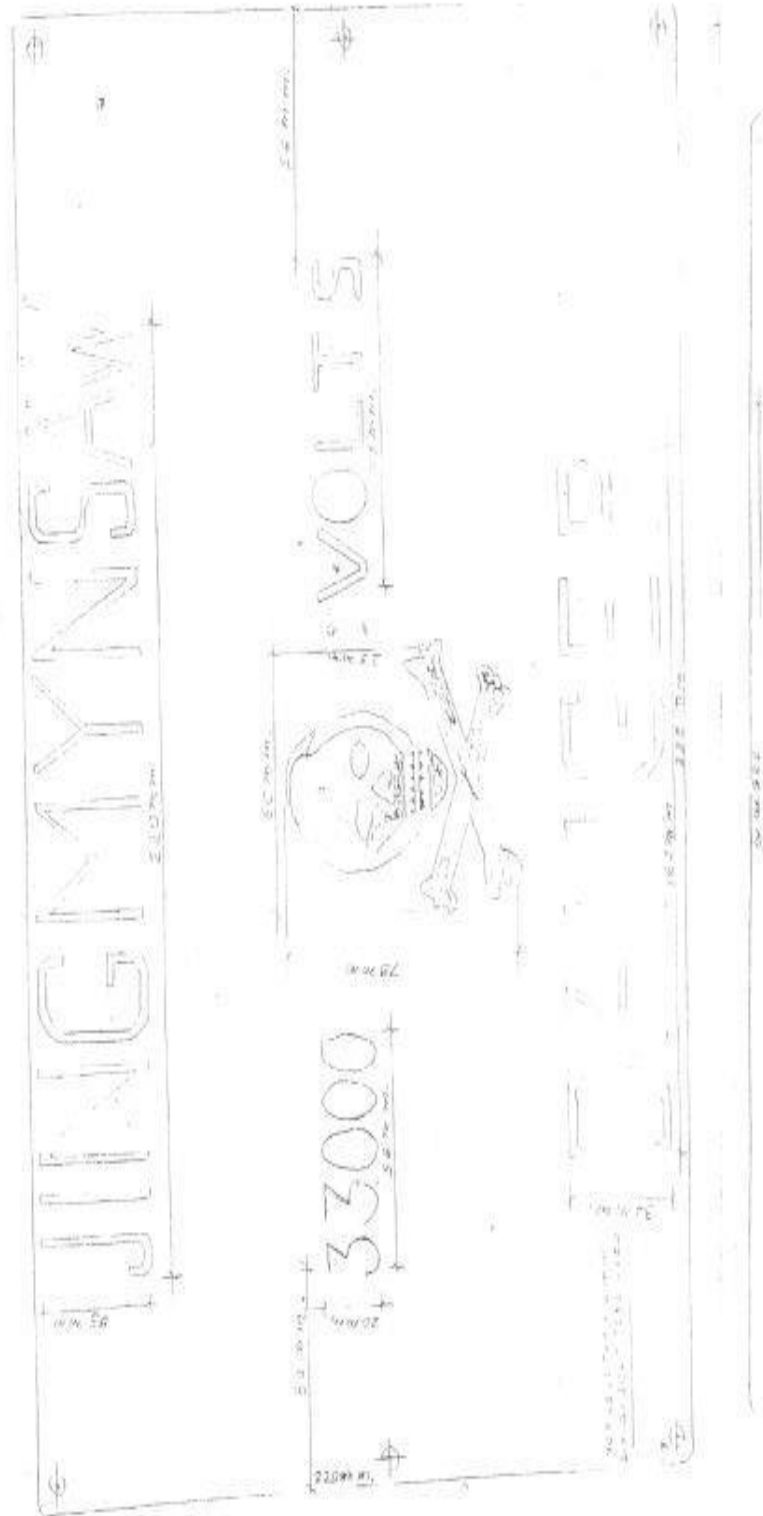


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