



To serve - Knowledge Power ~ Power knowledge



## REVOLUTION IN EARTHING TECHNOLOGY

[www.pinnaclepune.co.in](http://www.pinnaclepune.co.in)  
[www.pinnacleengineeringsolutions.com](http://www.pinnacleengineeringsolutions.com)



## TYPES OF EARTHING SYSTEMS IN PRACTICE

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- Driven Rods
- Pipe Earthing
- Plate Earthing
- Chemical Earthing
- Gel or Pipe in pipe technology
- Solid section wire mesh/mat



## MAINTENANCE OF ABOVE SAID EARTHING SYSTEMS

**These earth enhancing materials require**

- Regular watering
- Re-charging or complete replacement over a period of time
- Even Bentonite needs regular watering to maintain its beneficial characteristics as per IEEE 80 Std

## EARTH ENHANCING / BACK FILL MATERIALS IN USE



CHARCOAL  
AND SALT



SODIUM  
CARBONATE



CALCIUM  
CARBONATE



CALCIUM  
SULPHATE



COPPER  
SULPHATE



BENTONITE



## **EFFECT OF CORROSION ON PLATE / CHEMICAL / PIPE-IN-PIPE EARTHING**





# NEW EARTHING TECHNOLOGIES AVAILABLE AROUND THE WORLD

## — HISTORY OF MARCONITE —

# ELECTRICALLY CONDUCTIVE AGGREGATE



Mr. Guglielmo Marconi  
**Mr. Guglielmo Marconi**

Mr. Guglielmo Marconi and PMC Carbon jointly developed Marconite® in 1972 and it was displayed to the World on UK's technology program Tomorrow's World in 1977.

In the year 2002, James Durrans & Sons Ltd, UK bought the patent right of Marconite® and since then they are the manufacture of Marconite® through their group company Carbon International Ltd. UK.

In the year 2011 Carbon International Ltd. UK appointed Inter – Tech, New Delhi as their prime distributor of Marconite® for India.



## ADVANTAGES OF MARCONITE

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- Low resistivity
- Versatile
- Cost effective
- Chemically inert
- High strength
- Easy to use
- Permanent & Secure
- Environment friendly



## USES OF MARCONITE

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- Marconite was developed specifically for
- **Electrical Earthing/Grounding**
- **Anti Static Applications**
- **Electro Magnetic Shielding**



## MARCONITE EMBEDDING SAVES METAL CONDUCTOR FROM CORROSION



## RE-LOCATABLE ELECTRODES FOR COMMUNICATION LORRIES





## QUALITIES OF MARCONITE

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### Versatile & suitable for all types of soils

- Hilly terrain, Rocks or Granite
- Sand or sandy soils
- Salty terrains or sea shores
- Water logged areas or River beds
- Made up grounds

## — QUALITIES OF MARCONITE —

### RELIABLE EARTHING CONCRETE

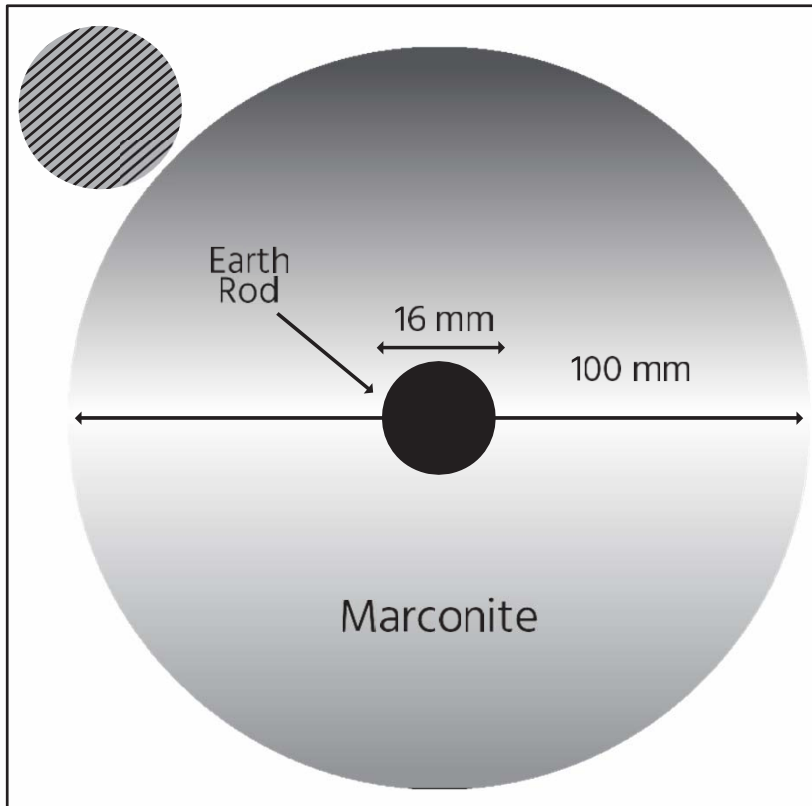
- Ultra low resistivity :  $0.001 \Omega \text{ m}$
- When mixed with cement : It is still  $0.04 \Omega \text{ m}$
- Higher mechanical strength :  $> \text{M25 Gr concrete}$
- Chemically inert : ph is in neutral range
- Does not corrode metal conductor
- Conduction of current : Electronic



