# WORKED EXAMPLE: 8.5 KW SHOWER

## WHAT CABLE DOES AN 8.5 KILOWATT SHOWER NEED?

### THE QUESTION

An 8.5 kW electric shower is to be installed in a domestic property.

- Wired in PVC/PVC flat twin and earth
- Reference method 102
- Cable run 20 m
- Protective device: BS EN 60898 circuit breaker
- No rating factors

Select a suitable cable and protective device. Show all working.

### WORKING

1) Design current
   Ib = P ÷ V = 8500 ÷ 230 = 36.96 A  (keep the decimals: don't round as

2) Protective device (domestic, so Type B)
   Next standard size ≥ 36.96 A → In = 40 A, Type B, BS EN 60898
   Check: Ib ≤ In → 36.96 ≤ 40 ✓

3-4) Method 102, no correction factors → Iz = It, and it must be ≥ In = 40 A

5-6) On-Site Guide Table F6 (70 °C flat T&E), method 102 column:
   6 mm² → 35 A ✗ (less than 40)
   10 mm² → 47 A ✓ → select 10 mm² twin and earth

7) Voltage drop (not lighting, so max 5% = 11.5 V)
   Table F6, 10 mm² → 4.4 mV/A/m
   VD = (4.4 × 36.96 × 20) ÷ 1000 = 3.25 V
   3.25 V ≤ 11.5 V ✓

Answer: 10 mm² T&E on a 40 A Type B circuit breaker

**On-Site Guide** · Appendix B · Table B6: circuit-breaker ratings (BS EN 60898 / RCBOs) · **p.159**

**Electrician's Guide to the Building Regs** · **Table 4.1.2a**: standard Type B final circuits — cable, device, maximum length, maximum measured loop, method 101 size · **p.75**

**On-Site Guide** · Appendix F · Tables F4–F6: current-carrying capacity and voltage drop · from **p.187**

**On-Site Guide** · **Table F6**: 70 °C thermoplastic flat twin and earth (It and mV/A/m) · **p.193**

### Pick the right table

Table F4 is **single-core** cable and Table F5 is multicore **round** cable. Neither is T&E. **Table F6** says *flat* thermoplastic sheathed cable, and that's the twin and earth table. It gives you both **It** and **mV/A/m**.

### Checking your answer against the book

The Electrician's Guide has a **standard final circuits table** for Type B domestic circuits (Table 4.1.2a, p.75). For a shower on a **40 A** device it gives **10 mm²** — the same answer this example works out — along with a maximum cable length, a maximum measured loop impedance, and the bigger size you'd need in **reference method 101** (insulation). Use it to **check** a design, never as a replacement for the seven steps: the exam wants the method, and the table only covers standard circuits with no rating factors.

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