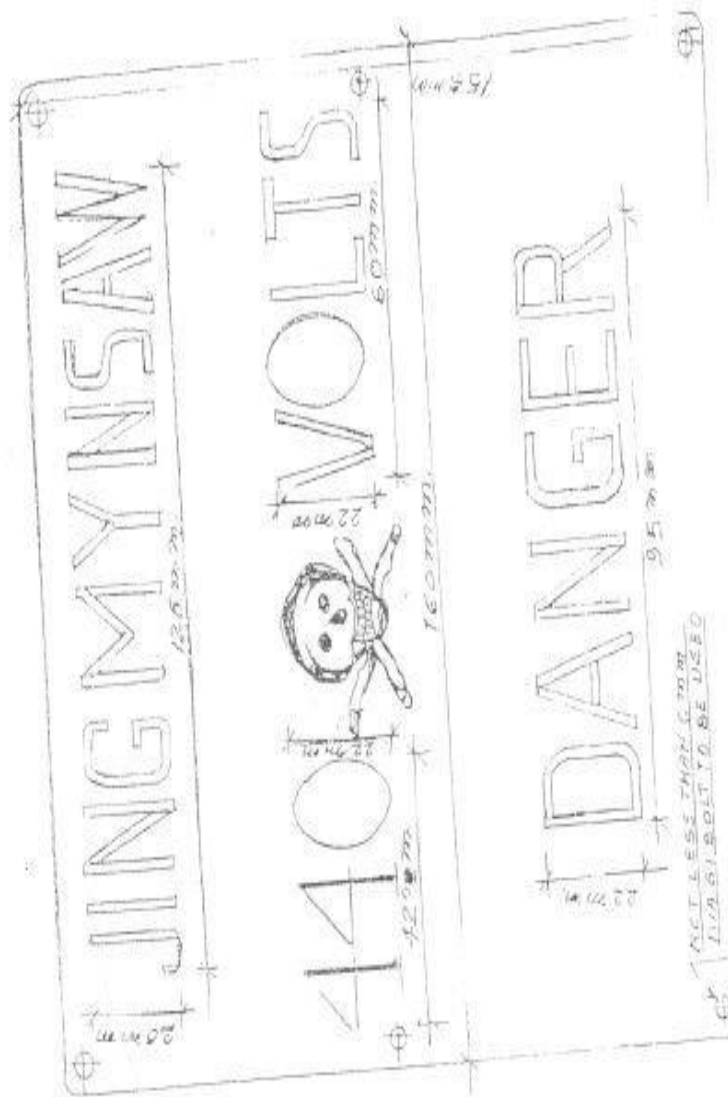


