TECHNICAL SPECIFICATIONS FOR Supply, Installation, Testing & Commissioning of conventional copper plate Earthing system at Akashvani Saharsha (Bihar)

Location of Work : New 10KW FM Transmitter at Akashvani Saharsha(Bihar).

Detail of work & supply for each site :

Scope of work : Technical Earth Pit with Cu Plate & Strip has to be made at the project site for connecting to the equipment. Earth resistance should be less than one Ohm. Required Cu plate, strip, Nylon sleeves, GI pipe, separate earth strip terminal junction box, flannel, Salt, charcoal etc. is to be provided by the bidder at site. Other materials, tools & plants and labour required for the work has to be arranged by the bidder at site at his cost and risk.

Technical specifications and description of work :

(1) Site preparation :

a). The location of the earth pits will be identified by the Engineer-in charges at the site or IO.

b). The identified site has to be excavated by means of manual digging of the soil where ever is practible or by means of auguring the soil to make a pit of size **3Mtr(D) x 1Mtr.(L) x 1Mtr.(W).** After excavation broken lumps and stones, if any, are to be removed from the earth pit.

c). Earth has to be excavated at the depth of 0.3 M for laying of Cu strip from the earth pit to the building where the strip will enter the building and to be terminated.

(2) Providing and Fixing of Earth Electrode etc :

a). The required Copper earth plate of size 600 mm x 600 mm x 3mm(Electrolytic) and Copper Strip of size 25 mm x 3 mm (99.8% electrolyte) are to be provided by the bidder as latest IS rating. The required copper strip has to be **brazed properly using Silver Brazing rod(60 : 40)** with the Cu plate overlapping 600 mm from bottom portion of copper plate to make the surface conductive. Also the plate & strip has to be fixed with 3 sets of Brass nuts & bolts for making a firm connection.

b). A 40 mm diameter NB class B, GI pipe of 3 mtr. Length. Has to be provided. Sufficient numbers of tapped holes of 12 mm diameter throughout the length of the pipe at alternate directions up to the entire length should be provided for seeping of poured water in soil through the pipe to maintain the moisture in the soil.

c). This copper plate is to be laid into the excavated pit vertically, as per drawing, at a depth of not less than 3 mtrs. from ground level.

d). After laying the Cu plate, the pit has to be filled with alternate layers of Charcoal and Salt of minimum thickness of 150 mm each and as many layers necessary includes bentonite for improving the soil conductivity so as to achieve earth resistance of less than one Ohm. **However, minimum quantity of Charcoal & Salt laid should be 200 kgs each earth pit and Bentonite should be 50 kgs.**

e). The GI pipe and funnel has to be places as per attached drawing conforming to IS-3043-1987. The unfilled pit has to be filled with fresh & fresh soil and a chamber has to be constructed & a funnel placed as per attached drawing. The chamber has to be covered with a pit cover of appropriate size.

f). The loose end of the Cu strip has to be brought out from the earth pit and connected to the junction box which is to be fixed at a suitable place in the technical area with required fixing arrangement. In ground the earth strip will run through good quality sleeves and through 40mm PVC pipe at least below 0.3Mtr under soil and in wall through sleeves and 50 mm PVC pipe.

g). Earth resistance has to be measured following the standard procedure. The maximum Earth resistance of each earth pit shall not exceed **One Ohm in any case.** Further, soil enhancement material, if required, may be added to improve the soil conductivity so that measured earth resistance is limited within 1 Ohm.

h). Distance between each earth pit shall be **not less than 10 feet.**

i). Quality of charcoal, salt and Bentonite should be high grade to meet resistance criteria of each earthing pit. If required the firm has to make additional provision to meet the resistance criteria without any additional cost.

(3) Providing and Filling of Earth Enhancement Material :

The job includes filling up of the earth pit with charcoal, salt & Bentonite alternatively and then remaining part with fresh soil up to the pit top after placing the copper earth plate/electrode with strip & GI pipe in the excavated earth pit. Fresh soil shall be watered and rammed as tight as possible for carrying out proper bonding of the plate with the adjacent soil. Conductive material i.e. Charcoal, Salt & Bentonite has to be filled up to top of the Cu plate i.e. 600 mm in alternate layers of minimum thickness of 15 cm.

(4) Construction of Earth Chamber :

The job includes providing earth pit brick chambers of 500 mm x 500 mm size. Depth of the earth pit chamber should be 300 mm from the ground level. Earth pit chamber and cover should be finished at 100 mm above ground level so as not to hinder public/commuter movement at Kendra.

