

DE-RATING OF CABLES

When cables are installed in groups in close proximity of each other or under different conditions it is often omitted to de-rate the rated current of the cables accordingly for the actual conditions. This can cause cables to fail prematurely

Sustained current ratings

The current rating of cables as tabulated in data sheets are for a single isolated cable or in the case of single core cables a single group of three cables laid in trefoil. The standard conditions of the medium surrounding the cable used for the calculation of the current rating of a cable are as below:

Ambient air temperature: 30°C
 Soil Temperature: 25°C
 Soil thermal resistivity: 1.2 K.m/W
 Depth of burial:
 Low voltage cables: 500mm
 Medium voltage cables: 800mm
 High voltage cables: 1200mm

De-rating of the rated current

When cables are installed under different conditions than mentioned above the rated current of the cable must be de-rated accordingly.

The rated current of the cable must also be de-rated for groups of cables and for any other cables or heat sources in close proximity.

Example:

Assume we need to select a medium voltage XLPE insulated 3 core cable to be installed 1000mm below ground, the cables will be together with two other similar cables in the trench. The soil thermal resistivity was found to be 2.0 K.m/W and soil temperature can reach 35°C.

De-rating

Soil temperature (k1)	0.92
Soil thermal resistivity (k2)	0.83
Depth of burial (k3)	0.98
Group of 3 cables touching (k4)	0.70

The overall de-rating factor is $0.92 \times 0.83 \times 0.98 \times 0.70 = 0.52$

Now apply this to the standard current rating as tabulated.

Worst-case scenario

A cable may experience various different environments along its route. At each of these environments the thermal resistivity and ambient temperature will be different. The environment that causes the most de-rating of the rated current should be taken and used for the whole cable.

References

Refer to rating factor tables and SANS 10198 Part 4 for each unique set of conditions.

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