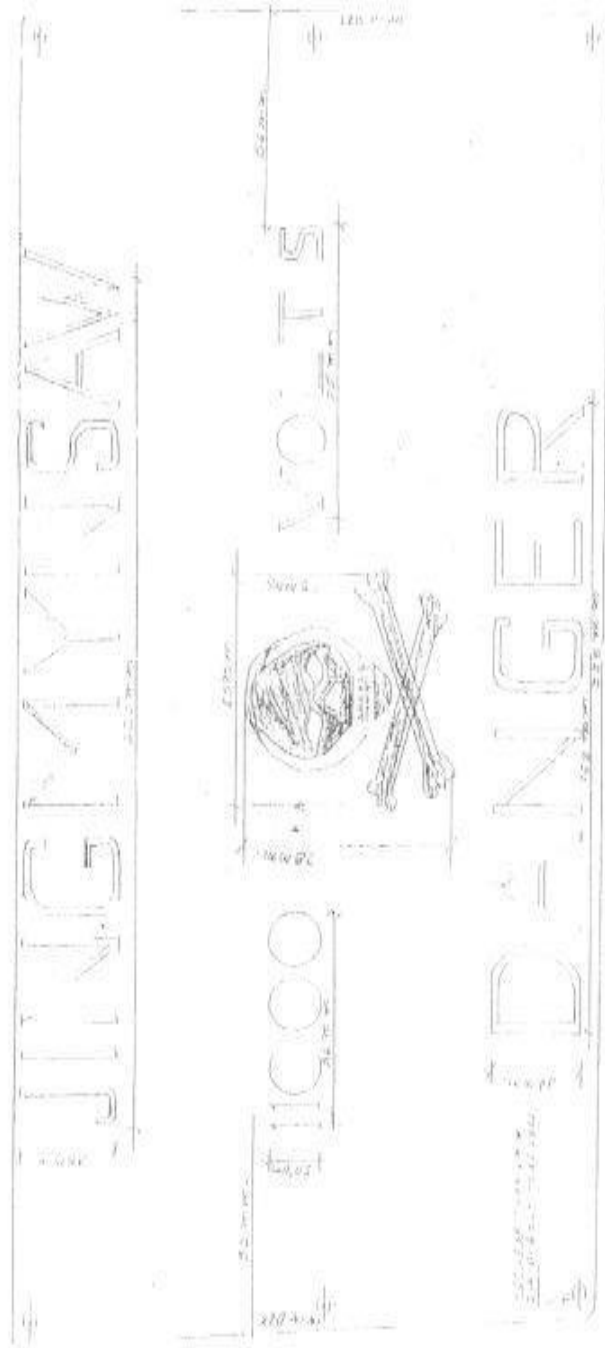






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C. A. M. B.  
 1914

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**SPECIFICATION FOR THE DESIGN, MANUFACTURE AND SUPPLY  
OF DANGER PLATE**

1. **SCOPE:** This specification covers the design, fabrication and supply of Danger plates to be displayed on 3300V, 1100V and 440V sub-station, sub-transmission line at the Khosi & Jaintia Hills and Garo Hills District of Meghalaya.

2. **CLIMATIC CONDITION:**

The climatic conditions at the site where the Danger plates are to be installed are as follows:

Average Annual rainfall : 2280mm (May to Sept)

Average number of rainfall days : 5 months (May to Sept)

Maximum dry bulb temperature : 40°C

Minimum dry bulb temperature : 2°C

Isoceraunic level : 60

Relative humidity : 71% to 93%

Maximum wind pressure : 150Kg/M<sup>2</sup>

3. **STANDARDS:**

The Danger plates shall comply all respect with the requirements of the latest of (Indian Standard) IS No: 2551 except wherein specified otherwise in these specifications. Where the Danger Plates conform to any other standard, the salient point of difference between the standard adopted and the Indian Standard shall be clearly brought out in the tender.

**GENERAL FEATURES OF THE DANGER NOTICE PLATES:**

- i. The plate shall be made from mild steel at least 1.0mm thick and vitreous enamelled shall and bronze in signal red colour on the front side. The rear side of the plate shall also be enamelled.
- ii. The covers of the Danger plates should be rounded off.
- iii. Size of the Danger Notice plates shall be as follows:

Sl. No.	Voltage at the installation	Size
1.	3300V and 11000V	335 x 220mm.
2.	440 Volts	160 x 150mm.

iv. Drawing of danger notice plates for 3300V, 11000V and 440V installation are enclosed.

a. Drawings of danger notice plates for installation at the Khosi & Jaintia Hills District are given in Figure-1, Fig-5 & Fig-6.

**ADDITIONAL ITEMS:**

All additional items required for fixing the Danger plate which may not be specially mentioned in the specification but which are usual or necessary for installation the plate shall be deemed as included in the contract and shall be supplied by the supplier without extra charges.

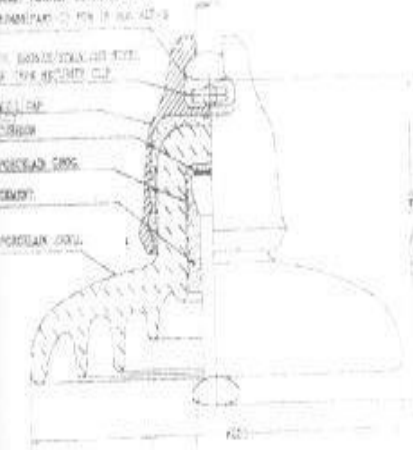
**DEVIATION FROM SPECIFICATIONS:**

All deviation from specification shall be separately listed as per proforma given in Annexure-II in the absence of which it shall be presumed that the provision of the specification are complied by the tenderer.



