unicorn energy systems

THE SMART CHOICE FOR
SAFE & RELIABLE
EARTHING

ZERO EARTH CEM®

Earth Soil Conductivity Enhancement Material

THE BEST CHEMICAL TO REDUCE ELECTRICAL EARTH RESISTANCE

REDUCES EARTH RESISTANCE
Reduces the resistance of existing electrical earthing by up to 60%.

WATER SOLUBLE
Fully dissolve in water and pour into existing earthing pipe or soil.

IDEAL FOR HIGH RESISTIVITY SOIL
For sandy or rocky soil, mix ZERO EARTH CEM® with other earthing chemicals for best results.

FAST ACTING
Shows immediate effect as soon as it is absorbed in the bore soil.

COMPATIBLE WITH ALL CHEMICALS
Can be used with all types of earthing chemicals.

DELIVERY NATIONWIDE
Fast and reliable delivery all over Pakistan.

RESIDENTIAL BUILDINGS · INDUSTRIAL PLANTS · TELECOM TOWERS · SOLAR POWER SYSTEMS · ELECTRICAL INSTALLATIONS

TRUSTED QUALITY

STRONG EARTHING • MAXIMUM SAFETY
RELIABLE PERFORMANCE

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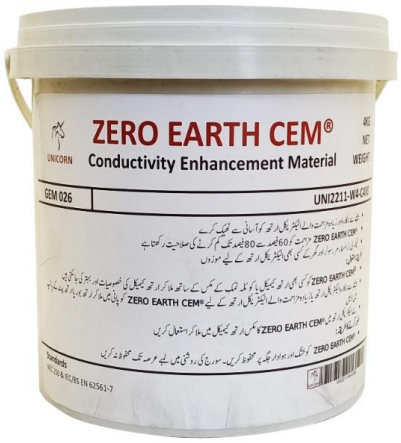
Technical Datasheet

Zero Earth CEM®

GEM 026 UNI2211-W4-C400

A proprietary low-corrosive ionic salt formulation engineered to dramatically reduce soil and sand resistivity — reviving old earth pits and enhancing new earthing installations in high-resistivity ground conditions.

Product of **Unicorn Energy Systems**

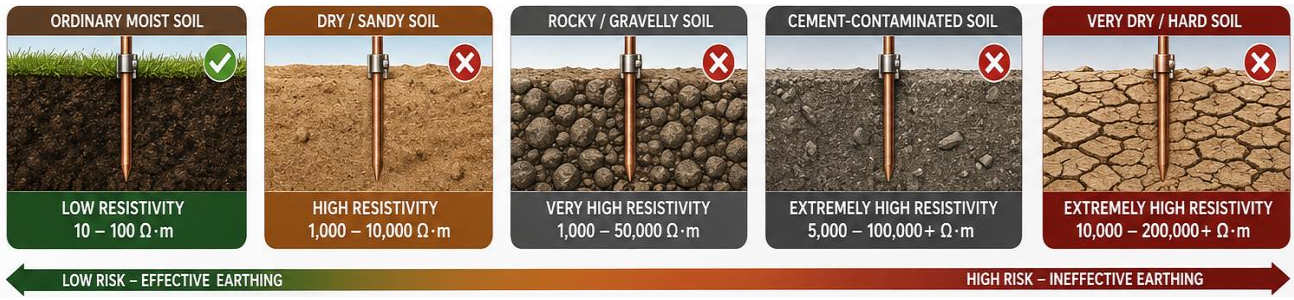


The Need for Electrical Earthing

Electrical earthing (grounding) provides a safe, low-resistance path for fault currents, lightning surges, and stray voltages to dissipate safely into the earth. It is a foundational requirement of every electrical installation — protecting human life, safeguarding equipment, and ensuring the stable, reliable operation of power and electronic systems.

