CAPE
ELECTRIC

Railway Applications
Safety & Protection of Electronics
RDSO Approved Earthing

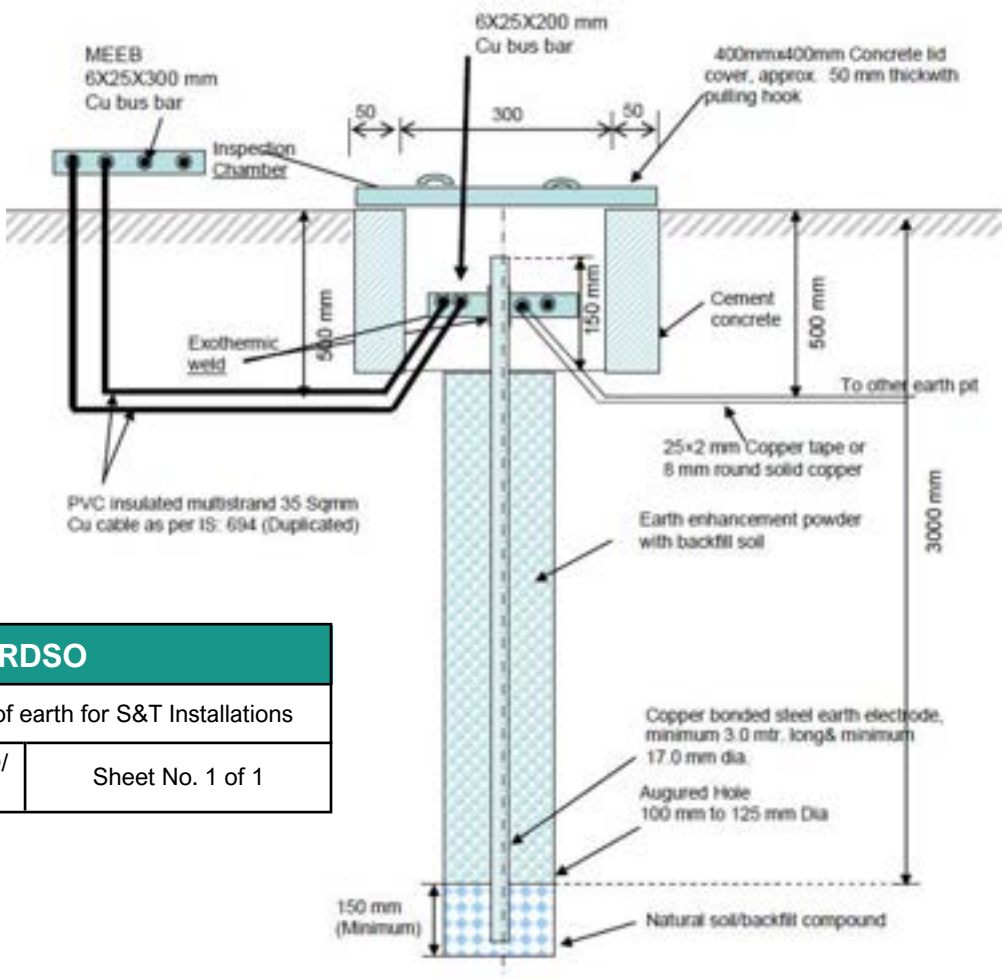
- Lightning Protection System
- Surge Prortection System
- Functional Earthing
- Safety Earthing
- Signal Reference Earthing
- Equipotential Bonding
- Exothermic Welding
- EMI / EMC

RDSO APPROVED
RDSO/SPN/197 Ver 1.0
(Code of Practice for Earthing & Bonding System for Signaling Equipment)

Confirming to IEC & UL

Earthing & Equipotential Bonding

RDSO Approved as per RDSO/SPN/197,Version 1.0 (or) Latest



RDSO	
Typical installation of earth for S&T Installations	
Drg. No. SDO / RDSO/ E&B/001	Sheet No. 1 of 1

