

Conductive Cement for Cathodic Protection

Part Number: **SAN-EARTH M5C**



Developed in 1975 in Japan, SAN-EARTH M5C is the original conductive cement. When used in cathodic protection systems, it extends the life of the anode and reduces the overall cost. SAN-EARTH M5C 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 as a mortar, or as a slurry and, over time, it hardens to become conductive concrete. It helps protect water resources by sealing aquifer, aquitard, and aquiclude / confining layers and helps prevent cross-contamination. Unlike carbon coke, venting is not required as any gas that forms is on the outside surface of the hardened SAN-EARTH M5C. The current is dispersed over the large surface area reducing the breakdown reaction resulting in a smaller amount of gas bubbles which easily dissipate into the surrounding soil. This reduced reaction also allows the cathodic protection system to have a much longer life. SAN-EARTH M5C creates a special environment where the galvanic reaction with the anode is minimized.

Features:

- Protects Aquifer from Cross-Contamination
- No Vent Pipe is Required
- Reduces Corrosion
- Maintenance-Free
- Extends Life Up to Ten Times
- Easy to Install
- Environmentally Friendly and Non-Hazardous
- Makes Excellent Contact with Surrounding Soil
- Cost Efficient
- Works in Various Types of Environments
- Over 40 Years of Proven Performance
- Numerous Applications
- Works in Environments Where Other Products Fail
- Consistent Performance as a Wet Slurry or a Cured Solid
- Powder Mixes Easily with Water
- Doesn't Shrink or Expand
- Doesn't Crack When Curing
- Outperforms Competitors
- Available in 55lb (25kg) Bags or 2000lb (907kg) Super Sacks
- Available Globally
- Won't Be Swept or Washed Away by Water or by Soil Movement
- Strict Quality Control at Every Factory
- Large Existing Customer Base
- Extends Sacrificial Anode Life in Cathodic Protection Systems
- Withstands Heavy Ground Fault Currents
- High Compressive Strength
- Designed to Comply with NFS 60
- Simplifies Well Decommissioning Process
- Ideal as Conductive Filler for CIP Surveys

Specifications			
Resistivity	< 5 Ω-cm		
Curing Time	27 Days		
Color	Gray - Dark Gray		
Odor	None		
Dry Density	80.2 lbs/ft ³ (1284.7 kg/m ³)		
Dry Powder Particle Size	80 - 350 sieve mesh		
pH Range	9-12		
Compressive Strength When Fully Cured	208 kgf/cm ²	3045 psi (21 MPa)	(ASTM C293)
Flexural Strength	47 kgf/cm ²	300-450 psi (2070-3100 kPa)	(ASTM C109)
Shrinkage	0.014% at 27 days		
Life Expectancy	30+ years		
IEC 62561-7 Standard	Complies		
NSF / ANSI 60 Standard	Designed to Comply		
Permeability to Water When Cured	1.8 x 10 ⁻⁸ cm/sec		

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Packaging

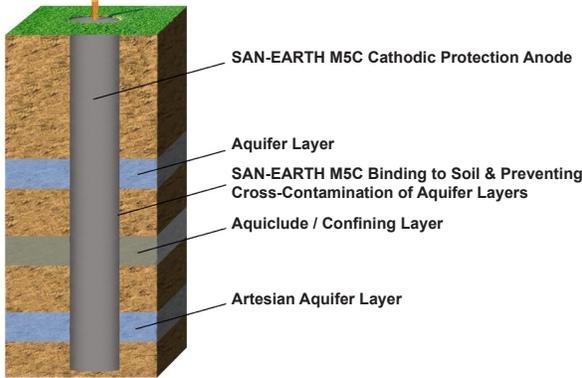
- 55lb (25kg) 4-Ply bags holding 0.827ft³ (0.02342m³) of SAN-EARTH M5C. 36 bags per pallet. 720 bags per 20ft container.
- 2000lb (907kg) super sacks holding 30.07ft³ (0.8516m³) of SAN-EARTH M5C

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

- **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. Start with approximately 3 gallons (11L) of clean water per 55lb bag. Add additional water to reach desired consistency.

