

DR. ZZEUS



'DR. ZZEUS' TOM BROOKES, MD OF ZZEUS TRAINING AND CHAIRMAN OF THE FSA, ANSWERS YOUR QUESTIONS RELATED TO FIRE SAFETY COMPLIANCE.



This month I'm going to answer two questions relating to the skills of fire alarm and security installers:

- 1. How do you measure the resistance of a cable?**
- 2. How do you calculate the resistance of a 1.5 mm standard fire alarm cable?**

Continuity

BS 5839-1 clause 38.1 states that all installed cables with a manufacturer's voltage rating suitable for mains use should be subject to insulation testing at 500 V d.c. Insulation resistance should be measured between each conductor and earth and achieve no less than 2 MΩ.

It continues to say that on completion of the installation work,



where maximum circuit resistance for any circuit is specified by the manufacturer or supplier, measurement of the resistance of every such circuit must be documented. At ZZEUS Training, this is standard day three practical electrical testing, but it may appear that some training providers are not doing this. The standard is very clear: if you install a fire cable, you must test it. Both should be done without devices attached.

Firstly, you need to know what the expected resistance of a cable is in set



parameters; there are tables for the types of metal, and the temperature of the cable standard copper 1.5 mm fire cable at 20°C is 12.10 ohms per km.

Resistance determines how difficult it is for current to flow and is measured in ohms (Ω).

For this example, we are working out 85 m of 1.5 mm fire cable.

Step 1) Calculate the ohms per metre – $12.10/1,000 = 0.001210$ ohms per metre.

Step 2) Multiply the ohms per metre by the length of the cable – $85 \text{ m} \times 0.001210 = 0.1028$ ohms expected.

Next, you need to measure the cable's resistance physically. For this step, you will need a calibrated multifunction tester or multi-meter to measure in ohms. A word of caution: some multi-meters are inaccurate, so I prefer to use a multifunction tester.

Zero or null the leads. All good meters have this function; that way, you are taking a true reading from the cable only. Next, attach your positive lead to one end of the core and the negative to the other end, select 'continuity' and press 'test'.

You should get a reading close to the expected 0.1028 ohms; I would expect it to be within 5% on the new undamaged cable. Ensure you attach the clips firmly, as loose clips can give a poor reading.

In the next column we'll look at how you take an insulation reading on a fire cable.



DO YOU HAVE A QUESTION YOU'D LIKE ANSWERED?

EMAIL YOUR QUERIES TO:

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