INDEX PARTS COMPARED TO  
SUMMARY OF FIG. 10 AND 11

1. BARK/CORK/CLAY MIX.  
2. 1/4" REINFORC. CUP



REINFORC.  
CUP  
PORCELAIN SHEET  
CONCRETE  
PORCELAIN CORE

INDEX PARTS ALL FOR GOVERNMENT  
TO I.E.S. PART-12 FIG. 10 AND 11

### TECHNICAL PARTICULARS

DESCRIPTION	L.S. FIG.
10 kV. DISC TYPE INSULATOR	10 kV. DISC
20 kV. DISC TYPE INSULATOR	20 kV. DISC
CERTIFICATE MADE -	

J S I  
BORA  
TOLA  
MADE IN INDIA

NO.	REV.	BY	CHKD.	DATE	REVISION	TOTAL	DRAWN BY	DATE

**BIRLA NGK INSULATORS PRIVATE LTD.**  
FORMERLY NARAYANA INSULATORS  
INDIA

**20 kV DISC INSULATOR**

EXTRA MONITOR

ALL DIMENSIONS IN mm

SCALE 1:1

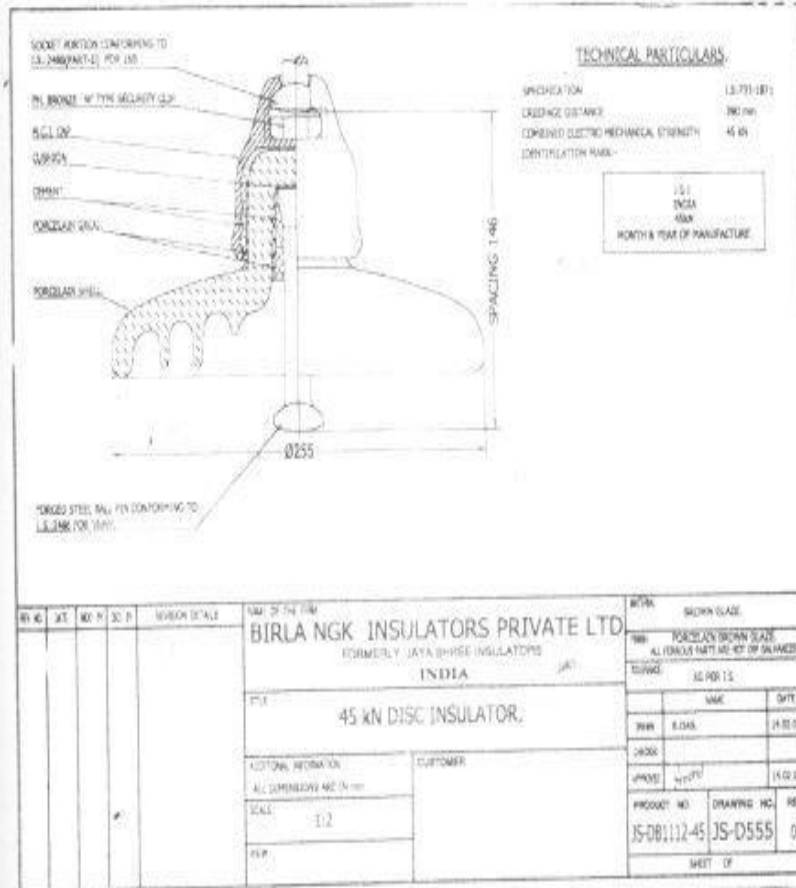
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DRYING

APPROVAL	PURCHASE
DATE	ENGINEER
DRAWN	BY
CHECKED	DATE
ISSUED	BY
PRODUCT NO.	DRAWING NO.
JIS-D3112-76	JIS-D556
PAGE 2	REV
	1

