A COOKER CIRCUIT CABLE CALCULATION, ON ONE PAGE

THE WHOLE DESIGN, IN A MINUTE.

9.6 KW COOKER + SOCKET, HMO KITCHEN, 27 M, 35 °C, 3 CIRCUITS GROUPED

STEP	RESULT	WHERE FROM
Device requirements	30 mA RCD + AFDD → RCBO with AFDD	Regs 411.3.3, 522.6.202, 421.1.7
Cable type	70 °C thermoplastic T&E	Table 4A1
Installation methods	B (trunking) · A (insulating wall)	Table 4A2
Ib full load	9600 ÷ 230 = 41.7 A	P ÷ V
Ib after diversity	24.5 A	OSG Table A2
In	32 A Type B	(OSG Table B6 lists sizes)
Ca · Cg	0.94 · 0.7	Tables 4B1 · 4C1
It needed	32 ÷ (0.94 × 0.7) = 48.6 A	App 4 formula
Cable	16 mm² T&E, 57 A (Method A)	Table 4D5
Voltage drop	1.85 V ≤ 11.5 V ✓	Table 4D5 · Table 4Ab
Overload	Iz 37.5 A · I2 46.4 A ≤ 54.4 A ✓	Reg 433.1.1
R1 + R2	4.23 × 1.2 × 27 ÷ 1000 = 0.137 Ω	GN3 Tables B1, B3
Zs	0.26 + 0.137 = 0.397 Ω ≤ 1.37 Ω ✓	Table 41.3
Max disconnection time	0.4 s	Table 41.1
PEFC	230 × 0.95 ÷ 0.397 = 550.4 A	Ohm's law with Cmin
Ia	160 A → trips in 0.1 s ✓	App 3 Fig 3A4
Adiabatic	1.51 mm² min · 6 mm² CPC ✓	Table 54.3 (k = 115)

Sparky's closing tip

Try the blank scenario yourself, and make your own version the same way. Change the load, the length, Ze, the grouping or the temperature and work it through. It looks hard, but it's a logical step-by-step process. Apart from the adiabatic equation, it's no harder than Ohm's law. Not many electricians could design a circuit like this without serious revision. The aim is to get "robotic" about it.

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