Solid copper earth rod (all copper)



The KALOT Group solid copper earth rod, or all-copper earth rod, is an earth electrode that is copper through its whole cross-section, with no steel core; so a scratch, a thread or the grip of a clamp never exposes steel. We make this earth rod in 16 and 20 mm diameters and 1500 mm sections; each section has an internal thread at both ends, and the sections are joined with dowels so the electrode reaches the depth required.

- Copper across the whole cross-section, no steel core
- Diameters of 16 and 20 millimetres, 1500 millimetre sections
- Internal thread at both ends; joined with a dowel
- Steel tip and threaded driving head

Technical specifications

Product type	Solid copper earth rod (earth electrode), in sections
Material	Copper across the whole cross-section (all copper)
Diameter D	16 and 20 mm
Thread	internal at both ends, M10 20 mm deep (both diameters)
Length of each section	1500 millimetres; other lengths to customer order
Ends	Chamfered; the steel tip fits into the lower thread
Joining lengths	earth rod dowel M10 40 mm long, brass or stainless steel; the faces of the two sections meet
Driving accessories	Steel tip in the lower thread and threaded driving head in the upper thread
Weight of each section	2.68 kilograms (diameter 16) and 4.19 kilograms (diameter 20)
Design basis	Requirements IEC 62561-2 for solid copper earth rods
Order code	SCER 1615 and SCER 2015

Order code and dimensions

Order code	Diameter D (mm)	Internal thread	Thread depth L1 (mm)	Length L (mm)	Weight (kg)
SCER 1615	16	M10	20	1500	2.68
SCER 2015	20	M10	20	1500	4.19

Every section has an internal thread at both ends and all sections are identical. We make other lengths to customer order. The M10 dowel, 40 mm long, the steel tip and the driving head are ordered separately. Our products are continually improved; please confirm final dimensions with our specialists before purchase.

Structure of the solid copper earth rod system

The solid copper earth rod system is built from identical sections, each with an internal thread at both ends. A steel tip is fitted to the lowest section to open the way through the soil, and it stays at the bottom of the electrode after driving; the sections are joined with dowels, and while driving, a threaded driving head screwed into the top thread takes the blows instead of the earth rod end.

This document is not contractual; we may update product design, dimensions, weights and images without prior notice.

Dimensional drawing

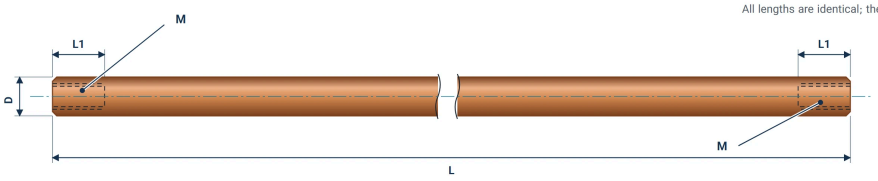
Solid copper earth rod dimensional drawing

M10 internal thread at both ends, length 1500 mm

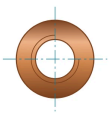
SOLID COPPER EARTH ROD · Ø16 · Ø20 · M10
KALOT GROUP · TECHNICAL ILLUSTRATION · NOT TO SCALE

Each length has an internal thread at both ends

All lengths are identical; the steel tip fits the lower thread



D (mm)	Thread M	L1 (mm)	L (mm)	Weight (kg)
16	M10	20	1500	2.68
20	M10	20	1500	4.19



Earth rod end view

Material: copper

Diameter: 16 and 20 mm

Thread: M10 for both diameters

Length: 1500 mm

Connection: M10 × 40 dowel; screw-on steel tip and driving head

Dimensions in mm.
We keep improving our products; please confirm final dimensions with our experts.

This document is not contractual; we may update product design, dimensions, weights and images without prior notice.

گروه کالوت KALOT GROUP Protect Today For Tomorrow Since: 1972 تاسیس: ۱۳۵۱
www.kalot.ir · Tel +98 21 2268 8852

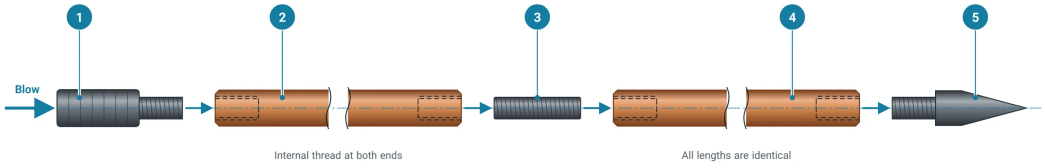
The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