GUARANTEED TECHNICAL PARTICULARS OF DISC INSULATOR BGL/MS FORM

S. NO	DESCRIPTION	GUARANTEED VALUE ETC.
1	Name & Address of Manufacturer	BIALA NGK INSULATORS PRIVATE LIMITED FORMERLY JAYA SHREE INSULATORS P.O. - PRANASAGAI, KISHRA DIST. - HOOGLY, WEST BENGAL
	Branch	A) RAJNA, CHH. - Hooghly, West Bengal B) HARI, DIST. - Panchmahal, Gujarat
2	Type of Insulator	BALL & SOCKET TYPE DISC INSULATOR (TYPE'S)
3	Our Product No.	JS-DB 1112-708
4	Size of Ball & Socket and standard to which it will conform	..... Series A/B ..... ..... as per IS 7489 Part II: 1985 .....
5	Details of characteristics of insulators	
	a) Maximum system voltage	KV 11
	b) Highest system voltage	KV 12
	c) Wet discharge Test voltage (Minimum)	KV 9
	d) Dry 1 min Power Frequency Withstand Voltage	KV 70
	e) Wet 1 min Power Frequency Withstand Voltage	KV 70
	f) Power frequency surge withstand voltage	KV 120
	g) Impulse (1.2/50 microsecond wave) withstand voltage	KV 110
	..... Factor	KV 110
	..... Test	KV 110
	h) Insulator Flashover (50 microsecond wave) voltage	KV 115
	..... Factor	KV 120
	..... Test	KV 120
	i) Dry 1 min frequency flashover voltage	KV 75
	j) Wet 1 min frequency flashover voltage	KV 75
	k) Maximum dry arcing time	Permitted 30
6	Thermal characteristics of insulators	
	a) Maximum firing test	KV 70
7	Maximum leakage current	
	a) 1 sec	mm 10
	b) 1 minute	mm 20
8	Size of insulators	
	a) Height	mm 145
	b) Socket inner diameter	mm 205
9	Colour of disc	..... BROWN .....
10	Weight per unit (Approx)	kg 1.2
11	Standard Specification according to which insulators are manufactured & tested	..... IS 731-1971 .....
		BY: MANOJ KANTH & INDUSTRIES LIMITED (INSULATOR DIVISION)
		(T. C. BANERJEE) MANAGER (M.C.)



GUARANTEED TECHNICAL PARTICULARS OF DISC INSULATORS BIS 1095-1980

Sl. No.	DESCRIPTION		GUARANTEED VALUES ETC.
	Name & Address of Manufacturer		SIRSA ROX INSULATORS PRIVATE LIMITED POWERSLY WATA SHREE INSULA 045 P.O. PRABHASNAGAR, KISHKA DIST. - HOOGHLY, WEST BENGAL
	Rating of		1) Rating, Dist. - Hooghly, West Bengal 2) Rating, Dist. - Ranchi, Jharkhand, Gujarat
	Type of Insulator		Ball & Socket type Standard Disc Insulator (Type 'B')
	Size & Designation of Ball & Socket with standard to which it will conform		..... diam. AS 'B'..... ..... dia. per IS-1095, Pt. II-1980.....
	Our Product No.		JS-DB 1112-45
	1) Overall dia.	mm	255
	2) Outer Diameter	mm	245
	3) Unit Spacing	mm	290
	4) Minimum Clearance Distance	mm	150
	5) Projected Clearance Distance	mm	150
	Insulation Values		45
	6) Factory production strength	KV	45
	or minimum factory value	KV	45
	7) Operation Values		44
	a) Normal System Voltage	KV	12
	b) Highest System Voltage	KV	9
	c) Minimum stroke discharge test voltage	KV	10
	8) 1000 Hz, 1 min. Power frequency withstand voltage	KV	40
	9) 1000 Hz, 1 min. Power frequency withstand voltage	KV	35
	10) 1000 Hz, 1 min. Power frequency withstand voltage	KV	45
	11) 1000 Hz, 1 min. Power frequency withstand voltage	KV	45
	12) 1000 Hz, 1 min. Power frequency withstand voltage	KV	105
	13) Positive Wave	KV	105
	14) Negative wave	KV	105
	15) Impulse withstand voltage (normal wave)		110
	16) Impulse withstand voltage (steep wave)		115
	17) Positive wave		110
	18) Negative wave		115
	19) Power frequency structure withstand voltage		110
	20) Power frequency structure withstand voltage		115
	21) Net weight (kg)		4.2
	22) Standard specification to which Insulators will conform		IS-1095-1975
			FOR INSULATION INDUSTRIES LIMITED INDUSTRIAL ESTATE KOLKATA WEST BENGAL

