

## MEASURING SOIL RESISTIVITY

When it is possible to choose the location of the earth connection, resistivity measurement helps to qualify the soil and thus determine the place where the soil's resistivity will be the lowest (optimization of construction costs).

### Definition of resistivity:

At constant temperature, the resistivity of a metal conductor of a given length and section is a specific characteristic of the material and depends on its nature.

It is expressed in ohm-meters ( $\Omega \cdot m$ ):

$$\rho = R \times S/L$$

where  $\rho$  = resistivity of the material ( $\Omega \cdot m$ );

$R$  = resistance measured ( $\Omega$ );

$S$  = section of the conductor ( $m^2$ );

$L$  = length of the conductor ( $m$ )

Metal's resistivity increases as the temperature rises:  $\rho_t = \rho_0(1 + \alpha_t)$

where  $\rho_t$  = resistivity at temperature "t";

$\rho_0$  = resistivity at 0 °C;

$\alpha$  = temperature coefficient;

$t$  = temperature in °C.

### Method for calculating soil resistivity $\rho$

#### WENNER method

The distances "d" between the 4 rods are identical.

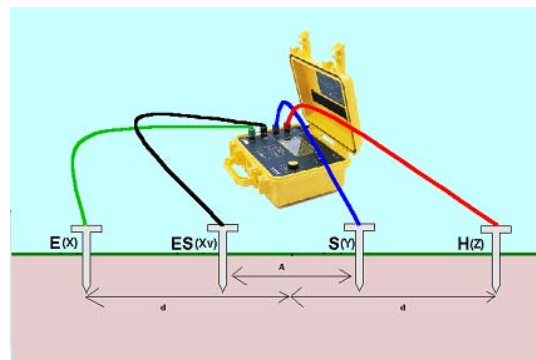
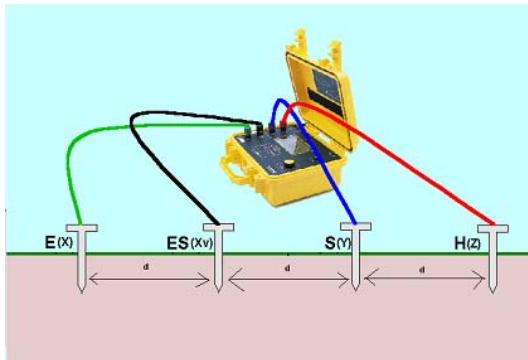
$$\rho_w = 2 \pi d R_{S-ES}$$

#### SCHLUMBERGER method

The distance between the 2 central rods S & ES is A.

The distance between the 2 external rods E & H is equal to 2d.

$$\rho_s = (\pi (d^2 - A^2/4) R_{S-ES}) / A$$



Chauvin Arnoux offers 3 instruments for this sort of measurement: the C.A 6470, C.A 6462 and C.A 6460 earth and resistivity testers.



C.A 6470



C.A 6462



C.A 6460