Exploded view

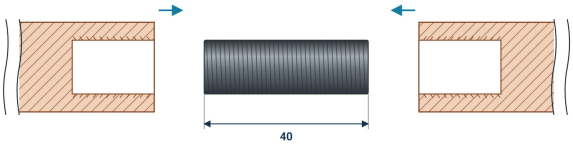
Solid copper earth rod exploded view

Driving head, two earth rod lengths with dowel, and steel tip

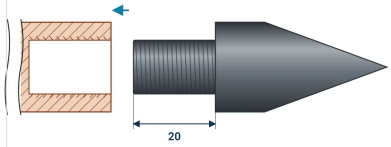
SOLID COPPER EARTH ROD · Ø16 · Ø20 · M10
KALOT GROUP · TECHNICAL ILLUSTRATION · NOT TO SCALE



Joining two earth rods with a dowel



Steel tip at the lower end



Brass or stainless steel **M10 × 40 dowel** 3

Internal thread at both ends **Solid copper earth rod** 2

in the upper thread; removed after driving **Screw-on driving head** 1

Opens the way through the soil **earth rod steel tip** 5

Repeat for greater depth **Next earth rod** 4

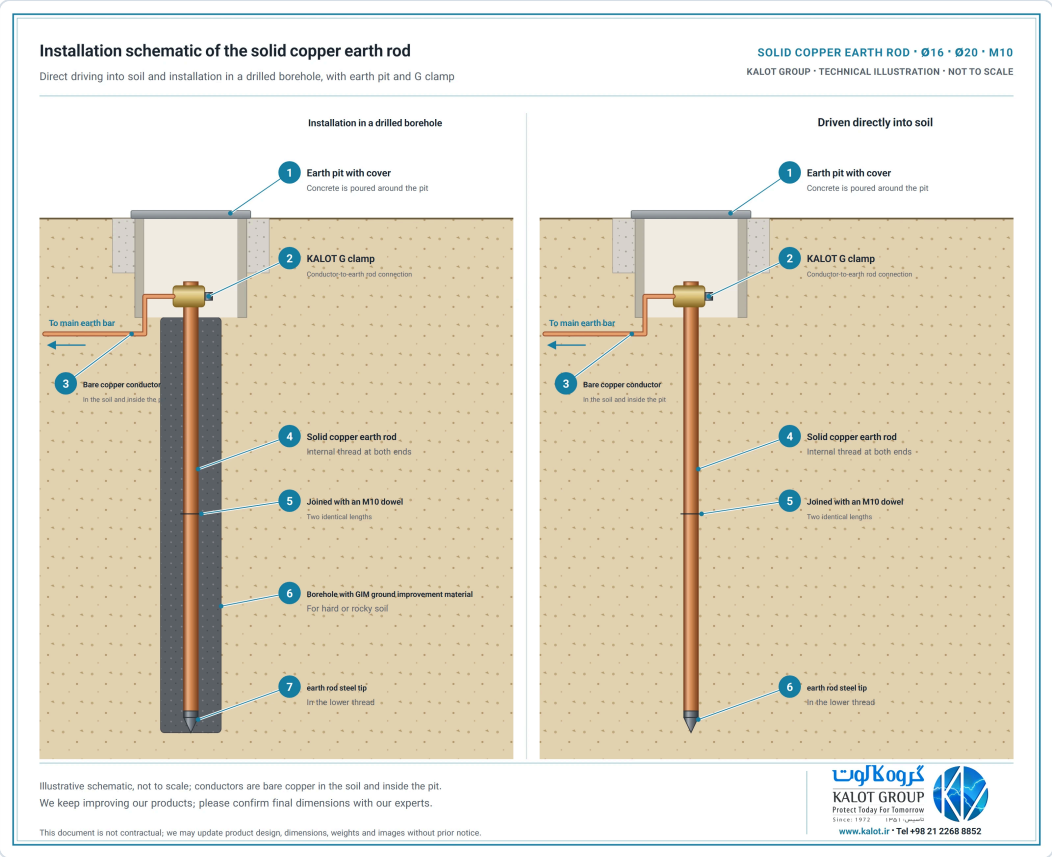
Dimensions in mm.
We keep improving our products; please confirm final dimensions with our experts.

This document is not contractual; we may update product design, dimensions, weights and images without prior notice.

گروه کالوت KALOT GROUP Protect Today For Tomorrow Since: 1972 تاسیس: ۱۳۵۱
www.kalot.ir · Tel +98 21 2268 8852

The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

Installation schematic: driven or in a borehole



The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

How to install and drive the copper earth rod

۱. Check the soil resistivity and the electrode location and mark the routes of underground services; dig the hole for the earth pit.

۲. Screw the steel tip fully into the lower thread of the first section, and the driving head fully into its upper thread.