(5) Providing Earth Pit Covers :

The job includes providing cast iron prefabricated covers of size 300mm x 300mm on the top portion of the earth pit chamber with suitable handle for lifting arrangement. A base frame of suitable dimensions shall be fixed to the earth pit chamber to accommodate earth pit cover. Complete arrangement shall be at 100mm above the ground level. Inside portion of the pit shall be plastered & cleaned properly.

(6) Identification of Earth Pits :

Earth pit display boards on top of an MS rod duly painted & marked with of earth pit number, individual pit resistance and location name on the display board shall be provided by the contactor for each individual earth pit.

(7) Measurement of Earth Resistance :

(a). The job includes measurement of resistance of the new earth pits as per prevailing practice before connecting to equipment.

(b). The values so obtained will be tabulated and submitted to Installation Officer at the time of construction and again at the time of equipment connection.

(c). All works is to be completed in presence of Installation officer.

(d). If the individual earth pit resistance is not within the limits (below 1 Ohm), soil enhancement material shall be added or new earth pit shall be provided by the firm at their own cost.

(8) Supply & Laying of Junction Box & Earth Strip :

(a). The requisite quantity of earth strips, provided by Agency, is to be laid from earth pit to the junction box.

(b). For laying the copper earth strips a trench of adequate size has to be dug up to 300mm into ground. The firm has to lay & clamp the supplied earth strip of 25 x 3mm as required up to junction box.

(c). Sufficient distance between each earth strip is to be maintained for isolation between each strips.

(d). Back filling of the said trench is to be done by utilizing fresh soil up to the ground level.

(e). Providing & fixing of transparent junction box (100A) of size(30mm x 15mm) at bottom side on wall or above the ground with proper fixing arrangement with **2Nos** of **Copper Busbar** for terminating the earth strip & also connecting earth cables.

(f). Exposed portion of the copper strips is to be covered with shrinkable PVC sleeve of suitable size.

(g). All hardware (nut, bolt & washer etc.) used for connection/joints along with brazing is done, shall be made of rod type stainless steel (SS) or brass only.

(h). Joints and tapings in the main earth loop (earth strip) shall be brazed in such a way that reliable & good electrical connections are permanently ensured. All welded joints shall be suitably protected by applying red oxide paint and bitumen.

(i). After laying of earth strip, concrete floor/brick floor/soft soil shall be restored to it's original position. At some locations (like wall etc.) earth strip shall be fixed/clamped to the surface with the help of appropriate clamps.

(9) General :

(a). Deployment of man power, transportation of man & machinery, consumables, brazing equipment, drilling machine tools & plants, implements, construction materials etc. required for execution of the said work at location shall be at the cost & risk of the firm. The required Copper earth plate (600 mm x 600 mm x 3mm) and Copper Strip (25 mm x 3 mm) will be provided by bidder at site. Power supply & water already available at site, shall be provided to the firm free of cost.

(b). The contractor at his own cost shall visit the site before quoting the tender.

(c). Since the work is to be done in working station, advance written permission of the station authority/installation officer has to obtain before carrying the tools & plants, materials, manpower etc. to the site and commence the work.

(d). Necessary valid insurance documents for the work force has to be produced by the firm before commencement of work.

(e). The firm exercise utmost precaution while carrying out the work to prevent any damage to the property etc.. However, while carrying out the work any damage is caused to the property etc. the firm will make good the damage caused at his cost & risk.

(f). No Mobilization advance is payable to contractor for the said work.

