

## The Scurge of CCA, CCS, CCC Cables

So what are these cables...

CCA: Copper Clad Aluminium

CCS: Copper Clad Steel

CCC: Copper Clad Copper (yes you read that right!)

And refers to the construction method of the cable. In the right place all of the above construction methods have their merits but in the world of data standards for Cat5, Cat5e, Cat6 etc. they don't.

We have even seen wholesalers promoting boxes of this cable as something special and if you ask they are often very poorly informed. Generally, the cable will be a lot cheaper (but not always) and will be very light when you pick a box up.

When installing it is very easy to stretch the cable without even knowing, causing all sorts of issues which may well not become evident until the site is finished.

**It is a total false economy and steer clear!**

If you want a better understanding, then read on...

We're seeing increasing use of cable sold as Cat5e which is not made of pure copper. This is Copper Clad Aluminium or CCA. Essentially aluminium, a cheaper metal, plated with copper

The problem is networks installed with this cable will never comply with the Cat5e standards. This is due to the different electrical properties of aluminium over copper. These cable often have markings like Cat5e ANSI/TIA-568-C, ISO/IEC 11801 or BS EN 50173 fooling the buyer into thinking they are compliant.



The standard clearly states "the conductor shall be annealed solid copper and comply with the requirements of EN 50288-1:2003, 4.1. The conductor shall be plain or metal coated.

**NOTE Copper covered (clad) aluminium and/or steel conductors are not permitted."**

The resistivity of annealed copper is  $1,72 \times 10^{-8}$  whereas the resistivity of aluminium is  $2,82 \times 10^{-8}$ . The resistance of an aluminium conductor is therefore 64% above that of copper conductor of equal cross-sectional area. The production of a composite CCA conductor produces conductors that have resistance approximately 40% above the copper equivalent.

Put simply CCA over pure copper Cat5 has...

- 40% Higher resistance
- Poor flexibility and can break easily
- Easily oxidises causing poor terminations in the patch panel and module
- Not suitable for Power over Ethernet (PoE) due to the resistance
- Prone to breaking as aluminium is much less malleable than copper. This makes it harder to terminate and more likely snap conductors if you need to relocate the cables.

There are some applications where CCA can be used, such as analogue CCTV over cat5 twisted pair but this will still exhibit poorer performance and transmission distances will be reduced.

- Always check the markings on the cable jacket anything marked CCA or equivalent.
- Check the conductor core by scoring with a knife if it goes silver then it is a clad cable
- If the cable box or reel feels light, then it is likely to be CCA cable
- Always buy known brands from reputable suppliers