



conGraph

GND-20

DATA SHEET

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DESCRIPTION

conGraph GND-20 is a mortar that combines carbonaceous and cement-based materials, which make it possible to achieve a product with high electrical conductivity and mechanical strength.

Due to its properties, it is used to **reduce the grounding resistance of electrical installations**, offering a **permanent solution over time**.

conGraph GND-20 is supplied in a **20 Kg** paper bag.

BENEFITS

- Reduces grounding resistance
- Reduces the size of conventional grounding systems
- Reduces cost compared to deep electrode method
- Protects copper from corrosion
- Increases the effective diameter of the electrode
- High mechanical strength
- Does not need maintenance and it is permanent over time, both in its performance and in its structure
- Non harmful to the environment
- Protects against theft

TECHNICAL FEATURES

Fully compliance with UNE-EN IEC 62561-7:2018: Requirements for earthing enhancing compounds

Property	Typical value	Test method
Resistivity ($\Omega \cdot m$)	<10,0	UNE 83988-2:2014
Compressive strength (MPa)	1 days	8 \pm 1,5
	28 days	15,0 \pm 2,0
Solid - Water ratio	0,38 \pm 0,02	UNE-EN 12350-8:2020
Density (kg/ m ³)	Slurry	1700 \pm 100
	Powder	900 \pm 100
Slurry workability time (min)	350	-
pH	12,5	UNE-EN 16192-2:2012
Sulphur content (%)	<1,0	ISO 4689-3:2017
Hydraulic conductivity (cm/s)	1,9 \cdot 10 ⁻⁷	UNE-EN ISO 11275
Corrosion rate (μm /year)	<1,2 (*)	ASTM G59 - 97 ASTM G102 - 89 UNE-EN ISO 10111:2020
Leaching	See breakdown	UNE-EN 12457-2:2003 UNE-EN 16192-2:2012

LEACHING BREAKDOWN RESULTS

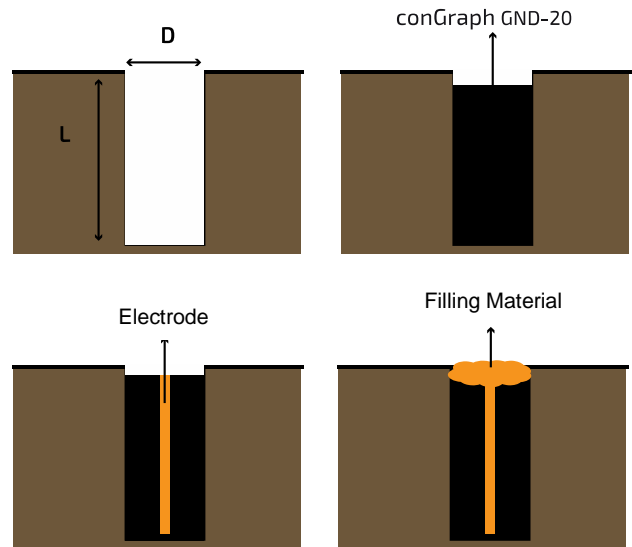
Elements to be determined according to IEC 62561-7	Value (%)	Limit Values
Fe	<0,43	According to the national or international regulation applicable
Cu	0,01	
Zn	<0,09	
Ni	<0,01	
Cd	<0,01	
Co	<0,01	
Pb	0,05	

* Bentonite corrosion rate: 8,3 μm /year

HOW TO USE CONGRAPH GND-20

VERTICAL ROD

1. Drill a hole in the ground. Minimum diameter 65 mm (2 ½ "). Minimum depth 2 m (6'6").
2. Mix **conGraph GND-20** with water until a slurry is obtained. Use 7.5 to 8.0 liters (2 US gal) of water per bag. Do not use salt water.
3. Pour **conGraph GND-20** into the hole (see table).
4. Place the rod in the center of the hole and insert it.
5. Wait at least one hour to fill to the top of the hole with **conGraph GND-20** powder or natural soil.