**TECHNICAL PARTICULARS**

UNGLAZED P-0347

BY TOS  
560 PTH  
10 AN  
S.6 K4

DATE: 10/10/56  
DRAWN BY: S.6 K4  
CHECKED BY: S.6 K4  
APPROVED BY: S.6 K4

MONTH & YEAR OF MANUFACTURE

MATERIAL: PORCELAIN  
FINISH: BROWN GLAZE

TOLERANCE: AS PER SPECIFICATION

DRAWN	NAME	DATE
CHECKED	P. K. CHOWDE	10/10/56
APPROVED	S.6 K4	

PRODUCT NO. DRAWING NO. REV  
JS-P3311 JS-P034 1

SHEET OF

**BIRLA NGK INSULATORS PRIVATE LTD.**  
FORWARD - AYAZI, DELHI - INDIA

100 AV. PIN INSULATOR  
CUSTOMER

ADDITIONAL INFORMATION  
ALL DIMENSIONS ARE IN MM  
SCALE 1:2

WITH

GUARANTEED TECHNICAL PARTICULARS OF JKBY PIN INSULATOR

S.No.	PARTICULARS		GUARANTEED VALUES ETC.
1	Name & Address of the Manufacturer		BKLA NOK INSULATORS PRIVATE LIMITED FORMERLY JAYA SHREE INSULATORS P.O. - VEERAMASHAGAR, RISHRA DIST - HOOGHLY, WEST BENGAL a) Rishra, Dist. - Hooghly, West Bengal b) Main, Dist. - Paschim Medinipur, Gujarat
2	Product No.		JS P 3311
3	Electrical Characteristics of Insulator		
a)	Normal System Voltage	KV	33
b)	Highest System Voltage	KV	36
c)	10 Minute Visible Discharge Test Voltage	KV	27
d)	10 Min. Power Frequency Withstand Voltage	KV	35
e)	Wet 1 Hz Power Frequency Withstand Voltage	KV	25
f)	Power Frequency Partial Discharge Voltage	KV	100
g)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
h)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
i)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
j)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
k)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
l)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
m)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
n)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
o)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
p)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
q)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
r)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
s)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
t)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
u)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
v)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
w)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
x)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
y)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
z)	Thrust Withstand Voltage - 10 sec. 1000 rpm Wind	KV	170
1	Color of Pin		BROWN
2	Weight of Pin	kg	500
3	Weight of Pin	kg	200
4	Weight of Pin	kg	10
5	Weight of Pin	kg	280
a)	Core Density	kg/cm <sup>3</sup>	2.3
b)	Core Density	kg/cm <sup>3</sup>	2.3
6	Weight of Pin	kg	280
7	Weight of Pin	kg	280
8	Weight of Pin	kg	280
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98	Weight of Pin	kg	280
99	Weight of Pin	kg	280
100	Weight of Pin	kg	280

