

AECMSA warns of non-compliant electrical cable products in the South African market

By the Technical Sub-Committee of the Association of Electric Cable Manufacturers (SA)

Electrical power is part of everyday life, and we cannot imagine our world without it in the long term. Our bodies themselves function with the flow of electrical current, but of course electricity is dangerous to human and animal life in excessive doses. We live so close to this mortal danger throughout the span of our lives, with nearly no incidents or undue risk in a controlled environment. This isolation from the threat of electrocution comes as a result of many layers of protection in the form of rules, regulations, standards, legislation, quality control, etc, which attempts to make our electrical environment 100% safe.

Standards, regulation and control

Electric power cables and conductors are associated with the safe channelling of electrical power from the source to a consumer and, as such, it is subject to high levels of standardisation, regulation, and control. At a standards' setting level, we have the South African Bureau of Standards (SABS) as the main local standards body that develops and amends local standards and adopts international standards for local application.

The Association of Electric Cable Manufacturers South Africa (AECMSA) forms part of the International Electrotechnical Commission (IEC) community of which SABS is a founding member, and which is structured in such a way that full members participate in the standards development and amendment process and as such, are mandated as a South African National Committee of the IEC to comment and vote on documents, which are produced by the various Work Groups of the IEC.

Through the SABS TC 66 (Electric Cables) technical committee, local experts actively participate in IEC TC 20 (electric cables) and TC 7 (overhead conductors) technical committees on a voluntary basis in order to further the collective work of not only the IEC, but also to improve the safety of the South African public. The SABS TC 67 (electricity distribution systems and components) technical committee plays a pivotal role in the establishment and maintaining of standards such as in the field of wiring of premises as prescribed in the Wiring Codes SANS 10142-1(LV) and SANS 10142-2 (MV)

In the local context, specific SANS electrical cable standards are singled out for their potential impact on public safety, and these are the standards that are promulgated by law to be compulsory VC safety standards. The aim of making these standards compulsory is to ensure that any cables that are imported, manufactured and sold in the country and which are covered by these standards, must comply with the relevant VC Safety

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Standard. Medium Voltage (6,6 kV to 33 kV) and low Voltage (up to 3,3 kV) as well as flexible cables (up to 2,5mm² 300/500V) are all covered by VC standards

While the SABS controls SANS standards, the National Regulator of Compulsory Specifications (NRCS) is responsible for the drafting and regulating of VC standards, which specifically deal with power cables.

The compulsory standards that are applicable in the wiring of premises are governed by the Department of Employment and Labour (DoEL) Chief Electrical Inspector, while in the mining environment, the Mining Regulations determine which cable standards are compulsory.

Informal watchdog industry bodies such as the organisation, SAFEhouse, also play a major role in securing commitment from members for adherence to standards and the safety of the products that they produce, distribute and sell, as well as highlighting concerns about product safety.

Upholding safety standards

Commercial interests, if left unchecked, can work counter to the upholding of safety standards and thereby impact directly on public safety and therefore, in this non-ideal world, measures are put in place to keep the industry on the straight and narrow.

Product marks

Power cable users mostly rely on product marks, such as the SABS Mark as a confirmation that the product complies with the applicable standard and that the manufacturer takes responsibility for the safety and performance of its product, including product recall or other actions which may become necessary, should any defects become apparent.

Some examples of non-compliant products found in the South African market (below) are illustrative of how public safety can be put at risk of electrocution and electrical fires.



An example of cable with copper clad aluminium conductors. CCA conductors are not allowed to be used in power cables in South Africa and can lead to protective devices in these wiring systems not functioning and cables and connections overheating, thereby creating a safety and fire risk.

Wiring cables with copper clad aluminium (CCA) conductors,

Commodity cable types such as house wire, surface wiring cables and flat 'twin and earth' cables, which are used in the wiring of premises, are often the targeted by unscrupulous importers. The stranded or solid conductors of these cables are manufactured using CCA that has roughly only about 60% of the conductivity and much lower current-carrying capacity of that of compliant cables with copper conductors.

