

ERITECH[®]

GEM

Ground Enhancement Material



ERICO[®]

GEM25A

Developed in 1992, Ground Enhancement Material (GEM) is a superior conductive material that solves your toughest grounding problems. GEM is a low-resistance, non-corrosive, carbon dust-based material that improves grounding effectiveness, especially in areas of poor conductivity. GEM contains portland cement, which hardens when set, to become a conductive concrete that is permanent, maintenance-free and will never leach or wash away.

GEM improves grounding effectiveness regardless of soil conditions. It is the ideal material to use in areas of poor conductivity, such as rocky ground, mountain tops and sandy soil. GEM is also the answer in situations where ground rods can't be driven or where limited land area makes adequate grounding difficult with conventional methods.

No other material matches GEM for reducing earthing resistance, maintaining a permanent low resistance and for providing high conductivity for the life of the grounding system. In addition, GEM does not adversely affect soil and will not leach ions or contaminate ground water. It meets all EPA requirements for landfill (USA). A Material Safety Data Sheet (MSDS) is available on request.

GEM is **effective**

- Dramatically reduces earth resistance and impedance measurements
- Maintains constant resistance for the life of the system once in its set form
- Performs in all soil conditions even during dry spells

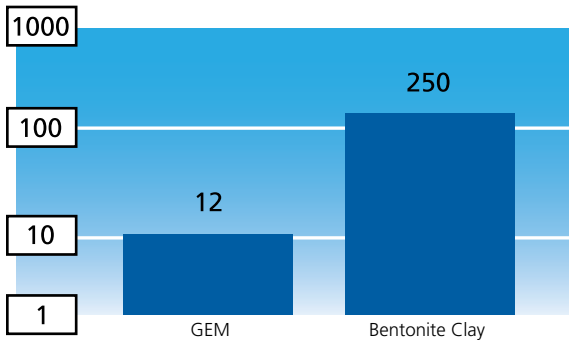
GEM is **permanent**

- Does not dissolve, decompose or leach out with time
- Does not require periodic charging treatments or replacements
- Does not require maintenance
- Does not require the continuous presence of water to maintain its conductivity

GEM is **easy to use**

- Easy-to-handle 25 lb (11.36 kg) bags or 25 lb bucket (GEM25ABKT)
- Requires one person to install
- Can be easily mixed into a slurry
- Solidifies into a conductive cement in three days
- May reduce the size of the grounding system where conventional methods are unsatisfactory
- Reduces vandalism (ground rods cannot be easily removed when set in concrete)

Resistivity Characteristics



GEM has a resistivity factor more than 20 times lower than bentonite clay.

Fast and Easy Ordering

For more information, contact your local ERICO sales representative for a quote. You can reference the GEM part numbers.

Part Number	Description
GEM25A	25-lb. (11.36 kg) bag with handles
GEM25ABKT	25-lb. (11.36 kg) plastic bucket with locking lid



Design and Estimating Software

Design software estimates the quantity of GEM needed and calculates the anticipated ground resistance on any installation. GEM software is available at www.erico.com/products/GEM.asp.

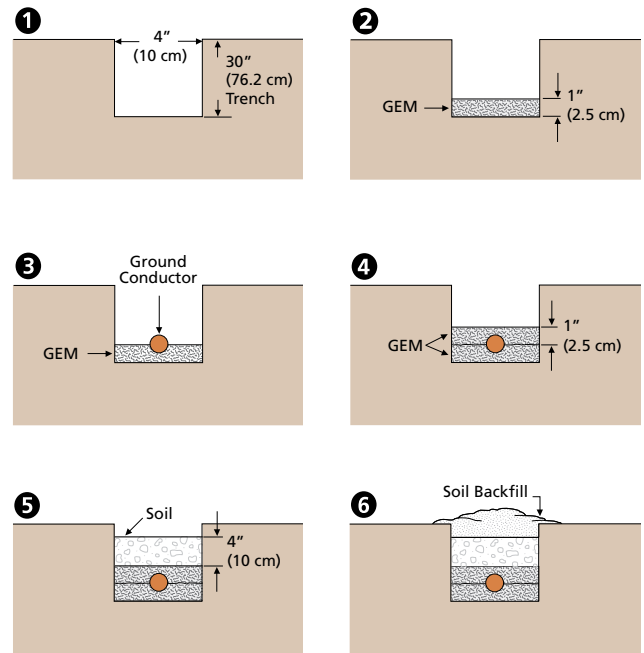
Specifications

Ground enhancement material must be permanent and maintenance-free (no recharging with salts or chemicals, which may be corrosive) and maintain its earth resistance with time. It must set up firmly and not dissolve or decompose, or otherwise pollute the soil or the local water table. The ground enhancement material must also be suitable for installation in a slurry form. It should not depend on the continuous presence of water to maintain its conductivity, and in its set form will have a resistivity of not more than 20 ohm-cm.

Instructions

Trench Installation:

1. Premix GEM into a slurry form. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per bag of GEM.
To mix GEM into a slurry form, use a standard cement mixer or mix in a mixing box, wheelbarrow, etc. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per bag of GEM. Do not mix GEM with salt water.
2. Spread out enough GEM to uniformly cover bottom of trench—about 1 inch (2.5 cm) deep. (See Table)
3. Place conductor on top of GEM. (See Note 1)
4. Spread more GEM on top of conductor to completely cover conductor – about 1 inch (2.5 cm) deep. Allow GEM to harden. Wait 30 minutes to one hour before filling the trench with soil backfill.
5. Carefully cover the GEM with soil to a depth of about 4 inches (10 cm), making sure not to expose the conductor.
6. Tamp down the soil, then fill in the trench.



