SUPPLEMENTARY BONDING IN BATHROOMS, AND WHEN YOU CAN AVOID IT

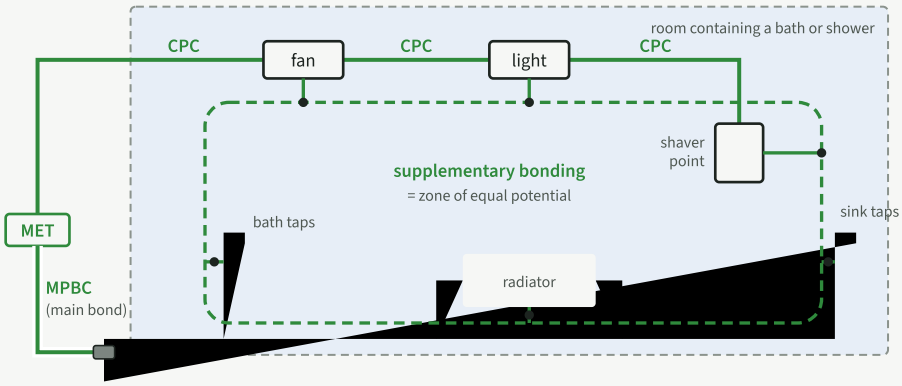
WHEN CAN YOU LEAVE OUT BATHROOM BONDING?

Unlike main bonding, **supplementary bonding can often be avoided**. The classic example is a bathroom, meaning any **room containing a bath or shower**. The fan, light and shaver point are often on the **lighting circuit**, joined by its **CPC** back to the MET. The bath taps, radiator and sink taps are on copper pipes that connect to the main water and gas, which should have **main bonding** downstairs.

WHY A BATHROOM IS AN AREA OF INCREASED RISK

- It's usually a **small, confined** space, full of things connected to extraneous conductive parts: taps, radiators, baths, shower trays and towel rails.
- People are likely to be **undressed**, so more skin is exposed and there's more chance of touching, say, a radiator.
- Skin is likely to be **wet**, so body resistance is **much lower**.

Imagine an earth fault at the shaver point. Even with main bonding in place, a person touching the shaver point and a tap could still see a **potential difference**, and they're in a much riskier situation.



Faraday's idea (the Faraday cage, 1830s): if everything around you is at the same potential, you're safe. Supplementary bonding links every exposed conductive part (the CPC terminals of the fan, light and shaver point) to every extraneous conductive part (taps, radiator) with bonding clamps, making a **zone of equal potential**.

Supplementary bonding can be left out when all three are met (Reg 701.415.2)

1. All final circuits in the location meet the required **disconnection times** for ADS.
2. All final circuits in the location have **additional protection by a 30 mA RCD**.
3. All extraneous conductive parts in the location are **effectively connected to the main protective bonding**.

One way to check the third condition: the **resistance** between the **MET** and each **extraneous conductive part** is **less than 1667 Ω**. Measure it with a **low-resistance ohmmeter** using the wander (long) lead, **test method 2**.

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WHERE 1667 Ω COMES FROM
R ≤ 50 V ÷ IΔn (Reg 415.2.2), the same 50 V figure
as Table 41.5 (Zs × IΔn ≤ 50 V)
30 mA RCD: 50 ÷ 0.03 = 1667 Ω
→ no more than 50 V (the touch voltage limit) can appear between a faulty
  exposed part and an extraneous part before the RCD disconnects.
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Watch out: where 1667 Ω fits The 1667 Ω figure ($R \leq 50\ V \div I_{\Delta n}$) is a way of checking the third condition, not a condition of its own.

BS 7671 · **Reg 701.415.2** supplementary bonding · **p.258** (Section 701 starts p.257)

BS 7671 · Table 41.5 max earth fault loop impedance for RCDs (30 mA → 1667 Ω) · **p.77**

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