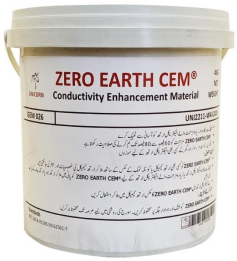
The Challenge of High-Resistivity Ground

An earthing system is only as effective as the soil surrounding its electrode. Dry, sandy, rocky, or cement-contaminated ground can have resistivity many times higher than ordinary moist soil — weakening fault-current dissipation, degrading lightning protection performance, and putting both personnel and equipment at risk. Over time, even a correctly installed earth pit can lose effectiveness as surrounding soil dries out or as the original backfill material depletes.



About the Product

Zero Earth CEM® is a proprietary conductivity enhancement material (CEM) formulated from low-corrosive ionic salts, engineered specifically for use in high-resistivity earthing environments. Mixed with water and introduced into an earth pit, it significantly lowers ground resistance — making it an effective solution for reviving old, high-resistance earth pits and for enhancing new installations in sandy or rocky ground.

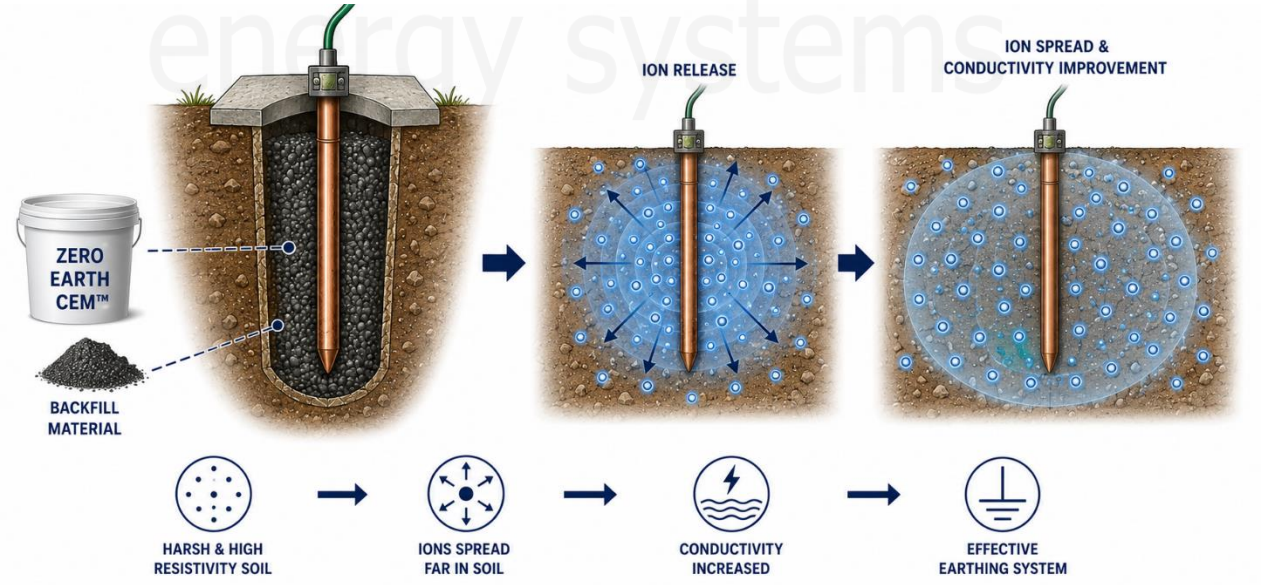


Key Features

- **Low-corrosive ionic salt formula —** reduces resistance without the accelerated electrode corrosion associated with ordinary rock salt.
- **Revives old earth pits —** simply mix with water and pour into an existing high-resistance earth pit.
- **Compatible with other backfill media —** can be combined with materials such as Super Earth GEL Powder™ to counter sandy or rocky soil conditions.
- **Significant resistance reduction —** decreases earth resistance by 60–80% in typical field conditions.
- **Multi-application use —** suitable for industrial, solar, and residential earthing systems.
- **Hygroscopic action —** naturally attracts and retains ambient moisture, sustaining conductivity over time.