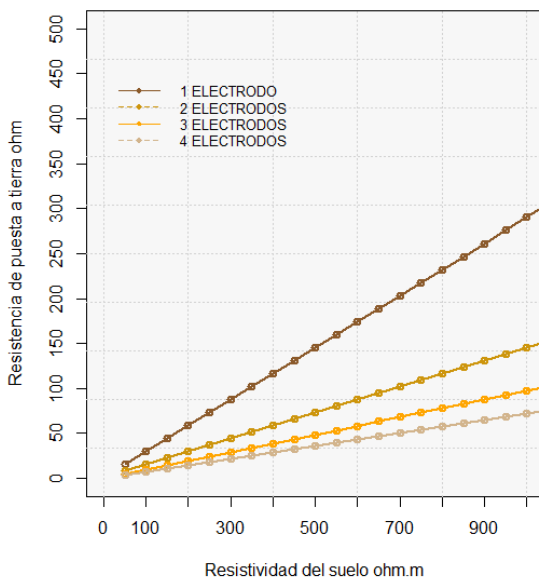
Number of bags to use according to hole diameter and depth

Prof. (m)	Depth (ft)	Diámetro de la perforación (mm) Hole Diameter (in)													
		60	80	100	120	140	160	180	200	220	240	260	280	300	
2	6,6	1	1	1	2	2	3	4	4	5	6	7	8	9	
4	13,1	1	2	2	3	4	6	7	8	10	12	14	16	18	
6	19,7	2	2	3	5	6	8	10	12	15	17	20	24	27	
8	26,2	2	3	4	6	8	11	13	16	20	23	27	31	36	
10	32,8	2	4	5	8	10	13	16	20	24	29	34	39	45	

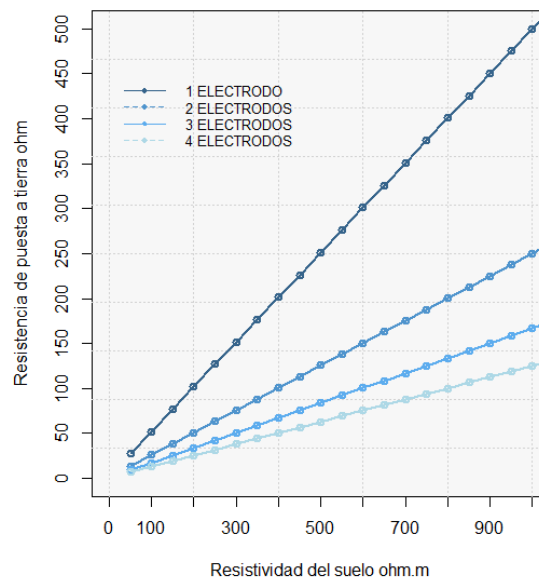
HOW DOES CONGRAPH GND-20 IMPROVES THIS SYSTEM

