BASEC
BRITISH APPROVALS SERVICE FOR CABLES

GUIDANCE NOTES – Testing

Background

The electrical supply industry adheres to strict codes of practice and, to that end, the testing of products is an essential part of the process.

At BASEC, we apply rigorous criteria to ensure cables are of a relevant standard and we also independently test cable for other reasons including disputes.

For these reasons, a cable bearing the BASEC approval mark is known to be safe, reliable and of a certain quality, conforming to specific standard criteria.

Our Guidance

For resistance, copper conductors are carefully tested to ensure they meet the individual standard's requirements, measuring the conductor resistance using a resistance bridge. The electrical resistance of the insulation material is also measured to ensure it provides sufficient electrical isolation.

The test for electrical breakdown is designed to show any faults in a cable's insulation. A sample is immersed in a tank of water and a test voltage is applied between the conductors and the water.

This is normally between 1000V and 5000V depending on the type of cable. If there is a fault in the insulation then an electrical current will pass between the conductor and the water. There is a second version of this test for armoured power cables, where the test voltage is applied between each of the conductors and the protective armour surrounding the cable.

Cables can expect flexing, impact and abrasion throughout their lifetime.

Our endurance test for flexing takes a sample and applies the rated voltage and current. Then, using a specially designed rig, the sample is subjected to 30,000 cycles of flexing. At the end of the test there must be no short/open circuits detected.

For impact resistance, the test is conducted at -15°C where a specified mass is dropped from a height of 100mm onto the cable. There must not be any splits or cracks visible on the insulation.

The abrasion test is applied to armoured power cable and involves a chisel edge, loaded with a specified mass, being placed perpendicular to the test sample. The sample is then pulled under the chisel edge for 25 cycles. At the end of the test there must not be any visible cracks or splits on the external or internal surfaces of the insulation.

In order to determine whether the materials used are suitable, a range of mechanical tests are undertaken. The tensile strength and percentage elongation are specified in the material's standard, in which limits are set for un-aged product, aged, and after compatibility, ageing. These different limits are designed to simulate different stages in the cable's life. Ageing is achieved by heating the samples in air ovens, typically for between seven and 14 days at between 80°C and 200°C.

The sample under test is then mounted onto a special test rig that elongates the material and records measurements for comparison against the requirements of the relevant standard.

To ensure that cables perform across the temperature range, elongation, pressure, heat shock and shrinkage tests are also conducted at high temperatures, and elongation and bending tests are undertaken at low temperatures.

These tests confirm that the insulation will maintain its integrity during installation and throughout the cable's life.

The cable's construction is also checked to ensure the correct number of cores, the number of conductors in each core, the cable's markings and the core colours.

Cable is also measured against the standard's dimensional criteria to confirm the size of its conductors, insulation and sheath where appropriate.

As part of BASEC management system certification, manufacturers have to possess all the necessary test facilities and satisfactorily implement the testing regimes required in the individual product specification. In addition they must also pass the testing of randomly selected samples taken by BASEC from the production line, which can be as many as 150 per year.

In Summary

To ensure a cable reaches the standard it says, BASEC applies tough test processes and revisits manufacturers' premises to carry out random tests on production lines.

Tests are carried out for a range of criteria including flexing, impact and abrasion, at various temperatures and to ensure the correct number of cores, the number of conductors in each core, the cable's markings and the core colours.

Because of these unrivalled processes, cable which carries the BASEC approval mark is recognised to be safe, reliable and of a certain quality.

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