How It Works

When **Zero Earth CEM®** is mixed with the backfill material and placed inside an electrical earthing bore, its active ions disperse uniformly through the surrounding soil. This ionic movement enhances conductivity even

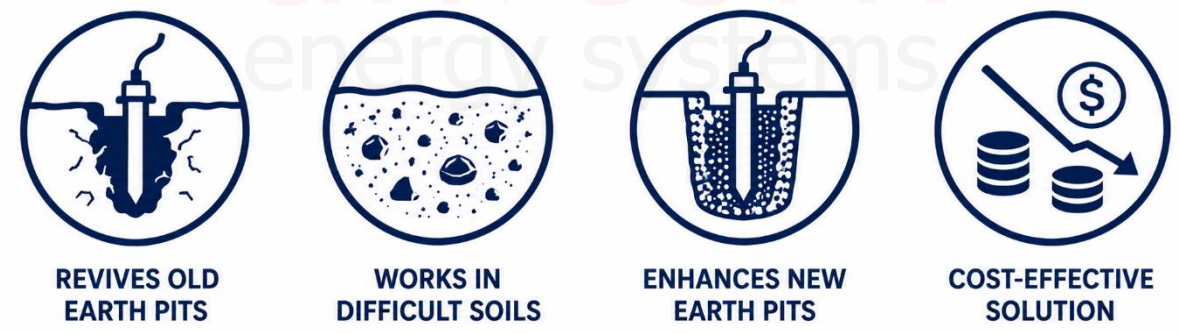


in high-resistivity conditions such as sandy, stony, or rubble-filled soils, improving fault current dissipation and overall earthing performance.

The Role of Conductivity Enhancement Salts

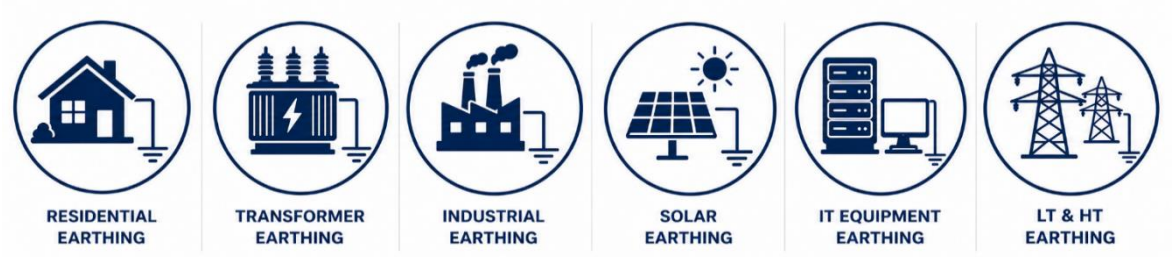
Zero Earth CEM® is a concentrated ionic salt compound designed to correct this problem directly. When dissolved in water and introduced into the soil, its ionic salts dramatically increase the ion-conducting capacity of the surrounding ground — lowering resistivity without corroding the electrode at the rate of ordinary rock salt. This makes it especially valuable for:

- **Reviving old or "dead" earth pits —** restoring performance in aged installations where resistance has risen above acceptable limits.
- **High-resistivity native soils —** sandy, rocky, or cement/concrete-contaminated ground that resists conventional earthing methods.
- **New earth pit enhancement —** boosting the performance of backfill materials such as Super Earth GEL Powder™ in difficult soils.
- **Cost-effective remediation —** avoiding the expense of deeper electrodes or additional earth pits.