These conductors are characterised by being light in weight and because they are mostly supplied in the hard drawn condition, they are easily broken when bent. A quick test to check for CCA would be to nick the copper surface with a blade, followed by bending the conductor in reverse directions at the nick, which would quickly lead to snapping of the wire. CCA conductors are not allowed to be used in power cables in South Africa and can lead to protective devices in these wiring systems not functioning and cables and connections overheating, thereby creating a safety and fire risk.

The Association of Electrical Cable Manufacturers (SA) is extremely alarmed at the escalation in the amount of non-compliant wire on the market and urges electrical contractors especially to be mindful of their responsibilities (as the 'responsible person') to only install cable in accordance with SANS 10142-1 and VC standards VC 8077 and VC 8075.



An example of cable with copper clad steel conductor. CCS conductors are not allowed to be used in power cables in South Africa and can lead to protective devices in these wiring systems not functioning and cables and connections overheating, thereby creating a safety and fire risk.

Wiring cables with copper clad steel (CCS) conductors:

Similarly, as the case with CCA, commodity cable types such as house wire, surface wiring cables and flat twin and earth cables that are used in the wiring of premises, are also targeted by unscrupulous importers. The stranded or solid conductors of these cables are manufactured using CCS, which has roughly only about 40% of the conductivity and much lower current-carrying capacity of that of compliant cables with copper conductors.

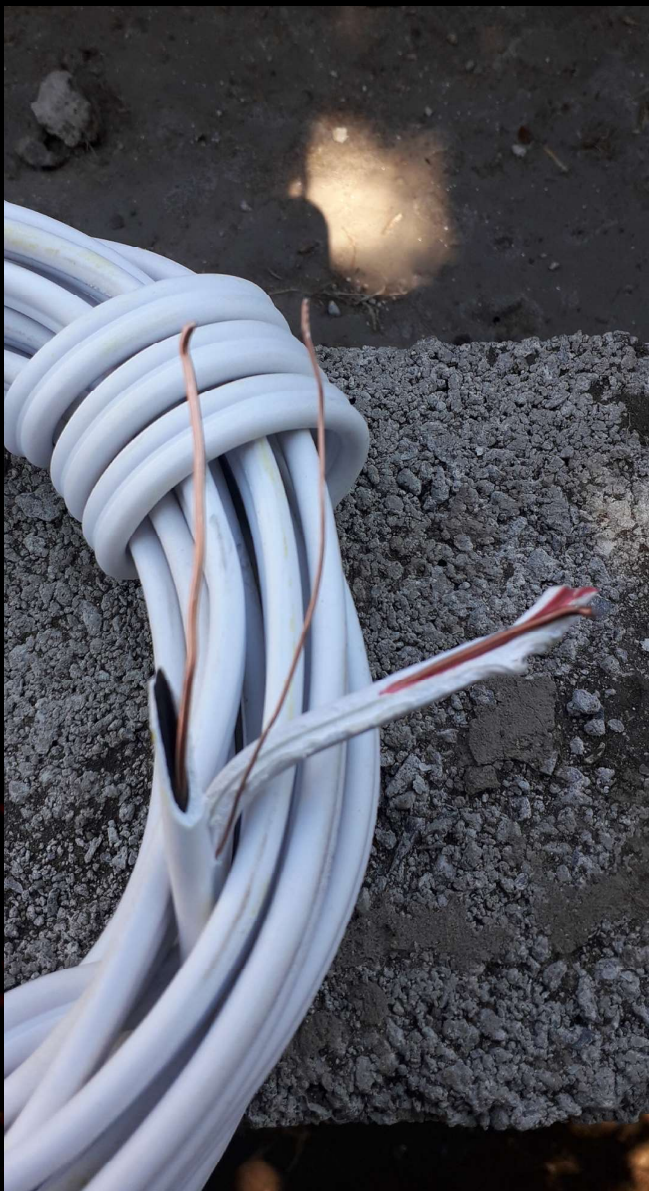
These conductors are characterised by being hard and resistant to bending. A quick test to check for CCS would be to place a magnet next to the wire to verify whether the conductor contains a magnetic material that, in this case, would be steel that would be attracted by the magnet.

