



पूर्वोत्तर सीमा रेलवे
NORTHEAST FRONTIER RAILWAY
प्रमुख मुख्य विद्युत अभियंता का कार्यालय, मालेगांव, गुवाहाटी - 11

Office of Principal Chief Electrical Engineer, Maligaon, Guwahati - 11

No: EL/M/210/8 /1771

Date 04.10.2024

Sr.DEE/G/KIR, APDJ, RNY, GHY, LMG & TSK,
Sr.DEE/TRD/KIR, APDJ, RNY, LMG & TSK,
Dy.CEE/NBQS, DBWS, Dy.CEE/PS/HQ,
DEE/G & TRD/GHY

Sub: Technical circular & drawing for Pipe Earthling & power cable laying direct underground for Electrical General services.

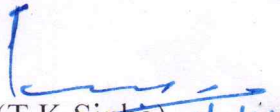
Enclosed find herewith following Technical Circulars:

1. TC no. EL/PS/2024/1 with Drawing no. PCEE/ELG/DRG/2024/1 dated 30.09.2024.
2. TC no. EL/PS/2024/2 with Drawing no. PCEE/ELG/DRG/2024/2 dated 04.10.2024.

These TCs will take immediate effect and supercedes all earlier TC & drawings issued by PCEE/NFR's office, Divisions, Workshops, Construction organizations.

This is for your information and necessary action please.

DA: As above


(T.K.Sinha) 4/x/24
CEGE/NFR

Copy to:

1. CEE/Con-I, II & III/NFR: for information & necessary action please.
2. DRM/KIR, APDJ, RNY, LMG & TSK: for information please.
3. PD/RVNL/PIU/GHY: for information & necessary action please.
4. GM/Electrical/RITES: for information & necessary action please.
5. CGM/Elect/IRCON/SCL, TSK, GM/Elect/IRCON/APDJ: for information & necessary action please.
6. CGM/Elect/CO/IRCON/Siliguri: for information & necessary action please.

Technical circular no. EL/PS/2024/1

Sub: Standardisation of pipe earthing for Electrical general services installation.

Scope :

It is found that there is wide variation in the method of earthing being followed by Divisions/workshops/Construction wing and there is lack of uniformity. Therefore, in order to bring uniformity, with respect to the pipe earthing for 415 Volt 3 phase distribution network, a standard earthing drawing has been developed, incorporating the relevant guidelines contained in the latest IS codes and manuals/handbooks issued by various agencies. This drawing supersedes the previous drawing no. CEE/STD/1 dated 23.12.77 for "Earthing for Buildings".

References considered for the earthing :

- 1) IS 3043:2018 (Second Revision): Code of practice for Earthing.
- 2) CEE/NFR Office Drawing No. CEE/STD/1 dated 23.12.77.
- 3) CAMTECH's Basics of LV Earthing System, Vol-I, 2021.
- 4) CAMTECH's Handbook on Electrical Earthing-December, 2010
- 5) Electrical General Services Manual, Volume-1 (Power Supply), 1st Edition-August, 2022.

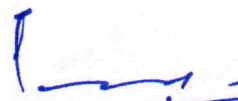
Construction of Earth pit:

For 415 Volt, 3 phase distribution network, construction of earth pit should be prepared as per drawing no. PCEE/ELG/DRG/2024/1 dated 30.09.2024, (copy attached).

General Practices to be adopted for Earthing:

- 1) Earthing must be carried out in accordance with the requirement of I.E. rules, 1956, as amended from time to time and the relevant regulation of the electricity supply.
- 2) The Earth electrode must conform to IS 1239 specification.
- 3) Perforations to be made along the pipe to enhance the earth conductivity in order to achieve uniform distribution of water .
- 4) The pipe should have a tapered casing at the lower end, properly sealed with welding.
- 5) All earth pit locations should be easily accessible for maintenance & inspection.
- 6) Each earth pit installation should be checked for ohmic resistance value at least once in six months & in dry seasons
- 7) Earth resistance value of each earth pit should be measured & record maintained in a separate register. The register shall be produced for inspection, whenever asked by the inspecting official.
- 8) The values of earth resistance measured should be painted on the Earth pit cover/lid along with the date of measurement.
- 9) The connecting conductor from earth electrode to the distribution panel board should not be thinner than 8 SWG GI wire to carry the fault current and during the earth pit checking the continuity of this conductor is also to be checked.
- 10) This has the approval of PCEE/NFR.