Calculation example for 15cm hole diameter and 2m depth

USING CONGRAPH GND-20

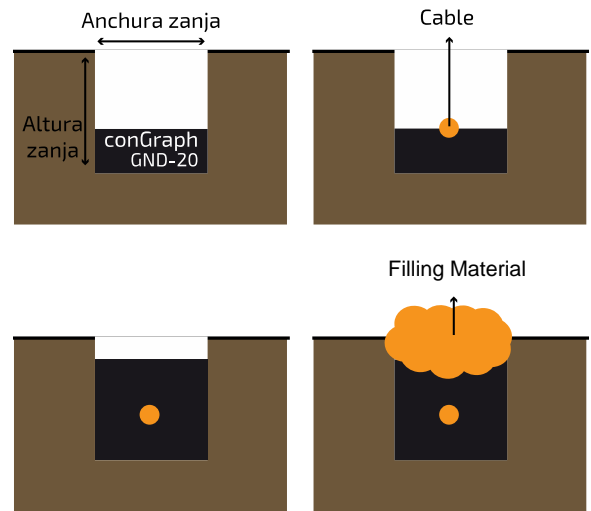


TRADITIONAL SYSTEMS



HORIZONTAL ROD

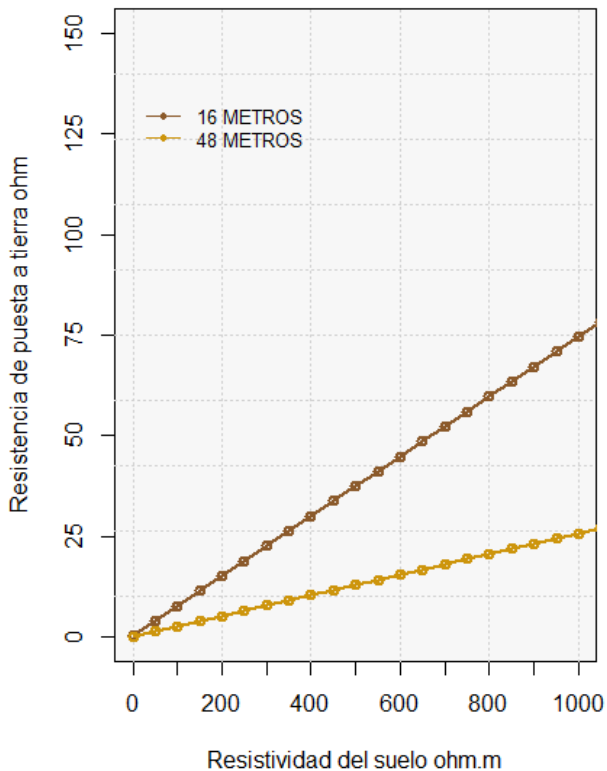
1. Dig a trench of suitable dimensions.
2. Mix **conGraph GND-20** with water to obtain a slurry. Use 7.5 to 8.0 liters of water (2 US gal) per bag. Do not use salt water.
3. Pour a layer of the slurry at least 100 mm (4") deep.
4. Place the conductor on the top of the layer of **conGraph GND-20**.
5. Pour another 150 mm (6") deep layer of **conGraph GND-20**. The conductor must be completely covered.
6. Wait at least one hour to backfill the trench with natural soil.



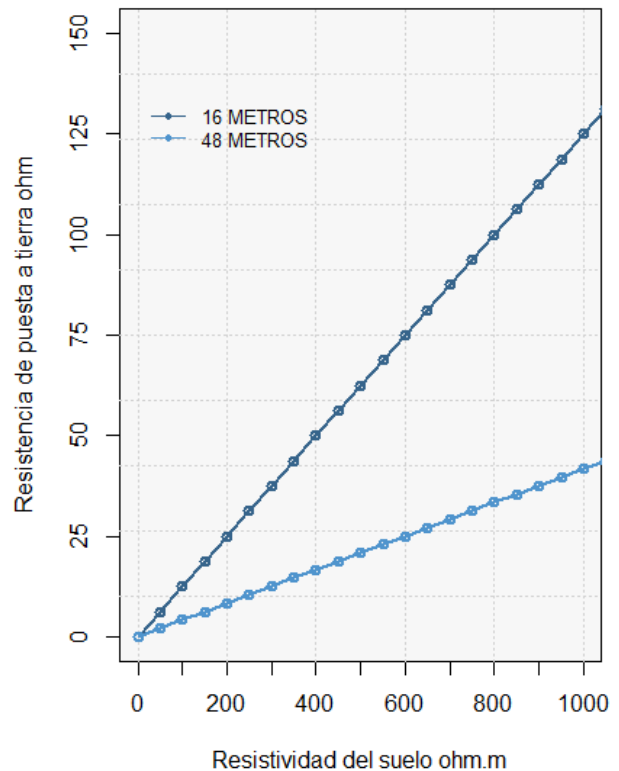
HOW DOES CONGRAPH GND-20 IMPROVES THIS SYSTEM

Calculation example for **40cm width trench, 40cm depth and 25cm thickness of conGraph GND-20**

USING CONGRAPH GND-20



TRADITIONAL SYSTEMS

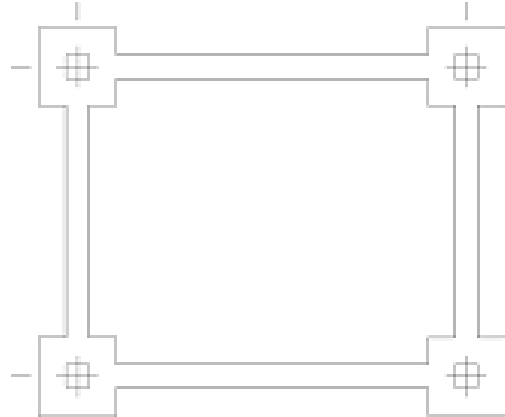


WHAT IF THE TWO ABOVE CONFIGURATIONS ARE COMBINED?

When both previous configurations are combined, the effect of **conGraph GND-20** generates a drastic ground resistance reduction.

