

**GEM**  
**GROUND ENHANCEMENT MATERIAL**



# GEM25A

Pentair Ground Enhancement Material (GEM) is the effective, maintenance-free, long-lasting, easy to use, and environmentally sensitive solution to your toughest grounding problems.

GEM is a low-resistance, non-corrosive, carbon-based superior conductive material that improves grounding effectiveness, especially 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.

GEM contains portland cement, which sets within 3 days and fully cures within 28 days, to become a highly conductive concrete that performs in all soil conditions irrespective of the presence of water. GEM maintains a constant level of superior performance once cured that will not diminish over the life of the grounding system.

GEM comes in easy to use 25 lb (11.3 kg) bags or buckets that one person can install. GEM is maintenance-free and will never leach or wash away. A Safety Data Sheet (SDS) 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
- May reduce the size of the grounding system where conventional methods are unsatisfactory

## GEM is **easy to use**

- Easy-to-handle 25 lb (11.3 kg) bags or buckets
- Requires one person to install
- Can be installed in dry form in vertical orientation

## Fast and Easy Ordering

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

Part Number	European Article Number	Description
GEM25A	163670	25 lb (11.3 kg) bag with handles
GEM25ABKT	NA	25 lb (11.3 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/GEM](http://www.erico.com/GEM).

## GEM is **maintenance-free**

- Does not require periodic charging treatments or placement
- Does not require the continuous presence of water to maintain its conductivity, making it ideal for tough soil conditions or remote installations

## GEM is **environmentally sensitive**

- Exceeds IEC® 62561-7 which sets the benchmark for corrosion, leaching, sulfur content, and other environmental regulations
- EPA compliant to Toxicity Characteristic Leaching Procedure (TCLP)
- Safety data sheet available upon request

## GEM is **long-lasting**

- Fully sets within 3 days, fully cures within 28 days
- Does not dissolve, decompose or leach out
- Non-corrosive per IEC
- Reduces vandalism and theft since conductors are hard to remove from concrete



## Recommended Specifications:

Parameter	Recommended Values	Test Method
Standards Compliance		Full compliance to IEC 62561-7 EPA Toxicity Characteristic Leaching Procedure (TCLP), test method 1311
Leaching	Arsenic < 1.5 mg/L, Barium < 60 mg/L, Cadmium < 0.15 mg/L, Chromium < 3.0 mg/L, Lead < 1.5 mg/L, Mercury < 0.06 mg/L, Elenium < 1.0 mg/L	EC 62561-7 EN 12457-2
Sulfur Content	< 2%	ISO 14869-1
Resistivity	<2 Ω-cm for powder <20 Ω-cm for mixed and cured material	Compressed powder according to ASTM G187-12 Mixed and cured per ASTM D991-89
Corrosion Performance	For copper-plated earth electrodes, the polarization resistance shall be > 8 Ω x m2 for aggressive environments For galvanized earth electrodes, the polarization resistance shall be > 7.6Ω x m2 for aggressive environments	IEC 62561-7, Sec 5.5, aggressive environment.
Flexural Strength	300-450 psi [2070-3100 kPa]	ASTM C293
Compressive Strength	100-200 psi [690-1390 kPa] after 672 hours curing time	ASTM C109