Applications

Zero Earth CEM® is suitable for every type of electrical earthing application, whether in the IT sector, HT or LT power sector installations, solar PV systems, or residential and commercial building earthing



Technical Parameters

Parameter	Value
Chemical Nature	Ionic
Other Properties	Hygroscopic
Mesh Size	10 to 50 (mixed grade)
Soil Resistivity Reduction (5% dosage)	59.11 Ω·m → 0.886 Ω·m (98.5% decrease)
Sand Resistivity Reduction (5% dosage)	262.1 Ω·m → 2.42 Ω·m (99% decrease)
Typical Field Resistance Reduction	60% – 80%

Packaging & Storage

Specification	Detail
Product Code	GEM 026 | UNI2211-W4-C400
Packaging Format	Sealed plastic bucket
Net Weight	4 kg
Dimensions (H × D)	8" × 7"
Storage Conditions	Store in a dry, ventilated location at normal ambient temperature; do not store in direct sunlight or humid conditions
HS Code	3824.99

Usage Instructions

1. Use in New Electrical Earthing Bore

Zero Earth CEM® is used as an add-on material with other backfill chemicals, such as Super Earth GEL Powder, in electrical earthing bores during new earthing rod installation.

Step 1: Inspect the new earthing bore site for adverse conditions, such as nearby tree roots, rubble or stone, sandy soil, or proximity within about ten feet to basements, underground water tanks, or large sewer lines.

Step 2: Thoroughly mix **Zero Earth CEM®** with **Super Earth Gel Powder** until the blend is uniform.

Step 3: Place the prepared mixture into the bore as backfill, packing it evenly around the earth electrode to form a continuous conductive envelope.

2. Reviving Old Electrical Earthing Bore

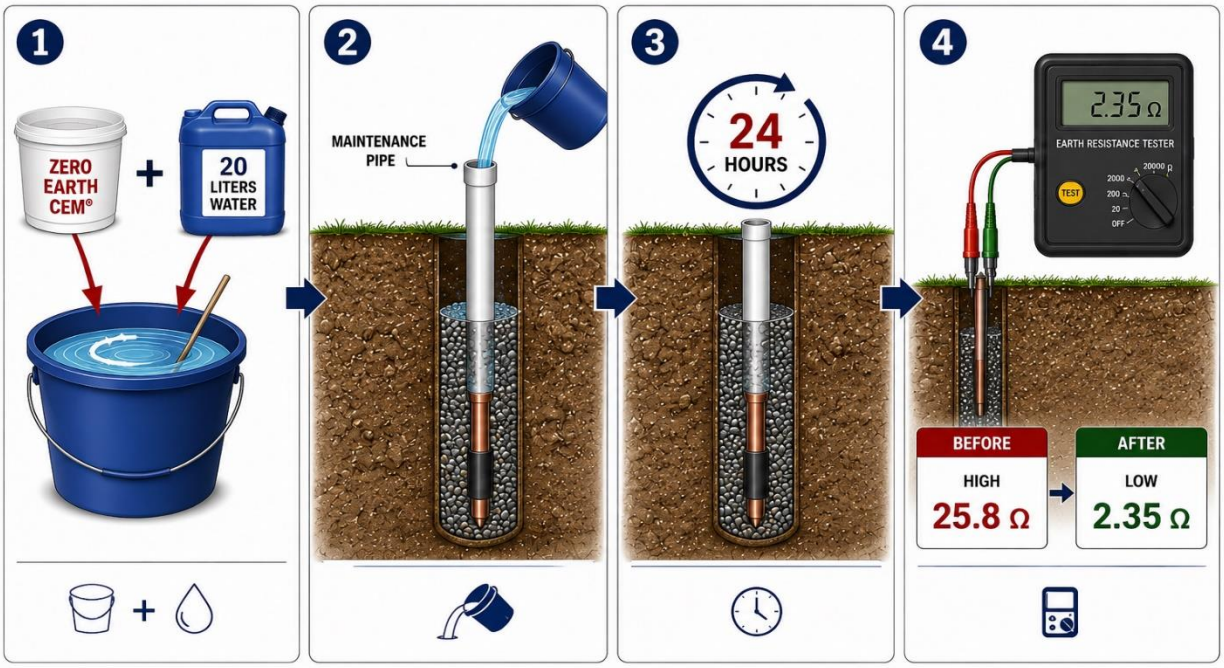
Zero Earth CEM® is designed for use in existing or old electrical earthing bores to help restore and improve earthing performance.