۳. Hold the earth rod vertical and use a sledgehammer or light hammer to strike gently, evenly and along its axis. Copper is soft, and for hard soil or great depths the borehole method is more suitable. If the earth rod tilts, stop work and straighten it.

۴. When only a short part of the section is left above ground, remove the driving head, screw the dowel halfway into the thread, and turn the next section onto the dowel until the end faces of the two sections meet. Fit the driving head on the new section and carry on.

۵. In hard or rocky soil or for great depths, drill a borehole, place the joined sections in its centre, and fill around them with ground improvement material, compacting it layer by layer.

۶. Measure the resistance after each section, and at the required depth remove the driving head.

۷. Connect the copper conductor to the earth rod top with a KALOT G clamp or exothermic welding, fit the earth pit and pour concrete around it.

Measurement and inspection

Measure the electrode resistance by the fall-of-potential method (62 percent); in systems with several interconnected electrodes, a clamp-on tester is also used. Record the result with the season and soil moisture, and during periodic inspections inside the pit check the clamp tightness and the condition of the conductor. For the measurement method, see How earth termination resistance is measured.

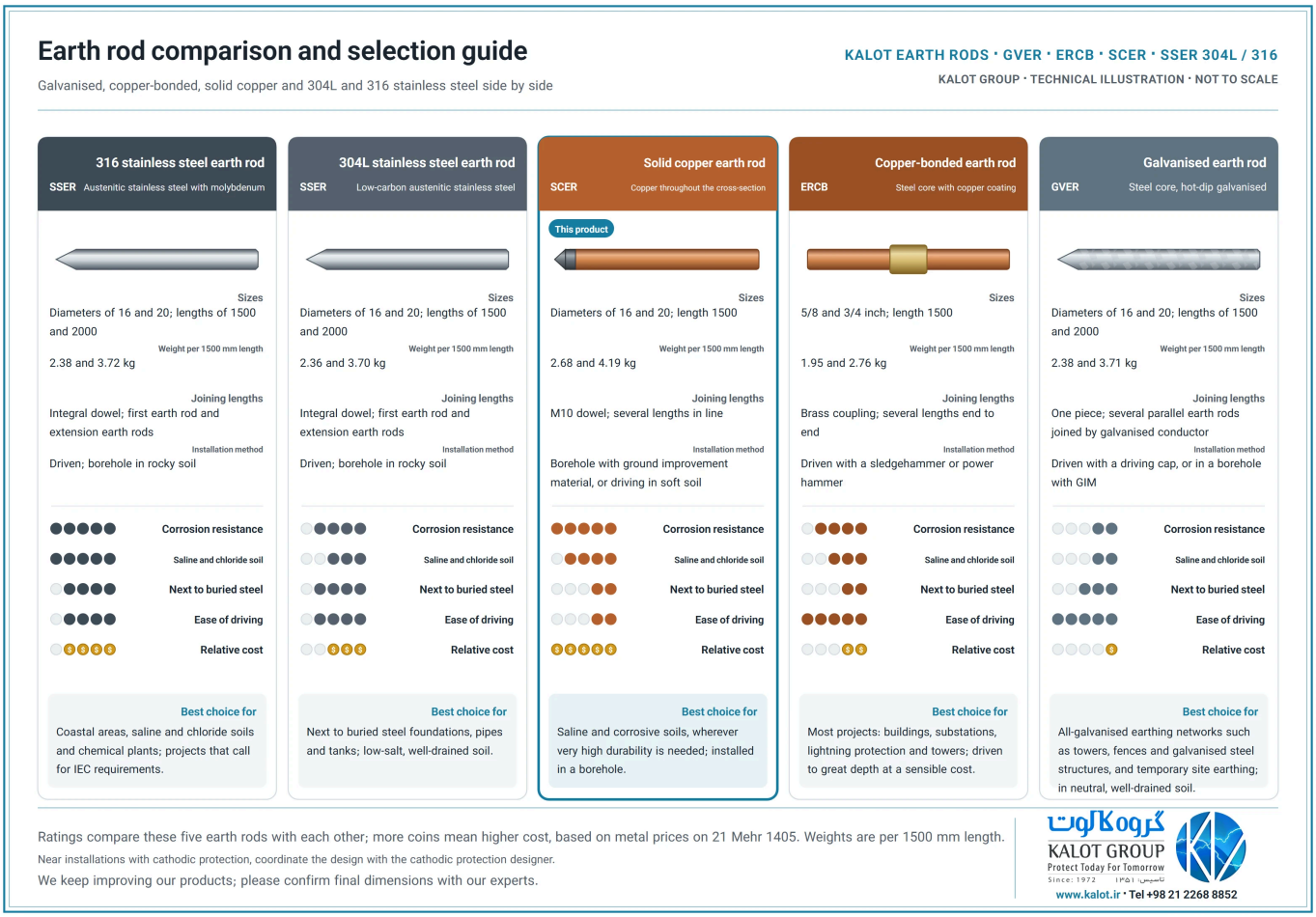
KALOT earth rod comparison table

Feature	Galvanised	Copper-bonded	Solid copper	Stainless steel 304L	Stainless steel 316
Material	S275 steel core with hot-dip galvanised coating (50 to 70 microns)	Steel core with copper coating (at least 0.25 mm)	Copper throughout the cross-section	Low-carbon austenitic stainless steel (18% chromium, 8% nickel)	Austenitic stainless steel with molybdenum (10% nickel, 2% molybdenum)
KALOT sizes	Diameters of 16 and 20; lengths of 1500 and 2000	5/8 and 3/4 inch; length 1500	Diameters of 16 and 20; length 1500	Diameters of 16 and 20; lengths of 1500 and 2000	Diameters of 16 and 20; lengths of 1500 and 2000
Weight per 1500 length (kg)	2.38 and 3.71	1.95 and 2.76	2.68 and 4.19	2.36 and 3.70	2.38 and 3.72
Joining lengths	One piece, no thread; several parallel earth rods with a galvanised conductor	Brass coupling; several lengths end to end	earth rod dowel M10; several lengths in line	Integral dowel; first earth rod and extension earth rods	Integral dowel; first earth rod and extension earth rods
Installation method	Direct driving with a driving cap, or a borehole with ground improvement material	Driving to great depth	Borehole with ground improvement material, or driving in soft soil	Driving; in rocky soil, a borehole with ground improvement material	Driving; in rocky soil, a borehole with ground improvement material
minimum diameter per IEC 62305-3 (mm)	14	14 (with 0.25 mm coating)	15	15	15