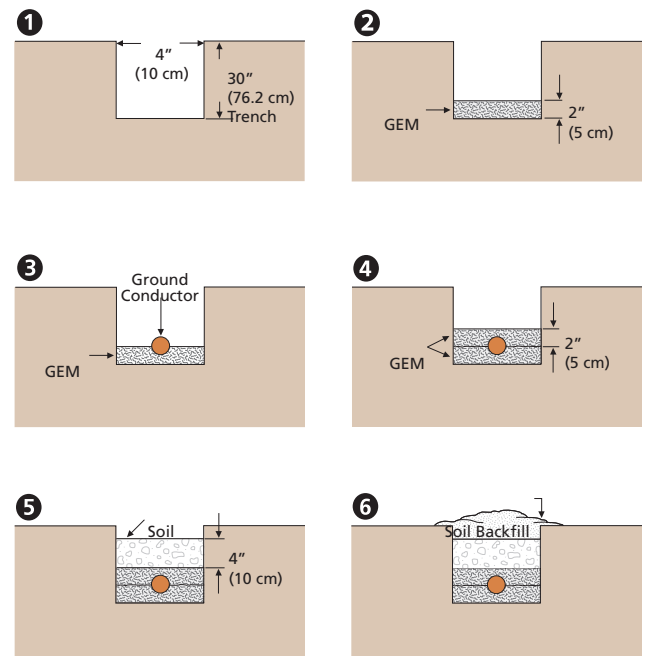
## Installation Instructions

### Trench Installation:

- Mix GEM into a slurry form by using a standard cement mixer or mix in a bucket, mixing box, wheelbarrow, etc. Use 1.5 to 2 gallons (5.7 to 7.6 liters) of clean-potable water per bag or bucket of GEM. Do not mix GEM with salt water.
- Spread out enough GEM to uniformly cover bottom of trench – about 2 in (5 cm) deep. (See Table). Let the GEM harden to prevent the conductor from sinking to the bottom of the trench.
- Place conductor on top of GEM. (See Note 1)
- Spread more GEM on top of conductor to completely cover conductor – about 2 in (5 cm) deep. Allow GEM to harden. Wait 30 minutes to one hour before filling the trench with soil backfill.
- Carefully cover the GEM with soil making sure not to expose the conductor.

**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.



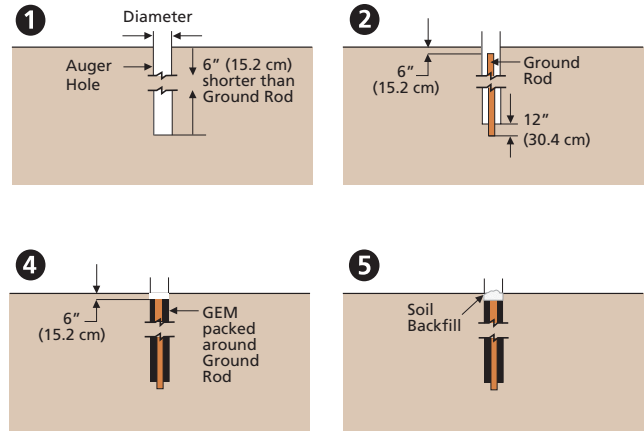
### Estimated linear feet of ground conductor covering with each bag of GEM

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 or bucket of GEM. The installation of GEM in a dry state is acceptable for vertical ground rod applications.
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 must 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/ft<sup>3</sup>

Diameter of Hole		Depth of Hole*													
		ft		cm		ft		cm		ft		cm		ft	
Inches	Centimeters	6	183	7	213	8	244	9	274	17	518	19	579	20	610
3	7.6	2		2		2		2		4		4		4	
4	10	2		3		3		3		6		7		7	
5	12.7	3		4		4		5		9		10		10	
6	15.2	5		5		6		7		13		14		15	
7	17.8	6		7		8		9		17		19		20	
8	20.3	8		9		11		12		22		25		26	
9	22.8	10		12		13		15		28		31		32	
10	25.4	12		14		16		18		34		38		40	

\* 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.

## Customer Support

Support representatives are available to answer any product or application questions you may have; visit [www.eric.pentair.com](http://www.eric.pentair.com) to find a phone number for your nearest customer support representative.

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### WARNING

Pentair products shall be installed and used only as indicated in Pentair's product instruction sheets and training materials. Instruction sheets are available at [www.eric.pentair.com](http://www.eric.pentair.com) and from your Pentair customer service representative. Improper installation, misuse, misapplication or other failure to completely follow Pentair's instructions and warnings may cause product malfunction, property damage, serious bodily injury and/or death, and void your warranty.

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