

Conductive Cement / Ground Enhancing Material

Part Number: **SAN-EARTH M5C**



Developed in 1975 in Japan, SAN-EARTH M5C is the original conductive cement ground enhancing material. It improves grounding system performance and extends grounding electrode life, especially in areas with high soil resistivity. SAN-EARTH M5C doesn't rely on water and doesn't expand, shrink, or crack over time. It yields consistent performance and is both environmentally safe and maintenance free. It can be easily installed in dry powder form, as a mortar, or as a slurry and, over time, it hardens to become conductive concrete. It will act as an electrode theft deterrent while protecting electrodes from corrosion and increasing their life up to ten times. Its low resistance and high capacitance lowers the surge impedance and allows dangerous lightning surges to be quickly diverted into the ground away from valuable equipment and personnel.

Features:

- Lowers Grounding System Resistance
- Reduces Corrosion
- Maintenance-Free
- Extends Electrode Life Up to Ten Times
- Electrode Theft Deterrent
- Easy to Install, Only One Person Required
- Environmentally Friendly and Non-Hazardous
- Makes Excellent Contact with Surrounding Soil
- Cost Efficient
- Works In Various Types of Grounding Systems
- Low Resistivity Material
- High Capacitance
- Lowers Surge Impedance
- Over 40 Years of Proven Performance
- Numerous Applications
- Works in Environments Where Other Products Can't
- Consistent Performance as a Dry Powder or a Wet Slurry or a Cured Solid
- Powder Mixes Easily With Water
- Reliable Results Even During Dry Spells
- Enables More Compact Grounding Systems
- Yields Low Resistance in Limited Space
- Doesn't Shrink or Expand
- Doesn't Crack When Curing
- Outperforms Competitors
- Available in 55lb (25kg) Bags or 2000lb (907kg) Super Sacks
- Available Globally
- Improves Personnel Safety
- Won't Be Swept or Washed Away by Water or by Soil Movement
- Strict Quality Control at Every Factory
- Large Existing Customer Base
- Improves Performance of Surge Arrestors
- Extends Sacrificial Electrode Life in Cathodic Protection Systems
- Withstands Heavy Ground Fault Currents
- No Salt or Chemical Recharging Required
- High Compressive Strength
- Easy To Pour Bags

Specifications	
Resistivity of Dry Powder	< 5.0 Ω-cm typically 1.9 Ω-cm
Resistivity of Wet Mortar	< 5.0 Ω-cm typically 1.9 Ω-cm
Resistivity of Wet Slurry	< 5.0 Ω-cm typically 1.9 Ω-cm
Resistivity of Cured Solid	< 5.0 Ω-cm typically 1.9 Ω-cm
Curing Time	27 Days
Color	Gray - Dark Gray
Odor	None
Dry Density (with no compression)	80.2 lbs/ft ³ (1284.7 kg/m ³)
Dry Powder Partial Size	typically 80 - 350 seive mesh
pH Range	7-11
Compressive Strength When Cured	208 kgf/cm ² 21 MPa (3045 psi) after 27 days (ASTM C293)
Flexural Strength	47 kgf/cm ² 300-450 psi (2070-3100 kPa) (ASTM C109)
Shrinkage	0.015% at 27 days
Life Expectancy	50+ years
IEC 62561-7 Standard	Complies
NSF / ANSI 60 Standard	Should Comply
Permeability to Water When Cured	1.8 x 10 ⁻⁸ cm/sec
Hygroscopic Property (water absorption)	≥ 24% of its weight
Corrosion Rate on Copper	4.44 x 10 ⁻⁵ mm/year (ASTM G102-89)

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Packaging

- 55lb (25kg) 4-Ply bags holding 0.827ft³ (0.02342m³) of SAN-EARTH M5C. 36 bags per pallet. 720 bags per 20ft container.
- 2000lb (907kg) super sacks holding 30.07ft³ (0.8516m³) of SAN-EARTH M5C

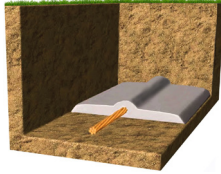
Storage, Transportation and Handling

Treat it the same as cement. Keep dry at all times. Keep away from moisture. SAN-EARTH M5C will harden after exposure to water. The SAN-EARTH M5C particle size is very small, so use of an approved dust mask is recommended.

Mixing Instructions

- **DRY** - SAN-EARTH M5C may be installed directly from the bag as a dry powder. Water will be absorbed from the surrounding environment and SAN-EARTH M5C will harden over time.
- **MORTAR** - SAN-EARTH M5C may be mixed with a small amount of water so that it forms a mortar that can be easily shaped. Slowly add clean water until desired consistency is reached.
- **SLURRY** - SAN-EARTH M5C may be mixed with a large amount of water so that it forms a slurry that can be easily poured or sprayed. Add approximately 4 gallons (15L) of clean water per 55lb bag. (About 2 parts water per 3 parts SAN-EARTH M5C)

Note: After mixing with water, a thin layer of water may form on top of mixture as contents settle.