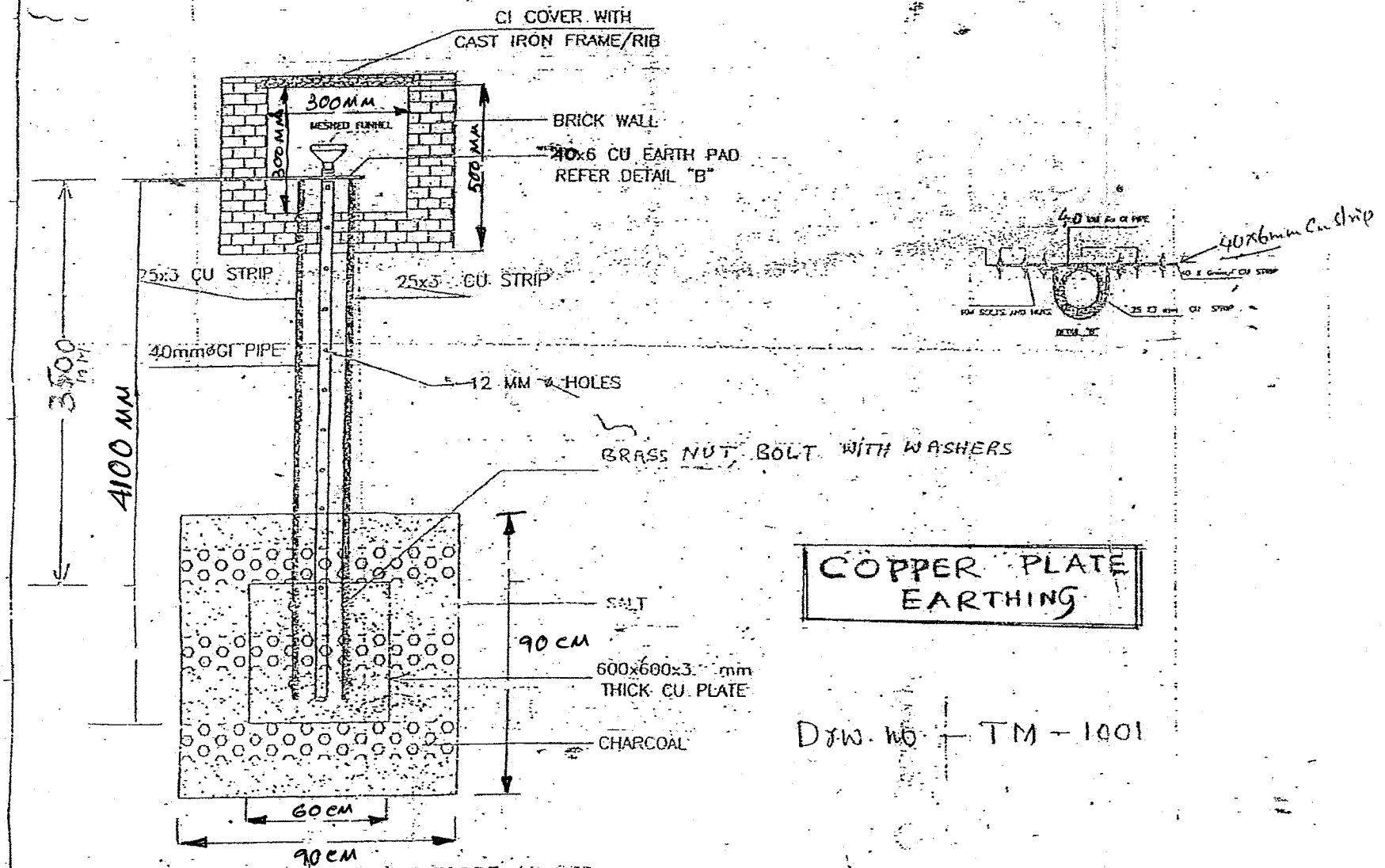
(g). In some locations, the work may be carried out near Live High voltage bus bars/lines, the firm has to adhere to all safety rules & regulations etc. and guide his manpower accordingly for safe working.

(h). Before commencing of work, **inspection of Copper Plate, Copper Strip and other materials will be carried out by the Inspecting Officer.** A sample of Copper Plate and Strip will be collected during inspection and submitted to National Test Laboratory/Govt. authorized test Laboratory for obtaining percubic of purity. The expenditure towards testing will be borne by firm/agency.

SCHEDULE OF REQUIREMENT

SITC of Copper Plate Earthing system at Akashvani Saharsha (Bihar):

Sl. No.	Description of Work	Quantity	Rate	Amount
1.	Construction Copper Plate earthing for Transmitter, Audio, RF cable , UPS Neutral point. Power Supply and Tower including supply of all required material as per Specification .	19 Nos		
2.	Supply and laying of copper strip (99.8% electrolyte) of size25mm x 3mm from earth pit to Junction Box including its termination at both end as per specification (Payment will be made as per actual measurement on prorata basis).	300 Mtr. (Approx.)		
3.	Junction Box (100 A) along with 02 Nos of Copper Busbar as per specification .	07 Nos.		



COPPER PLATE EARTHING

Drw. No - TM - 1001