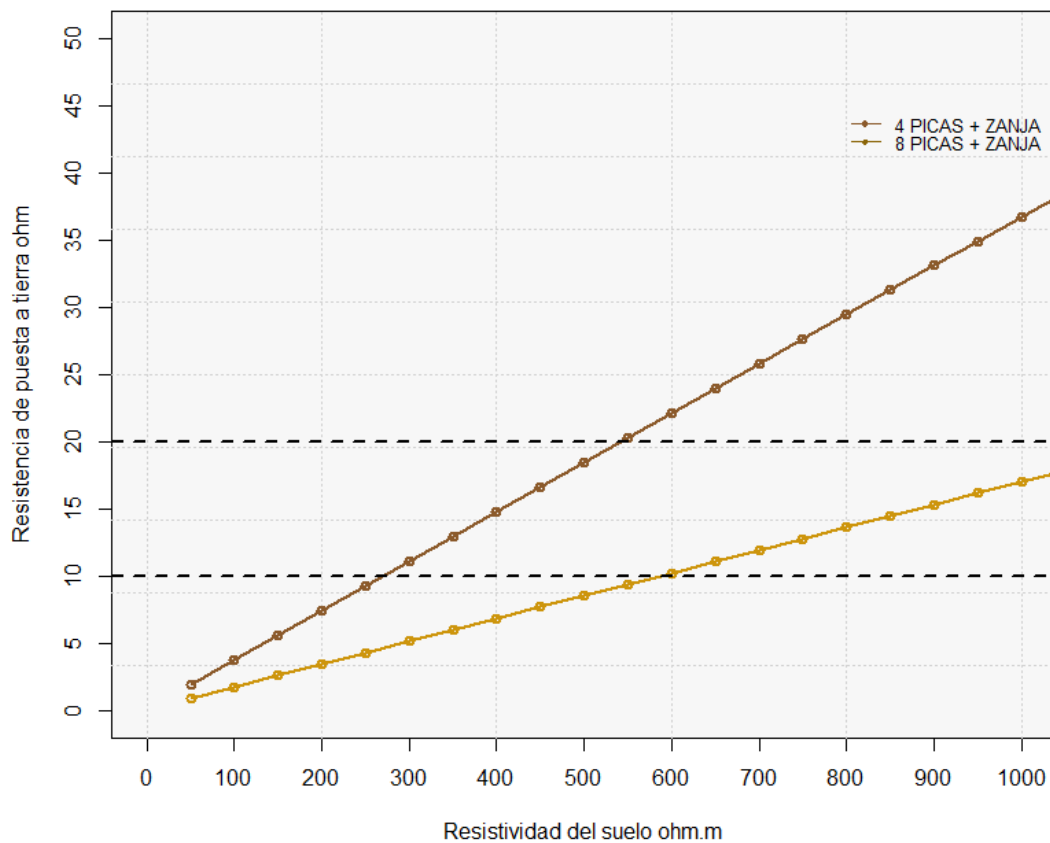
A typical configuration is a ground grid mesh made up of horizontal conductors and vertical rods at the ends.

When vertical rods are embedded into **conGraph GND-20** and they are also joined together through a trench in which by **conGraph GND-20** is also used, the effect shows the following results.



VERTICAL AND HORIZONTAL RODS WITH CONGRAPH GND-20

Calculation example combining vertical rods installed in **15cm diameter hole and 2m dept** and horizontal rods placed in a **trench of 40cm width and 40cm dept** using **25cm conGraph GND-20 thickness**.



CONGRAPH GND-20 IS A PERMANENT SOLUTION OVER TIME

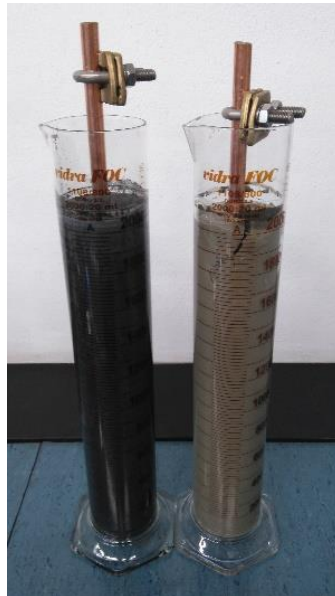
The below pictures show a visual comparison between bentonite, clearly deteriorated a few days after its application, and **conGraph GND-20**, which maintains its integrity over time.

Once the electrodes were removed after year of implementation, the one that had been immersed in bentonite appeared corroded and damaged, however the electrode that had been immersed in **conGraph GND-20** showed no damage.

The electrodes used for the test are made of steel core with a 300 micron copper coating.



TEST DAY



2 WEEKS



1 MONTH



4 MONTHS



1 YEAR



RODS REMOVED AFTER 1 YEAR