CABLE CALCULATION, STEP 7: IT AND CHOOSING THE CABLE

WHY DOES A COOKER NEED 16 MM² HERE?

$$It \geq In \div (Ca \times Cg)$$

In these notes this worked-out number is called **It**. The formula is also printed in BS 7671 Appendix 4.

WORKING

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It ≥ In ÷ (Ca × Cg)
   = 32 ÷ (0.94 × 0.7)
   = 32 ÷ 0.658
   = 48.6 A
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BS 7671 · Appendix 4 · the It ≥ In ÷ (Ca × Cg …) formula · **p.453**

48.6 A is not the current in the circuit

Only Ib (24.5 A) actually flows. But grouped with two other circuits at 35 °C, the cable finds it harder to get rid of its heat. It's like wrapping insulation round a metal rod held over a match: you'd burn your fingers sooner. So the cable must be able to handle **as much heat as 48.6 A would make in open air**. The 70 °C rating is the **insulation's** limit. It's the **conductor size** that decides how much heat the cable can carry (a big serving spoon heats up more slowly than a teaspoon).

Finding the cable

BS 7671 Appendix 4 has over 40 pages of current-rating tables: copper first, then aluminium. Each table's heading gives the cable type, and the corner says **copper** or **aluminium**. For flat 70 °C T&E it's **Table 4D5**. Read down the column for your reference method until you reach a value **at least** 48.6 A.

TABLE 4D5 VALUES USED HERE (T&E, COPPER)

CSA	REF METHOD A	REF METHOD B	REF METHOD C	MV/A/M
10 mm²	(too small)	52 A	–	–
16 mm²	57 A	69 A	85 A	2.8

- **Method B** (trunking) alone: **10 mm²** would do (52 A ≥ 48.6 A).
- **Method A** (insulating wall): 10 mm² isn't enough. You need **16 mm²** (57 A).

- Worst case wins, so: **16 mm² T&E**.

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OUR STATEMENT
Table 4D5 suggests that, using Ref Method A,
a 16 mm² cable is to be used, which has a tabulated
rating (It) of 57 A.
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BS 7671 · Appendix 4 · current-rating tables (copper first, then aluminium)

BS 7671 · Table 4D5 · 70 °C flat twin and earth (ratings and mV/A/m) · **p.484**

USE THE MV/A/M COLUMN, NOT A RATING COLUMN

The letters It and Iz It is the **tabulated** current-carrying capacity: the worked-out 48.6 A is the smallest It you can accept, so you choose the first table value above it, 57 A. **Iz** is the cable's rating once the factors are applied: 57 × 0.94 × 0.7 = **37.5 A**. Step 9 uses Iz.

Think like a designer

A 16 mm² cable is huge for a cooker. It's expensive and far harder to install than 10 mm². On a real job, this is the point where you'd question the route. For example, you might suggest keeping the cable in **trunking all the way down** (Method B), avoiding the insulating wall and Method A. We stick with 16 mm² here because it's a paper exercise.

Worth knowing: a cable buried directly in an ordinary (not insulating) masonry wall is normally Reference Method C, which rates **higher** than B. So in a normal wall, B in the trunking would still be the worst case. Check Table 4A2.

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