DA: DRG No. PCEE/ELG/DRG/2024/1 dated 30.09.2024.


(T. K. Sinha) 30/09/2024
Chief Elect. General Engineer
For Pr. Chief Elect Engineer/NFR

DRG NO: PCEE/ELG/DRG/2024/1 dated 30.09.2024

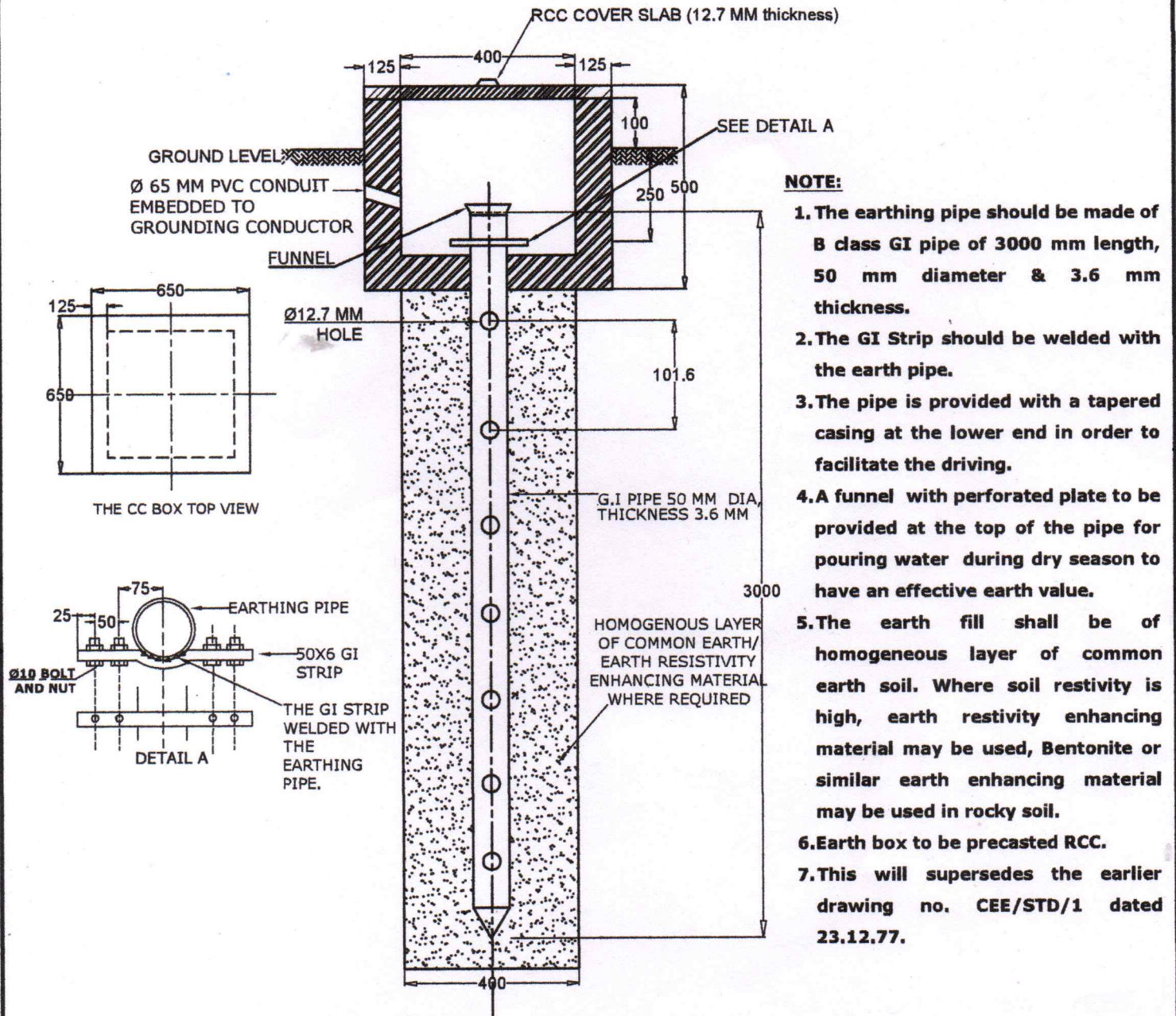


FIG: PIPE EARTHING ARRANGEMENT FOR ELECTRICAL GENERAL SERVICES INSTALLATIONS
(ALL DIMENSIONS ARE IN MM)

DRAWING NO. & DATE	PCEE/ELG/DRG/2024/1 dated 30.09.2024
DRAWING NAME	Pipe Earthing arrangement for Electrical General services installation
REFERENCES	1. IS 3043:2018 (Second Revision). 2. CEE/NFR Drawing No. CEE/STD/1 dated 23.12.77 3. CAMTECH Handbook on Electrical Earthing, December, 2010, 4. Electrical General Services Manual, Volume-1 (Power Supply), 1st Edition-August, 2022.
DRG PREPARED BY	Sahil Ist SSE/P-II/HQ 30.09.2024
APPROVED BY	CEGE/NFR 30/9/2024 For PCEE/NFR
OFFICE	PCEE Office, Maligaon, NFR HQ

Technical circular no. EL/PS/2024/2

Sub: Standardisation of Drawing for Power cable laying direct underground

Scope:

It is found that there is a wide variation in method of laying underground cables by divisions, workshops and construction agencies and there is a lack of uniformity. Therefore, in order to bring uniformity and to streamline the power cable laying directly underground, a drawing has been developed, incorporating the relevant guidelines contained in the latest IS codes and CAMTECH manuals. This drawing will supersede all earlier drawings on the subject matter issued by PCEE/NFR office, Divisional offices & Other units/Construction wing.

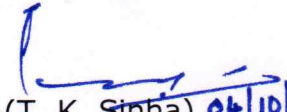
References considered for the cable laying

1. IS:1255-1983,Amdt.1: Code of practice for installation and maintenance of power cables up to and including 33kV rating (Power Cable)
2. CAMTECH/EL/2022-23/Vol.05: Conductors & Cables/1.0: Selection of Power cables in Electrical LV Installation
3. CAMTECH/E/2006/CABLES/1.0: Handbook on Electrical Power Cables for General Service.

General Instructions:

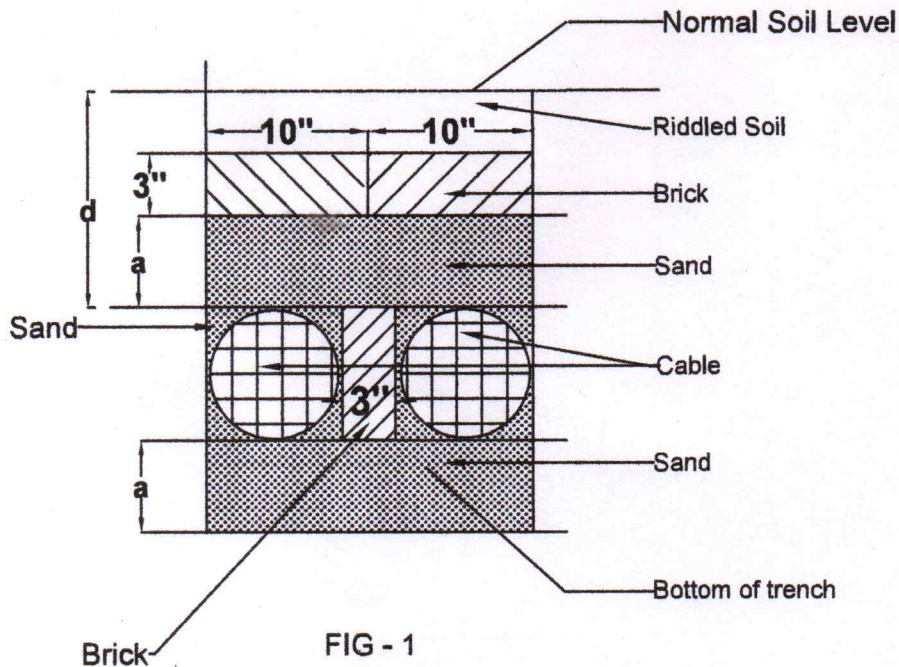
1. This TC covers the cable laying directly underground upto & including 33kV cables.
2. For multiple cables laying in the same trench, fire bricks of size 3"x5"x10" to be used in between any two adjacent cables as shown in PCEE's Drawing No. PCEE/ELG/DRG/2024/2 dt. 04.10.2024 to avoid cable damage during fault in one of the cables. For single cable laying, no brick separation is required. However, the brick layer on top of the cable/cables should be laid properly. For vulnerable locations like Railway Yards etc., where multiple departments are digging/excavating earth for their works, concrete cover may be used on the top of Underground Cables for better protection.
3. Cable route indicators/markers of PCC plate/post with inscriptions of "Power Cable" should be provided at an interval not exceeding 50 m and also at turning points. Voltage level like LT, 11KV, 33KV to be mentioned on route indicator/marker. A separate route indicator/marker with inscription of "Cable Joint" to be provided on top, where straight through or other types of cable joints are given underground.
4. While laying power cables, coordination with the appropriate telecom authority may be done to avoid interference with their cables.
5. Desired minimum clearances to be maintained:
 - (a) Power cable to Power Cable: 3" using fire brick separators.
 - (b) Power cable to Control cables: 0.2 m
 - (c) Power cable to Telecom cable: 0.3 m
 - (d) Power cable to Gas/Water main: 0.3 m
6. This drawing does not cover or should not be used for Railway Track crossing purposes.
7. Field Incharge should keep & maintain cable route drawing for future references and survey the existing cables at vulnerable locations like Railway Yards etc using cable tracers when cable route drawing or cable indicator/markers are not available. In such cases, manual digging may be resorted to by the agency.
8. This has the approval of PCEE/NFR

DA: Drg. No.PCEE/ELG/DRG/2024/2 Dtd. 04.10.2024.


(T. K. Sinha) 04/10/2024
Chief Elect. General Engineer
For Pr. Chief Elect Engineer/NFR

Note:

1. This will supercede all earlier drawings issued by PCEE office, Divisional offices & Other units and is a part of Technical circular (TC) No. EL/PS/2024/2.
2. Power cable route indicators to be used as given in TC No. EL/PS/2024/2.
3. Power cable should not be laid above Telecom cable.
4. Desired minimum clearances for different types of cables to be maintained as given in TC No. EL/PS/2024/2
5. Cable jointing, Cable end termination and earthing & bonding required in cable laying process should be as per para 5.5, 5.6 & 5.7 of CAMTECH Manual No. CAMTECH/EL/2022-23 Vol-05 or latest.



a = 7.5 cm coarse sand
d = depth of cable top surface from ground

SN	Voltage	Dimension (d)
1	≤11 KV	0.75 m
2	11 KV	0.90 m
3	33 kV	1.05 m
4	At Road / Level crossing	1.00 m

POWER CABLE LAYING DIRECT UNDER GROUND	
DRAWING NO.	PCEE/ELG/DRG/2024/2 Date:04.10.2024
REFERENCES	1. IS:1255:1983, Amdt.1 2. CAMTECH/EL/2022-23/Vol.05: Conductors & Cables/1.0 3. CAMTECH/E/2006-23/CABLES/1.0
DRG PREPARED BY	<i>[Signature]</i> 04.10.2024 SSE/P-I/HQ
APPROVED BY PCEE	<i>[Signature]</i> 04/10/2024 CEGE, for PCEE/NFR
OFFICE :	PCEE Office, Maligaon, NFR HQ