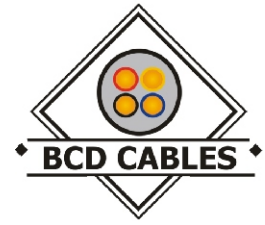


# Conductor & Insulation Resistance

## BCD Cables Safety/Technical Leaflet No8

For the calculation and parameter guidelines of conductor & insulation resistance.



Some parameters affecting operational characteristics of the cables mentioned in this catalog

## CONDUCTOR RESISTANCE

It is the most important parameter of the conductor sizing.

It is related to:

**ρ** conductor resistivity [ $\Omega / \text{mm}^2 / \text{m}$ ]

**l** conductor length [km]

**A** cross area [ $\text{mm}^2$ ]

**t** temperature [Deg C]

**f** frequency [Hz]

For low frequencies, conductor resistance is equal to DC condition.

$$R = \rho \cdot l / A [\Omega]$$

Temperature influence is calculated as:

$$R_t = R_{20} (234,5 + t) / 254,5 [\Omega]$$

where:

**R<sub>t</sub>** conductor resistance [ $\Omega$ ]

**R<sub>20</sub>** conductor resistance at 20 Deg C [ $\Omega$ ]

**t** conductor temperature [Deg C]

Conductor resistance increases with frequency.

## INSULATION RESISTANCE

It's a peculiar characteristic of the insulation material.

An higher value of insulation resistance means larger insulating capacity of the insulation.

The "insulation resistance constant K<sub>i</sub>" is calculated from the measured insulation resistance by the following formula:

$$K_i = l \cdot R \cdot 10^{-11} / (\log_{10} D / d) [M\Omega \cdot \text{km}]$$

where:

**R** measured insulation resistance [ $\Omega$ ]

**l** length of the cable [m]

**D** outer diameter of the insulation [mm]

**d** inner diameter of the insulation [mm]



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