tensile strength per IEC 62561-2:2018 (N/mm²)	350 to 770	350 to 770	200 to 450	350 to 770	350 to 770
maximum electrical resistivity per IEC 62561-2:2018 (μΩ·m)	0.25	0.25	0.018	0.80	0.80
Corrosion resistance	Moderate; the zinc coating is gradually consumed	Good, as long as the coating is intact	Very good	Good	Very good
Saline and chloride soil	Poor to moderate	Medium	Good	Moderate; pitting corrosion is possible	Very good
Acidic and organic soil	Poor	Medium	Medium	Good	Good
Beside buried steel and cathodic protection	Compatible, with faster consumption of the zinc coating; not when connected to foundation reinforcing bars	With caution	With caution	More suitable than copper; in coordination with the designer	More suitable than copper; in coordination with the designer
Ease of driving	Very good	Very good	Limited	Good	Good
Raw metal value per 1500 length (US dollars)	1.2 and 1.8	3.0 and 3.8	39.7 and 62.1	5.2 and 8.1	10.3 and 16.1
Metal value index (copper-bonded = 1)	0.4 to 0.5	1	13 to 16	1.7 to 2.1	3.4 to 4.2
Cost rank (1 = lowest)	1	2	5	3	4
Recommended use	All-galvanised earthing networks: towers, fences and galvanised steel structures; temporary site earthing; neutral, well-drained soil	Most projects: buildings, substations, lightning protection and towers	Saline and corrosive soils; high fault current	Beside foundations and steel pipes and tanks; low-salt, well-drained soil	Coastal areas, chloride soil, chemical industries; projects that call for IEC requirements

This table was prepared on 21 Mehr 1405. The metal value is calculated from the official London Metal Exchange (LME) prices for copper, nickel and zinc and global market reference prices for steel, chromium and molybdenum on the same days, and from the weight of each length; it changes as metal prices change. The selling price also includes manufacturing cost. Weights are for the smaller and larger size of each type. Earth resistance is set by the soil and the electrode length, not by its material; choose the material based on the soil, the surrounding metal structures and the installation method. To learn more, see Choosing the right material for an earth electrode and Calculating earth termination resistance.

This document is not contractual; we may update product design, dimensions, weights and images without prior notice.

Comparison and selection guide



The full print-quality version of this drawing (PDF) can be downloaded from the product page at www.kalot.ir.

Selection and enquiries

To request a price for the solid copper earth rod, send our specialists the diameter (16 or 20 millimetres), the number of sections or depth needed for each electrode, the number of electrodes and the accessories you need (dowel, steel tip, driving head, clamp and earth inspection pit). Our specialists at KALOT Group will stay with you in choosing the right diameter, installation method and material for your project's soil.