S. No.	Maintenance Free Earthing (Line items)	Size	Quantity
1	Earth Electrode	Dia - 17.0 mm (min) Length - 3.0 meters	1
2	Earth Enhancing Compound	30-35 kg	1
3	Main equipotential earth busbar (MEEB)	300X25X6 mm (min)	1
4	Sub equipotential earth busbar (SEEB)	150X25X6 mm (min)	1
5	Multi-strand single core PVC insulated copper cable as per IS:694 used to connect Individual equipments to SEEB using tinned copper lugs with stainless steel nut and bolts.	10 sq mm	As per requirement are stipulated by purchaser railway
6	Multi-strand single core PVC insulated copper cable as per IS:694 used to connect SEEB to MEEB using tinned copper lugs with stainless steel nut and bolts.	16 sq mm	
7	Multi-strand single core PVC insulated copper cable as per IS:694 used to connect Surge protection devices (SPD) to MEEB using tinned copper lugs with stainless steel nut and bolts.	16 sq mm	
8	Multi-strand single core PVC insulated copper cable as per IS:694 (Duplicated) used to connect MEEB to main earth electrode	35 sq mm	
9	Copper tape or solid copper round conductor to connect Main earth pit to other earth pit in case of loop earth	25X2 mm (or) 8 mm	As per site requirement
10	Copper strip to be exothermically welded to earth electrode	200X25X6 mm (min)	1
11	Exothermic Weld Material & Mould	-	As per site requirement

Copper Bonded Maintenance free Earth Electrode

CAPE CBR earthing rods are made of high tensile strength low carbon solid steel rod, molecularly bonded with electrolytic grade copper. The rods are tested as per IEC 62561 for its mechanical, electrical and corrosion resistance behavior. All 8 feet and 10 feet rods are UL listed. These electrodes offer tensile strength above 600 N/mm². Compared to solid copper rods, CAPE CBE rods are much stronger with a corrosion resistance almost equal to copper

- Tensile Strength: higher than 600 N/mm2
- Electrical properties tested.
- Accelerated corrosion - Salt mist test (IEC 60068-2-52:1996). Humid sulphurous atmosphere test (ISO 6988:1985). Ammonia atmosphere test (ISO 6957:1988)

Earth Enhancing Compound

PRO-CEM is a conductive cement based conductivity improvement compound, which hardens and becomes a permanent conductive layer after installation. The minerals used offer noncorrosive behavior and are tested in accordance with IEC 62561.

- PRO-CEM is a concentration of minerals combined with the elements that improves earthing effectiveness, especially in areas of poor conductivity (rocky ground areas of moisture variation, sandy soils etc.)
- It improves the contact area between earth electrode and soil and thus improves conductivity.
- Protects the electrode from corrosion, permanent installation, and NO Maintenance.

Complete accessories for earthing and Exothermic welding.

Tested to IEC 62561 and IEEE837

CAPE and Lightning Protection.....Since 1997

CAPE Electric and Lightning Protection together are not new in Indian market. CAPE is the first company who started educating Indian market about Lightning Protection based on IEC standards way back in 1997. We introduced RING earthing in 2002 to Indian railways for electronic interlocking system which has become a standard installation practice now. Our technical seminars were highly appreciated and accepted in industry including Railways, Defence and Private industries.

Indian standard for Lightning Protection IS/IEC 62305 recommends to use lightning protection in places where human safety is important. CAPE Products are tested and confirming to latest IEC standards

2015 - 2 days EMI / EMC program for Railway S&T officials at IRISET, Secunderabad

2018 - Earthing seminar at RDSO Lucknow

Lightning Protection System (LPS) as per IS/IEC 62305

An ideal LPS prevents the penetration of lightning current and related electromagnetic field into the structure and prevents dangerous thermal and electro-dynamic effects of current, dangerous sparking and over voltages for internal systems. Protection measures are adopted in order to reduce the risk according to the type of damage. Lightning protection system has been categorized into 4 classes (I, II, III, IV). Suitable level is determined by carrying out risk assessment as per IEC 62305-2. The four corresponding classes (I, II, III, IV) are based on fixed minimum and maximum lightning current parameters for each level.

