COLD CABLE, AND CORRECTING FOR AMBIENT TEMPERATURE

SAME CABLE, 40 DEGREES. WHAT CHANGES?

WHAT "COLD CABLE" MEANS

Every calculation so far has been for a **cold cable**. Imagine the cable still on the drum, or installed but not yet energised and commissioned.

> `Table B1 figures are a cold cable at 20 °C`

That is the state the installation is in when you turn up to do the dead tests — wired, but never switched on. Once it is in service and carrying load, the cable warms up and the resistance rises.

CORRECTING FOR AMBIENT TEMPERATURE

Guidance Note 3 · Appendix B · Table B2 · p.175 , "Ambient temperature multipliers (α) to Table B1". Table B1 is at 20 °C. If the ambient temperature on the test day is different, the calculation gains one more term:

> `R = (mΩ/m × length × Table B2 multiplier) ÷ 1000`

The **Table B2 multiplier** corrects the 20 °C figure to the ambient temperature you are testing in. At **20 °C the multiplier is 1**, so there is nothing to apply — you only reach for it above or below 20 °C.

THE SAME 4/1.5 CABLE, 10 M, BUT TESTED AT 40 °C AMBIENT

```
mΩ/m for 4/1.5 = 16.71
Length           = 10 m
Table B2 at 40 °C = 1.08

R = (16.71 × 10 × 1.08) ÷ 1000
  = 180.5 ÷ 1000
  = 0.1805
  = 0.18 Ω   (against 0.17 Ω at 20 °C)
```

You can apply it either way round.

Put the multiplier into the formula, or take the 20 °C answer you already have and multiply it by 1.08. Same result.

Higher temperature, higher resistance

Resistance **rises with temperature** — but not in proportion, the way it does with length. Going from 20 °C to 40 °C adds about 8% (the 1.08); it does not double it. At 15 °C ambient the resistance would come out **lower** than the 20 °C figure.

✋ **It is a test multiplier, not C_a.** Table B2 corrects a conductor resistance from 20 °C for testing. **C_a** is a different thing: the ambient temperature rating factor used when sizing a cable's current-carrying capacity. C_f, the factor for a semi-enclosed fuse, is **0.725**.

Where the multipliers live.

Guidance Note 3 · Appendix B · Table B2 · p.175, alongside Table B1. The C_a rating factors in **BS 7671** · Appendix 4 and **On-Site Guide** · Table F1 are for cable design, not for correcting a test reading.

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