Non-compliant 'Ripcord' that has been found in the local market, contains fine wire bunched CCS conductors.

CCS conductors are not allowed to be used in power cables in South Africa and can lead to protective devices in these wiring systems not functioning and cables and connections overheating, thereby creating a safety and fire risk. Bare CCS conductors are sometimes used in earthing applications where there is a risk of theft, but should never be used in power cables or wiring applications, which require compliance with the SANS 10142-1 Wiring Code.



Flat twin and earth cable labelled as speaker wire.



Flat twin and earth cable with CCS conductors and insulation adhering to the outer sheath.



Flat twin and earth cable without a SANS specification or SABS mark

Flexible cords with copper clad aluminium (CCA) conductors – ‘Cabtyre’ and ‘Ripcord’

The earliest incidences of non-compliant product being imported into this country were of flexible cords with CCA class 5 flexible conductors. The flexible conductors of these cables are manufactured using finely drawn and bunched CCA, which has roughly only about 60% of the conductivity and much lower current-carrying capacity of that of compliant cables with copper conductors.

These conductors are characterised by being light in weight and, because they are mostly supplied in the hard drawn condition, they are easily broken when bent. A quick test to check for CCA on these fine wires would be to apply a flame to the wires by using a gas lighter or similar. The CCA wires will crumble under the heat as the aluminium melts.

CCA conductors are not allowed to be used in flexible cables in South Africa and can lead to overheating and failure of cables and risk of fire. Breakages of the conductors caused by flexing during normal use can lead to arcing, which can result in damage to equipment and represents a fire hazard.

MV XLPE cables

MV XLPE cables manufactured to SANS 1339 must undergo an accelerated ageing test that demonstrates resistance to the growth of water trees, which is a known failure phenomenon associated with MV XLPE insulation. Cables that have not undergone this type test may be subject to premature failures.

Compliance to SANS 1339 is compulsory.

Other non-compliant cables

Non-compliant cables do not necessarily need to contain non-standard conductor materials such as CCA or CCS and may be non-compliant in other aspects relating to poor performance, reduced life or safety concerns, and which are not that easily detectable and may require specialised testing to confirm.

To ascertain whether a cable is suspect or not, the following points should be considered:

- Cables that do not carry the SABS Mark.
- Cables that do not have the manufacturer's name printed or embossed on the cable or of which the origin cannot be determined.
- A manufacturer's name that is not familiar.
- A manufacturer who does not have the SABS Mark (check on the SABS website).
- Non-SABS marked cables, which are imported without a Letter of Authority (LOA) from the NRCS.
- A cable manufactured by a manufacturer who is not a member of the AECMSA or of the SAFEhouse Association.
- Cable sold without a warrantee.
- If the cable price is too good to be true compared with the ruling market prices, then the cable is immediately suspect. A cable that is sold at below the ruling copper material price cannot be compliant with the compulsory standards.

“Bare CCS conductors are sometimes used in earthing applications where there is a risk of theft, but should never be used in power cables or wiring applications, which require compliance with SANS 10142-1 Wiring Code.”

The Association of Electrical Cable Manufacturers of South Africa supports all initiatives aimed at upholding of safety and quality standards in the country and works closely with the Department of Trade, Industry and Competition (DTIC), NRCS, SABS and the South African Revenue Services (SARS) in respect of training initiatives, standards development, product sampling and testing as well as the reporting of non-compliant products in the market, either directly or via its members.

The AECMSA supports the work of the SAFEhouse Association as well as the SABS Mark Scheme and other South African National Accreditation System (SANAS)-accredited Mark Schemes associated with electric cables.

We urge users of power cables to report suspected non-compliant products to the NRCS by submission of a Concern Form to the NRCS. Users are also welcome to contact the AECMSA at aecmsa@iafrica.com for assistance and clarity on such matters and we will be glad to assist.



An example of copper clad aluminium conductors.

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