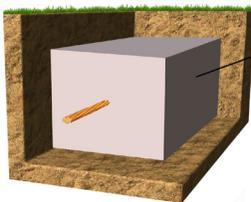


Typical Vertical Installation

Auger the hole to the required depth. Lower MMO anodes to desired depth and make sure that they are centered in the hole. Pour or pump (slurry is recommended) SAN-EARTH M5C into hole around electrode making sure it reaches to the proper depth and that there are no air pockets or gaps. Make sure electrode is completely covered in SAN-EARTH M5C to protect it. The electrodes or connected cables should be insulated at any point where they exit or are not embedded in the SAN-EARTH M5C to help prevent corrosion. The chart below will help determine the amount of SAN-EARTH M5C that will be required.

Vertical Anode Installation - Estimated Number of 55lb Bags of SAN-EARTH M5C Needed

HOLE DIAMETER	LENGTH OF ANODE / DEPTH OF HOLE						
	20ft (6m)	50ft (15m)	100ft (31m)	200ft (61m)	300ft (91m)	500ft (152m)	800ft (244m)
4in (10.16cm)	2.1 bags	5.3 bags	10.6 bags	21.1 bags	31.7 bags	52.8 bags	84.5 bags
6in (15.24cm)	4.8 bags	11.9 bags	23.8 bags	47.5 bags	71.3 bags	118.7 bags	190.0 bags
8in (20.31cm)	8.5 bags	21.1 bags	42.2 bags	84.4 bags	126.7 bags	211.0 bags	337.7 bags
10in (25.40cm)	13.2 bags	33.0 bags	66.0 bags	131.9 bags	197.9 bags	329.8 bags	527.6 bags
12in (30.48cm)	19.0 bags	47.5 bags	95.0 bags	190.0 bags	284.9 bags	474.9 bags	759.8 bags



Typical Lateral Installation

Dig the trench to the desired depth and width. Pour half of the desired thickness of SAN-EARTH M5C into the trench. Lay the electrode on top and in the center of the SAN-EARTH M5C. Cover with the remaining half of the desired thickness of SAN-EARTH M5C. The electrode should be insulated at any point where it exits or is not embedded in the SAN-EARTH M5C to prevent corrosion. Use a shovel to gently apply a 3-4 inch layer of backfill to the top of the SAN-EARTH M5C and pack down gently 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 Anode Installation - Estimated Length One 55lb Bag of SAN-EARTH M5C Covers

TRENCH WIDTH	THICKNESS / HEIGHT OF ANODE					
	0.25ft (7.6cm)	0.50ft (15.2cm)	0.75ft (19.1cm)	1ft (30.5cm)	2ft (61.0cm)	3ft (91.4cm)
0.25ft (7.60cm)	13.20ft (4.00m)	6.60ft (2.020m)	4.41ft (1.340m)	3.31ft (1.010m)	1.65ft (0.503m)	1.10ft (0.335m)
0.50ft (15.20cm)	6.60ft (2.02m)	3.31ft (1.010m)	2.21ft (0.674m)	1.65ft (0.503m)	0.83ft (0.253m)	0.55ft (0.168m)
1ft (30.50cm)	3.31ft (1.01m)	1.65ft (0.503m)	1.10ft (0.335m)	0.83ft (0.253m)	0.41ft (0.125m)	0.28ft (0.085m)
2ft (60.96cm)	1.65ft (0.50m)	0.83ft (0.253m)	0.55ft (0.168m)	0.41ft (0.125m)	0.21ft (0.063m)	0.14ft (0.043m)
3ft (91.44cm)	1.10ft (0.34m)	0.55ft (0.168m)	0.37ft (0.112m)	0.28ft (0.085m)	0.14ft (0.043m)	0.09ft (0.028m)

SAN-EARTH M5C vs. Coke Breeze	SAN-EARTH M5C	Coke Breeze
Greatly Extends Life of Anode	YES	NO
Impermeable - Protects Aquifer, Aquitard, and Aquiclude / Confining Layers from Cross-Contamination	YES	NO
Over 40 Years of Life with Proven Performance	YES	NO
Cause Galvanic Corrosion	NO	YES
Requires Venting	NO	YES