Step 1: Mix one bucket of **Zero Earth CEM®** thoroughly with 20 liters of clean water until a uniform solution is obtained.

Step 2: Slowly pour the entire prepared solution into the maintenance/watering pipe installed inside the electrical earthing bore, allowing the solution to penetrate the soil surrounding the earth electrode.

Step 3: Allow the treated earthing bore to remain undisturbed for 24 hours so that the solution can properly penetrate and condition the surrounding soil.

Step 4: After 24 hours, test the earth resistance again using an Earth Resistance Tester (Earth Resistance Meter) to evaluate the performance of the treated earthing system.



Improves conductivity of surrounding soil and reduces earth resistance.

RECOMMENDED QUANTITY GUIDE

APPLICATION	SOIL w/ CEMENT RESIDUES	DRY SAND	SMALL ROCKS
BORE EARTHING Copper Electrode 1m	1x ZERO EARTH CEM™ + 1x SUPER EARTH GEL POWDER	1x ZERO EARTH CEM™ + 1x SUPER EARTH GEL POWDER	2x ZERO EARTH CEM™ + 1x SUPER EARTH GEL POWDER
PLATE EARTHING 1.5' × 1.5'	2x ZERO EARTH CEM™ + 2x SUPER EARTH GEL POWDER	3x ZERO EARTH CEM™ + 3x SUPER EARTH GEL POWDER	4x ZERO EARTH CEM™ + 4x SUPER EARTH GEL POWDER
HORIZONTAL EARTHING 1 Meter Trench	1x ZERO EARTH CEM™ + 1x SUPER EARTH GEL POWDER	1x ZERO EARTH CEM™ + 1x SUPER EARTH GEL POWDER	1x ZERO EARTH CEM™ + 1x SUPER EARTH GEL POWDER
REVIVING OLD ELECTRICAL BORE	2x ZERO EARTH CEM™ IN WATER + 40L	3x ZERO EARTH CEM™ IN WATER + 60L	3x ZERO EARTH CEM™ IN WATER + 60L

ZERO EARTH CEM™
CONDUCTIVITY ENHANCEMENT MATERIAL

SUPER EARTH GEL POWDER™
GROUND ENHANCEMENT MATERIAL

NOTE: *For projects outside these standard conditions, contact* ***Unicorn Energy Systems*** *for consultancy via the details on the final page of this datasheet*

Safety & Handling

⚠ CAUTION

Do not mix this chemical with bare hands — prolonged contact may cause skin irritation. Always wear suitable gloves and eye protection when handling and mixing **Zero Earth CEM®**.

- **Handling —** wear gloves and eye protection; avoid inhalation of dust during mixing.
- **Storage —** store in a dry, ventilated location; do not store in direct sunlight or humid conditions.
- **Full safety data —** refer to the product Material Safety Data Sheet (MSDS) for complete hazard classification and first-aid measures.

Scan for Product Videos

Zero Earth CEM
Detail Video of Product

Click here to see video

Zero Earth CEM
How to Use video

click here to see video

Electrical Earthing
Process Video

click here to see video

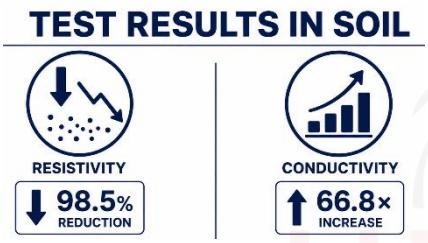
YouTube

Independent Laboratory Verification

Improvement in Soil

Zero Earth CEM® has been independently tested at the High Voltage Engineering Laboratory, Department of Electrical Engineering, University of Engineering and Technology (UET), Lahore, Pakistan.

Testing was conducted on a moist soil sample under controlled conditions at 29°C, comparing plain moist soil against moist soil treated with 5% **Zero Earth CEM®**. The untreated soil sample recorded an electrical resistivity of 59.11 Ω·m and a conductivity of 0.0169 S/m.