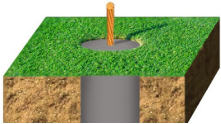


Typical Lateral Installation (recommended)

Dig the trench to the desired depth and width. Lay the electrode in center of the trench. Cover with the desired thickness of SAN-EARTH M5C. It should be spread across the bottom of the trench in a thin layer but slightly thicker at the center to make sure the electrode is completely embedded. Lift electrode slightly so that it is surrounded by SAN-EARTH M5C, which will protect it from corrosion. The electrode should be insulated at any point where it exits the SAN-EARTH M5C. Use a shovel to gently apply a 3-4 inch layer of soil to the top of the SAN-EARTH M5C and pack down to prevent displacement. Fill in trench with backfill. The chart below will help determine the amount of SAN-EARTH M5C that will be required.

Lateral / Trench Installation - Estimated Length One 55lb Bag of SAN-EARTH M5C Covers

TRENCH WIDTH	AVERAGE THICKNESS OF SAN-EARTH M5C LAYER					
	0.25in (0.6cm)	0.5in (1.3cm)	1in (2.5cm)	3in (7.6cm)	6in (15.2cm)	12in (30.5cm)
0.25ft (7.62cm)	158.8ft (48.4m)	79.4ft (24.2m)	39.7ft (12.1m)	13.2ft (4.0m)	6.6ft (2.02m)	3.31ft (1.01m)
0.50ft (15.24cm)	79.4ft (24.2m)	39.7ft (12.1m)	19.8ft (6.0m)	6.6ft (2.02m)	3.31ft (1.01m)	1.65ft (0.503m)
1ft (30.48cm)	39.7ft (12.1m)	19.8ft (6.0m)	9.9ft (3.0m)	3.31ft (1.01m)	1.65ft (0.503m)	0.83ft (0.253m)
2ft (60.96cm)	19.8ft (6.0m)	9.9ft (3.0m)	4.96ft (1.51m)	1.65ft (0.503m)	0.83ft (0.253m)	0.41ft (0.125m)
3ft (91.44cm)	13.2ft (4.0m)	6.6ft (2.02m)	3.31ft (1.01m)	1.10ft (0.335m)	0.55ft (0.168m)	0.28ft (0.085m)



Typical Vertical Installation

Auger the hole to the required depth. Insert the electrode in center of the hole. Pour SAN-EARTH M5C into hole around electrode (slurry is recommended) making sure it reaches to the proper depth. Make sure electrode is completely covered in SAN-EARTH M5C to protect it from corrosion. The electrode should be insulated at any point where it exits the SAN-EARTH M5C. The chart below will help determine the amount of SAN-EARTH M5C that will be required.

Vertical / Grounding Rod Installation - Estimated Number of 55lb Bags of SAN-EARTH M5C Needed

HOLE DIAMETER	LENGTH OF ROD / DEPTH OF HOLE						
	3ft (0.9m)	5ft (1.5m)	6ft (1.8m)	8ft (2.4m)	10ft (3.0m)	15ft (4.6m)	20ft (6.1m)
4in (10.16cm)	0.32 bags	0.53 bags	0.63 bags	0.84 bags	1.06 bags	1.58 bags	2.11 bags
6in (15.24cm)	0.71 bags	1.19 bags	1.42 bags	1.90 bags	2.37 bags	3.56 bags	4.75 bags
8in (20.31cm)	1.27 bags	2.11 bags	2.53 bags	3.38 bags	4.22 bags	6.33 bags	8.44 bags
10in (25.40cm)	1.98 bags	3.30 bags	3.96 bags	5.28 bags	6.60 bags	9.98 bags	13.19 bags
12in (30.48cm)	2.85 bags	4.75 bags	5.70 bags	7.60 bags	9.50 bags	14.25 bags	18.99 bags

SAN-EARTH M5C vs. Competitors

	SAN-EARTH M5C	Competitors
Extends Electrode Life / Reduces Corrosion Rate	YES	NO
Sacrifices Longevity for Lower Resistance	NO	YES
Easily Cracks / Low Compression Strength	NO	YES
Over 40 Years Proven Performance	YES	NO
Excellent Theft Deterrent	YES	NO

SAN-EARTH M5C vs. Bentonite Based Products

	SAN-EARTH M5C	Bentonite Based Products
Won't Expand, Shrink, Crack, or Separate from Electrode	YES	NO
Makes Good Contact with Surrounding Soil	YES	NO
Theft Deterrent	YES	NO
Easy to Install	YES	NO
Consistent Performance / Always Low Resistance	YES	NO
Maintenance Free	YES	NO
Relies on Water as the Conductor / Issues in Dry Areas	NO	YES
Protects Electrode from Corrosion and Chemical Resistant	YES	NO

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