## — BENEFITS OF USING MARCONITE —

### RELIABLE EARTHING CONCRETE

- Permanent, no water, maintenance or recharge required for its life
- Consistent performance
- Unaffected by change in environment
- Does not dissolve, leach or be swept away by ground water channels
- Environment friendly
- Biodegradable, no environmental hazard even after its complete life
- Life is more than 50 years
- Lowest ownership cost
- Solid structure provides larger surface contact area



## CONTACT SURFACE AREA

Contact surface area of marconite encased earth electrode increases more effectively than the area of ground rod.

A 16mm Dia ground rod, encased in 100mm Dia shell of Marconite concrete has contact surface area of nearly 6.4 times than the area of bare rod.

## — HOW DOES MARCONITE WORK —

- True conductor & does not need ions or presence of water to conduct electricity i.e. Electronic conduction.
- Does not suffer from effects of drying and performs in dry soils.

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## — TESTS AT CPRI, BANGALORE —

### **Fault Current**

40 mm & 100 mm Dia X 3 m – 80.52 kA

16 mm & 80 mm Dia X 3 m – 39.66 kA

### **Earth Resistance**

(In a rocky soil having resistivity 468.29 ohms-m)

100 mm Dia X 3 m – 90.87 ohms


200 mm Dia X 3 m – 55.43 ohms





## VS OTHER BACKFILL MATERIALS

<b>Resistivity</b>	0.001Ω-m	2.5Ω-m or above
<b>ph range, Conduction</b>	ph is inert & in neutral range, Electronic Conduction	Alkaline & ionic conduction
<b>Watering, Environment</b>	No watering & No ground water pollution hence environment friendly	Need regular watering, chemical pollute ground water channel
<b>Uses, Life</b>	Versatile, Life 50+ yrs & does not need any recharge	Limitation in rocky soil, 8/10 yrs & needs regular recharge
<b>Corrosion</b>	Embedded metal conductor does not corrode	Metal conductor gets corroded because of moisture & heat
<b>Surface Contact Area</b>	Larger surface contact area	Limited to metal conductor dia
<b>Ownership Cost</b>	Lowest considering long life	High considering short life

	Pipe	Plate	Chemical	
<b>Plant Life</b>	50 Years	50 Years	50 Years	50 Years
<b>Life cycle of earthing</b>	3 Years	7 Years	6-8 Years	50+ Years
<b>Replacement frequency during plant life</b>	16 Times	7 Times	6 Times	1 Time
<b>Initial cost (In soft soil)</b>	Rs. 2,618/-	Rs. 4,500/-	Rs. 8,000/-	Rs. ?
<b>Life cycle cost</b>	Rs. 2,618/- X 16 Rs. 41,888/-	Rs. 4,500/- X 7 Rs. 31,500/-	Rs. 8,000/- X 6 Rs. 48,000/-	Rs ? - X 1
<b>Maintenance cost</b>	Rs. 5,705/- X 16 Rs. 91,280/-	Rs. 7,335/- X 7 Rs. 51,345/-	Rs. 20,000/-	Nil
<b>Total life cycle cost</b>	Rs. 1,33,168/-	Rs. 82,845/-	Rs. 68,000/-	Rs. ?

— ACHIEVEMENTS —

**15000 + Marconite Earth Pits  
Pan India Installations**  
Where 'No' maintenance or Water  
is required for the Next 50 years

## — VALUABLE CUSTOMERS —





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 **THANK YOU!** 