With the addition of 5% **Zero Earth CEM®**, resistivity dropped sharply to 0.886 Ω·m, while conductivity rose to 1.129 S/m — a 98.5% reduction in resistivity, corresponding to a 66.8-fold increase in electrical conductivity.

These independently verified results confirm that **Zero Earth CEM®** delivers a substantial improvement in soil conductivity, supporting its effectiveness as a ground enhancement compound for low-resistance earthing system design.

HIGH VOLTAGE ENGINEERING LABORATORY
DEPARTMENT OF ELECTRICAL ENGINEERING
UNIVERSITY OF ENGINEERING AND TECHNOLOGY
LAHORE-54890, PAKISTAN

Unicorn Energy Systems,
Plot # 3, Khursheed Street, Opposite Rehman City Office,
0.5 km Saggiyan Bypass, Lahore.

No:Univ./EED/0174/23
Dated: 13.10.2023

Subject: **Testing of Electrical Earthing Chemical**

The following electrical earthing chemical sample (conductivity enhancer) was tested on 11.10.2023, in the High Voltage Engineering Laboratory. A testing fee was deposited at Habib Bank Limited, Engineering University Branch, Lahore, via Bank Challan No. 10289 on 10.10.2023. The testing results are presented below:

TEST REPORT:

Specimen: Zero Earth CEM ™
Manufacturer: Unicorn Energy Systems
Filled Volume:
Dimensions (D×W×L): 49 mm × 49 mm × 300 mm
Cross-Sectional Area (D×W): 2.4×10^{-3} m²
Length (L): 0.3 m
Room Temperature: 29 °C

Sr. No	Sample	Electrical Resistivity	Electrical Conductivity
1.	Moist Soil	59.11 Ω.m	0.0169 S/m
2.	Moist Soil with 5% Zero Earth CEM ™	0.886 Ω.m	1.129 S/m

Remarks: The resistivity of the sample was significantly reduced, by **98.5%**, which corresponds to an impressive **66.8** times increase in its electrical conductivity.

Director High Voltage Lab.

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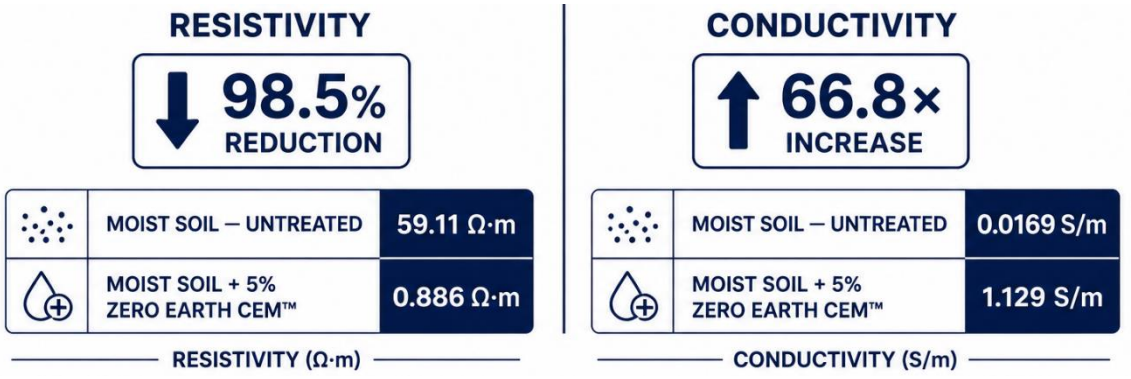
Office: +92-42-99029423, **Web:** www.uet.edu.pk **Email:** hvoltagelab@uet.edu.pk

Improvement in soil

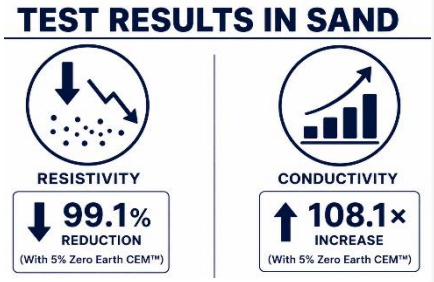


Independent Laboratory Verification

Improvement in Sand

A second trial of **Zero Earth CEM®** was conducted on moist sand under the same test conditions to verify performance across different soil types.