AS PER IS 731-1971

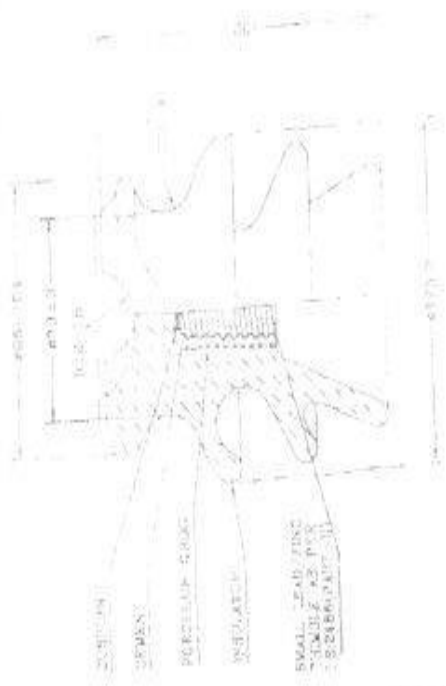
AS PER IS 731-1971

BY INDIAN ROPING & INDUSTRIES LIMITED  
INSULATOR DIVISION

D. K. RAJAN, MGR. SALES

TECHNICAL PARTICULARS

QUANTITY 12700  
 SIZE 230 mm  
 5 IN



MANUFACTURED BY  
 BIRLA NGK INSULATORS PRIVATE LTD.  
 100, INDUSTRIAL AREA, PHASE II, Gurgaon, Haryana

MATERIAL		PORCELAIN	
FINISH	THICKNESS	DATE	4.11.08
TOURANGE	AS PER SPEC.	DATE	4.11.08
DATE	4.11.08	REV	1
DESIGNER	DATE	PRODUCT NO/DRAWING NO.	JIS-PC-88
APPROVED	DATE	SHEET OF	1

NAME OF THE FIRM  
**BIRLA NGK INSULATORS PRIVATE LTD.**  
 (INCORPORATED IN INDIA)

REGISTERED OFFICE  
 100, INDUSTRIAL AREA, PHASE II, Gurgaon, Haryana

REGISTERED IN  
 HARYANA

REV	NO	DATE	BY	CHKD	REASON

DATE OF THE DRAWING  
 4.11.08

SCALE  
 1:1

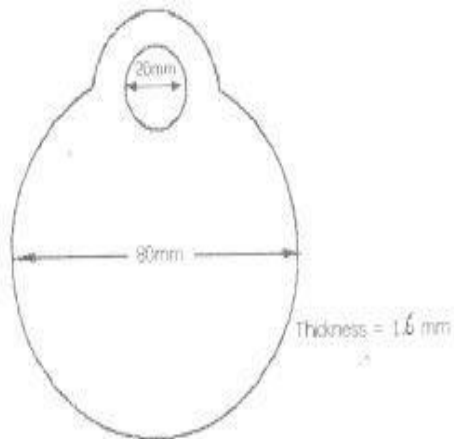
BY  
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CHKD  
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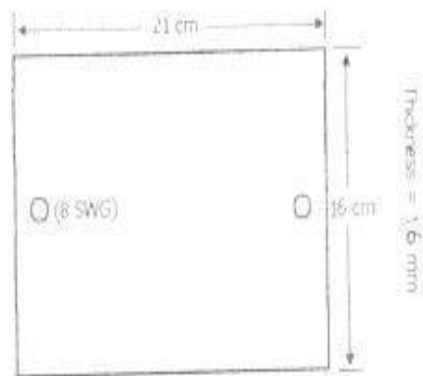
## GUARANTEED TECHNICAL PARTICULARS OF 11KV PIN INSULATOR

S. NO	PARTICULARS	GUARANTEED VALUES ETC.
1	Name & Address of the Manufacturer	BIRLA NGK INSULATORS PRIVATE LIMITED FORMERLY JAYA SHREE INSULATORS P.O. - PRABHASNAGAR, RISHRA DIST. HOOGHLY, WEST BENGAL a) Raiba, Dist - Hooghly, West Bengal b) Sakul, Dist - Parichmahals, Gujarat
2	Our Drawing No.	IS-P-048E
3	Electrical Characteristics of Insulators -	
	a) Nominal System Voltage	KV 11
	b) Highest System Voltage	KV 12
	c) Minimum Visible Discharge test Voltage	KV 9
	d) Dry 1 Min Power Frequency withstand Voltage	KV 65
	e) Wet 1 Min Power Frequency withstand Voltage	KV 35
	f) Power Frequency Puncture withstand Voltage	KV 105
	g) Impulse Withstand Voltage (1.2/50 Microseconds) - +ve	
	i) Positive	KVP 95
	ii) Negative	KVP 95
	h) Impulse Flashover Voltage (1.2/50 Microseconds) - +ve	
	i) Positive	KVP 100
	ii) Negative	KVP 105
	i) Dry Power Frequency Flashover Voltage	KV 70
	ii) Wet Power Frequency Flashover Voltage	KV 40
4	Colour of Glaze	-----BROWN-----
5	Creeper Distance (Min) (mm)	
	a) Total	mm 230
	b) Protected	mm 115
6	Minimum Height (mm)	75
7	Size of Insulator -	
	a) Outer Diameter	mm 44
	b) Weight	kg 1.75
8	Material of Thimble	-----LEAD-----
9	Net Weight ( Approx)	kg 1.1
10	Standards to which insulator will conform	-----IS-31-1971-----
11	Tolerance in dimensions if any	-----AS PER IS-31-1971-----
		FOR INDIAN RAYON & INDUSTRIES LIMITED (INSULATOR DIVISION)
		(D. O. SARKAR) MANAGER (SAL. PR.)



