Siechem
Wires & Cables

INDUCTANCE

Inductance is the property of an electrical conductor by which a change in current flow. It induces an electromotive force in both the conductor itself and in any nearby conductors by mutual inductance. Thus causes the phase angle of current is lag behind the voltage.

The inductance (L) per core of three single-core cables comprises two parts, the self-inductance of the conductor and the mutual inductance with other cores. It is given by

$$L = K + 0.2\log_e(2S/d) \qquad \text{(mH/km)}$$

Where,

K = a constant relating to the conductor formation (Table 1)

S = axial spacing between conductors within the cable (mm), or axial spacing between conductors of a trefoil group of single-core cables (mm), or 1.26 x phase spacing for a flat formation of three single-core cables (mm)

d = conductor dia. or for shaped designs the diameter of as equivalent circular conductor (mm)

For 2-core, 3-core and 4-core cables, the inductance obtained from the formula should be multiplied by 1.02 if the conductors are circular or sector-shaped and for 3-core oval conductors by 0.97

Table 1 – Typical values for constant K for different stranded conductors (at 50 Hz)

Number of Wires in Conductor	K
3	0.0778
7	0.0642
19	0.0554
37	0.0528
61	0.0514
1(Solid)	0.0500
Hollow – Core conductor,12 mm duct	0.0383