The untreated moist sand sample recorded a considerably higher baseline resistivity of 262.1 Ω·m and a conductivity of only 0.00382 S/m, reflecting sand's naturally poor conductive properties.



With the addition of 5% **Zero Earth CEM®**, resistivity dropped dramatically to 2.42 Ω·m, while conductivity rose to 0.413 S/m — a 99% reduction in resistivity, corresponding to a 108-fold increase in electrical conductivity.

These independently verified results confirm that **Zero Earth CEM®** delivers a substantial improvement in sand conductivity, supporting its effectiveness as a ground enhancement compound for low-resistance earthing system design

HIGH VOLTAGE ENGINEERING LABORATORY
DEPARTMENT OF ELECTRICAL ENGINEERING
UNIVERSITY OF ENGINEERING AND TECHNOLOGY
LAHORE-54890, PAKISTAN

Sr. No	Sample	Electrical Resistivity	Electrical Conductivity
1.	Moist Sand	262.1 Ω.m	0.00382 S/m
2.	Moist Sand with 5% Zero Earth CEM ™	2.42 Ω.m	0.413 S/m

Remarks: The resistivity of the sample was significantly reduced, by **99%**, which corresponds to an impressive **108** times increase in its electrical conductivity.

Note: The results are valid only for the sample tested on 11.10.2023.

Test(s) witnessed by:
Mr. Muhammad Bilal,
Assistant Professor, Department of Electrical Engineering.
UET, Lahore.

Director High Voltage Lab. Elect. Engg.

Chairman
Electrical Engineering Department

CHAIRMAN
Deptt. of Elect. Engg.
University of Engineering
& Technology, Lahore

Dr. Muhammad Asghar Saqib
Director
High Voltage Engineering Laboratory

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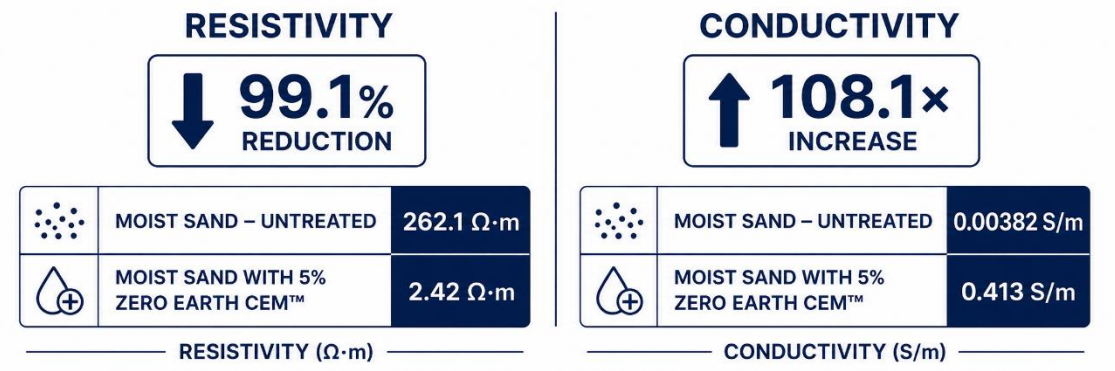

Improvement in sand

Standards & Compliance

Zero Earth CEM® is formulated with reference to internationally recognized earthing and lightning protection standards, including NEC 250 (National Electrical Code — Grounding & Bonding), IEC 62305 (Protection Against Lightning), and EN 50164 (Lightning Protection Components).