An LPS consists of both external and internal lightning protection systems. These protection measures are to be done based on lightning protection zones (LPZ). Protection measures are separate for external (to the structure) & Internal (electrical / electronic equipment). Both protection measures should complement each other.

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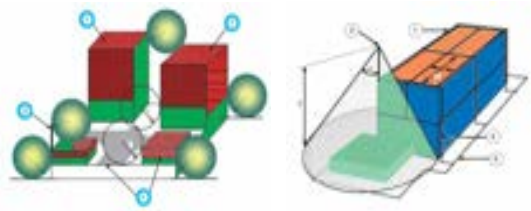
Protection measures to reduce physical damage is achieved by installing lightning protection system (LPS) which includes:

- Air-termination system
- Down-conductor system
- Earth-termination system
- Lightning equipotential bonding (EB)
- Electrical insulation (separation distance) from the external LPS



Protection measures to reduce failure of electrical and electronic systems is achieved by installing Special Protection Measures (SPM) which includes

- Earthing and bonding measures
- Magnetic shielding
- Line routing
- Isolating interfaces
- Coordinated SPD system

We design and install LPS and SPM as per IS/IEC 62305
We are an UL listed LPS installer
We manufacture complete components tested to IEC 62561

Changing the concepts of conventional SPD's. From world's largest SPD manufacturer

Raycap

CAPE has been actively involved in marketing SPD's in India since 1997. With our more than 20 years' experience in SPD and a strong technical team backed with the knowledge from world's largest SPD manufacturer, create history again in Indian.

Strikesorb Fast Response SPD

- Response time <1 nS,
- Tested to multiple strikes 10 kA * 1000 strikes
- Tested to multiple long duration strikes up to 2 mS* 250 strikes
- Tested to I_{imp} - 25 kA(10/350) and I_{max} - 200 kA (8/20) (strikesorb 80)
- Lowest Voltage Protection Level
- TOV withstand 120 mins – 440 volt
- No back up fuse required. Direct mounting on BUSBARS. Lowest voltage protection level.
- Models – Strikesorb 30, Strikesorb 40, Strikesorb 80
- 10 years warranty
- Millions of pieces operating world wide for critical applications

New Generation DIN Rail mounted SPD's designed for India

- TOV withstand 120 mins – 440 volt (Best suited for fluctuating voltages) Pluggable, visual indication, remote signaling contacts, shock resistant
- No follow current.
- Large short circuit withstand: 50 kA
- Higher Backup fuse (up to 315 Amps) gL/gG
- Tested with backup MCB
- Type 1+2, Type 2
- Models from 25 kA(10/350), 12.5 kA(10/350)

Redundant Type 2 SPD (Green – Yellow – Red)

- One SPD, 2 protective devices, 3 stage indication Continued protection and early warning.
- Pluggable, visual indication, Signaling Contacts Large short circuit withstand: 50 kA
- Higher Back up fuse: 160 amps
- Operating voltage from 60 volts to 400 volts

Signaling and Communication line SPD

- Type 3 SPD's for AC / DC power lines
- Signal Line SPD's from 5 volt to 110 Volt
- 2 line, 3 line and 4 line applications
- Wide range of coaxial SPD's
- UL listed CAT 6 - POE SPD's

Surge recorders for electrical panels with measuring current from 50 A to 50 kA with date, time and number of strikes measurement tested to IEC 62561 and 61326-1

Lightning recorders for external LPS down conductors with measuring current from 1 kA to 100 kA with date, time and number of strikes measurement tested to IEC 62561 and 61326-1

Universal SPD testers suitable for any make of SPD's

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