Note 1: Wait for the GEM to harden, about 15 to 20 minutes, before placing the conductor on top of the GEM. You must apply 4 inches (10 cm) of insulating material to the conductors and ground rods exiting the GEM, starting 2 inches (5 cm) inside the GEM.

Note 2: Excess standing water must be removed from trench.

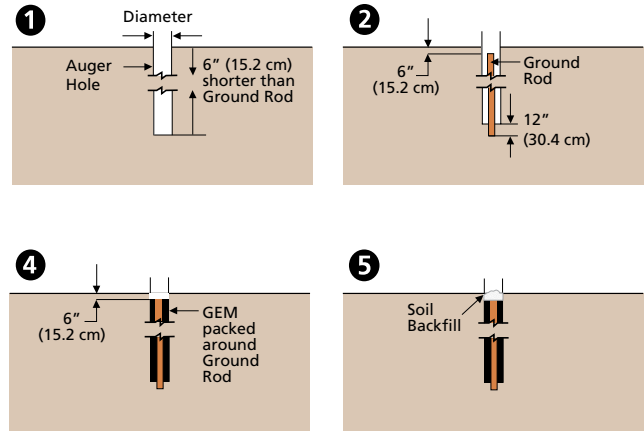
Estimated linear feet of ground conductor covering with each bag of GEM.

Trench Width		Total Thickness of GEM							
		in		cm		in		cm	
Inches	Centimeters	1	2.5	2	5	3	7.6	4	10
4	10.0	14.0	35.6	7	17.8	4.7	12	3.5	8.8
6	15.2	9.3	23.6	4.7	12	3.1	7.8	2.3	5.8
8	20.3	7.0	17.8	3.5	8.8	2.3	5.8	1.8	4.6
10	25.4	5.6	14.2	2.8	7.0	1.9	4.8	1.4	3.6
12	30.5	4.7	12	2.3	5.8	1.6	4	1.2	3

A 25-pound bag of GEM will cover 7 linear feet (2.1 m) of conductor length for a 4-inch-wide (10 cm), 2-inch-thick (5 cm) covering 1 inch (2.5 cm) below and 1 inch (2.5 cm) above conductor, based on a density of 63.5 lb/cu.ft.

Ground Rod Backfill Installation:

1. Auger a 3-inch (7.5 cm) or larger diameter hole to a depth of 6 inches (15 cm) shorter than the length of the ground rod.
2. Place ground rod into augered hole and drive 1 foot (30 cm) (if possible) into bottom of the hole. The top of the ground rod will be approximately 6 inches (15 cm) below grade. At this time, make any connections to ground rod using CADWELD® connections. (See Note 1)
3. Premix GEM into a slurry form. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per bag of GEM.
4. Pour the appropriate amount of GEM (see table) around the ground rod. To ensure the GEM material completely fills the hole, tamp around the ground rod with a pole. Wait 30 minutes to 1 hour before filling the hole with soil backfill.
5. Fill remainder of augered hole with soil removed during augering. For various augered-hole diameters and depths, see the table below.



Note 1: 4 inches (10 cm) of insulating material should be applied to the conductors and ground rods exiting the GEM, starting 2 inches (5 cm) inside the GEM.

Note 2: Excess standing water must be removed from the hole.

Estimated bags of GEM for backfilling around ground rods to a density of 63.5 lb/ft³

Diameter of Hole Inches Centimeters		Depth of Hole*													
		ft 6	cm 183	ft 7	cm 213	ft 8	cm 244	ft 9	cm 274	ft 17	cm 518	ft 19	cm 579	ft 20	cm 610
3	7.6	2	70	2	70	2	70	2	70	4	122	4	122	4	122
4	10	2	70	3	91	3	91	3	91	6	183	7	213	7	213
5	12.7	3	91	4	122	4	122	5	152	9	274	10	305	10	305
6	15.2	5	152	5	152	6	183	7	213	13	396	14	427	15	457
7	17.8	6	183	7	213	8	244	9	274	17	518	19	579	20	610
8	20.3	8	244	9	274	11	335	12	366	22	671	25	762	26	792
9	22.8	10	305	12	366	13	396	15	457	28	853	31	945	32	975
10	25.4	12	366	14	427	16	488	18	549	34	1036	38	1158	40	1219

* 8-foot (2.44 m) minimum rod length required to be in contact with the soil (or GEM), per NEC® 250-83-C.

Note: To mix GEM into a slurry form, use a standard cement mixer or mix in a mixing box, wheelbarrow, etc. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per bag of GEM. Do not mix GEM with salt water. For storage and safety precautions, see product packaging.

Technical Assistance

ERICO technical support is available to answer any questions you may have.

NEC is a registered trademark of, and National Electrical Code (NEC) standard is a copyright of the National Fire Protection Association.

WARNING

ERICO products shall be installed and used only as indicated in ERICO's product instruction sheets and training materials. Instruction sheets are available at www.erico.com and from your ERICO customer service representative. Improper installation, misuse, misapplication or other failure to completely follow ERICO's instructions and warnings may cause product malfunction, property damage, serious bodily injury and death.

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