Safety & Handling

- **Handling** — wear gloves, safety glasses, and a dust mask when handling the dry compound. The formulation contains ionic salts that may cause skin and eye irritation on prolonged or repeated contact; avoid inhalation of dust and wash exposed skin thoroughly after handling.
- **Storage** — store sealed bags in a cool, dry, elevated location away from direct moisture ingress. The compound is hygroscopic and readily absorbs atmospheric moisture if left unsealed, which will accelerate clumping and reduce ease of application. Store away from heat sources and combustible materials, as the formulation includes an oxidizing agent.
- **Disposal** — dispose of empty packaging and any unused/hardened material in accordance with local regulations; avoid direct discharge of loose dry compound into open water bodies or drainage systems due to its salt content.
- **Full safety data** — refer to the product Material Safety Data Sheet (MSDS) for complete GHS/OSHA hazard classification, oxidizer precautions, and first-aid measures.

Shelf Life

Zero Earth CEM® has a shelf life of approximately 48 months from the date of manufacture when stored in unopened, sealed packaging under proper conditions. Due to the hygroscopic nature of its constituent salts, the compound is highly moisture-sensitive; even brief exposure to humid air can cause caking or premature clumping, reducing effectiveness and ease of application. Keep sealed until immediately prior to use.

Warranty

Unicorn Energy Systems warrants that **Zero Earth CEM®** is free from manufacturing defects and meets the technical specifications stated in this datasheet at the time of dispatch. This warranty covers the material composition and quality of the product only.

Earth resistance achieved at any given site depends on multiple external factors — including native soil composition, moisture content, electrode design, installation method, and site-specific conditions — which are outside the manufacturer's control and cannot be guaranteed by the product alone. Accordingly, this warranty does not extend to resistance values, performance outcomes, or claims arising after final site inspection and client acceptance of the installed earthing system.

Any claim under this warranty must be raised prior to installation, accompanied by proof of purchase and storage in accordance with this datasheet.

About Unicorn Energy Systems

Unicorn Energy Systems is a Lahore-based engineering company and Pakistan's first dedicated **manufacturer** of electrical earthing chemicals. Founded on the principle of delivering **internationally-benchmarked** earthing and lightning protection solutions to the local market, the company designs, manufactures, and supplies a complete range of **products** — including ground enhancement materials, conductivity enhancement compounds, ESE and conventional lightning arrestors, earthing electrodes, and solar PV solutions. Beyond manufacturing, **Unicorn Energy Systems** also provides **specialized engineering services**, including solar installation **inspection and audits**, **thermal imaging** of solar and electrical installations, **lightning arrestor protection radius design**, and **earthing material design consultancy** tailored to specific project requirements.

Every product and service is developed with reference to recognized international standards such as **IEC 62305**, **IEC 62561-7**, and **NEC 250**, and is independently verified through testing at accredited laboratories including the High Voltage Engineering Laboratory at the **University of Engineering & Technology (UET), Lahore**.

Unicorn Energy Systems serves **residential**, **commercial**, and **industrial** clients across Lahore, Islamabad, Rawalpindi, Karachi, Multan, Gujranwala, Raiwind, and Kasur, and has been trusted by leading national organizations including Pakistan Railways, PTCL, the Pakistan Air Force, Frontier Works Organization (FWO), Sui Northern Gas Pipelines Limited (SNGPL), and Mughal Steel. Backed by in-house engineering expertise and a commitment to quality, safety, and reliability, **Unicorn Energy Systems** continues to advance the standard of electrical earthing and lightning protection practice in Pakistan."

Contact & Support

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Email: unicornenergysystems@gmail.com

Address: Saggiyan Industrial Area, Lahore, Pakistan

Disclaimer: Specifications, features, and images in this datasheet are subject to change without prior notice. This document is intended for general product reference; always consult project-specific engineering guidelines and the product MSDS before installation.

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energy systems

ELECTRICAL
EARTH SOLUTIONS

RELIABLE • DURABLE • EFFECTIVE

HIGH RELIABILITY | **CORROSION RESISTANT** | **EFFECTIVE PROTECTION** | **LONG LASTING PERFORMANCE**

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