PHASE PLATE

Phase Plate ( R, Y, B )



Number Plate

( Sl. No. to be painted as per requirement. )

### SPECIFICATION FOR THE DESIGN, MANUFACTURE AND SUPPLY OF NUMBER PLATE

#### 1. SCOPE:

This specification covers the design, fabrication and supply of number plate to be displayed on 132kV lines at Khasi & Jaintia Hills and Gora Hills District of Meghalaya.

#### 2. CLIMATIC CONDITION:

The climatic conditions at the site where the Number Plates are to be installed are as follows

Average Annual rainfall	2280mm (May to September)
Average number of rainfall days	5 months (May to September)
Maximum dry bulb temperature	40°C
Minimum dry bulb temperature	2°C
Isoceraunic level	60
Relative humidity	71 % to 93 %
Maximum wind pressure	150Kg/M <sup>2</sup>

#### 3. GENERAL FEATURE OF THE NUMBER PLATE:

- i) The plate shall be made from mild steel at least 1.6mm thick and number as per requirement. The rear side of the plate shall also be enameled
- ii) The Covers of the number plates should be rounded off
- iii) Size of the Number Plates shall be as follows

SINo	Voltage at the installation	Size
1	132kV	21 cm * 16 cm

Drawings of number plates for number installation are enclosed

- iv) Drawings of number plates for installation at the Khasi & Jaintia Hills are given in Figure - 1

## SPECIFICATION FOR THE DESIGN, MANUFACTURE AND SUPPLY OF PHASE PLATE

### 1. SCOPE:

This specification covers the design, fabrication and supply of phase plate to be displayed on 132kV lines at Khasi & Jaintia Hills and Gora Hills District of Meghalaya.

### 2. CLIMATIC CONDITION:

The climatic conditions at the site where the Phase Plates are to be installed are as follows:

Average Annual rainfall	2280mm (May to September)
Average number of rainfall days	5 months (May to September)
Maximum dry bulb temperature	40°C
Minimum dry bulb temperature	2°C
Isoceraumic level	60
Relative humidity	71 % to 93 %
Maximum wind pressure	150Kg/M <sup>2</sup>

### 3. GENERAL FEATURE OF THE PHASE PLATE:

- i). The plate shall be made from mild steel at least 1.6mm thick and number as per requirement. The rear side of the plate shall also beenameled.
- ii). The Phase Plates should be of Red, Blue & Yellow paint for each set
- iii). Size of the Phase Plates shall be as per Drawing.

6. FREEDOM FROM DEFECTS:

4. The line and joint wire shall be circular in section, free from scales and other defects and shall be uniformly galvanized.

7. TESTS:a. TENSILE TEST:

The completed barbed wire and the individual line wire shall have breaking loads as specified below:

TENSILE PROPERTIES:

Size of line wire (mm)	Tensile strength of line wire $W_1/m^2$	Minimum breaking load of completed barbed wire $W_2$
7.24	30 to 60	300

The test on the line wire shall be carried out in accordance with IS: 1521.

b. DUCTILITY TEST:

The wire shall be subjected to the wrapping test in accordance with IS: 1755.

B. DEVIATION FROM SPECIFICATION:

All deviation from specifications shall be separated listed as per proforma given in Annexure-II in the absence of which it shall be presumed that the provision of the specification are complied by the tenderer.

9. MARKING:

Every reel of barbed wire shall be marked lightly on it the name of the manufacturer, the type of the barbed wire, the diameters of the line and joint wires, barb spacing and length of the reel.