



# DOCUMENT CHANGE REQUEST

DCR number 1033 Changes required for: General

Date: 2017/01/16

Date sent: 2016/09/12

Status: IMPLEMENTED

Originator: Steve Thacker

Organisation: ESCC Executive Secretariat

Title: Generic Specification for Wires and Cables Electrical 600V Low Frequency

Number: 3901 Issue: 2

Other documents affected:

Page:

27 & 28

Paragraph:

9.18 & Figure I

Original wording:

See 3901 issue 2:

Para.9.18:

### CUT-THROUGH RESISTANCE

This test shall be performed to check the behaviour of the finished wire or core when it comes into contact with metal cutting edges. It shall be performed on 3 samples, each 30cm long, using the equipment described in Figure I of this specification. The beam shall be balanced by adjusting the counterweight such that the arm is motionless and horizontal when no weight is attached to it.

The specimen shall be placed on the mounting of the test equipment, so that the cutting needle is perpendicular to the cable axis. The test shall be carried out at  $+23\pm 3$  °C and the needle used shall have a diameter of 0.45mm (size No. 10). The end of the beam shall be loaded at a uniform rate of 600 grammes/minute until contact is made between the needle and the conductor. The test shall be performed 3 times on each of the 3 specimens taken from different samples and each specimen shall be moved forward 75mm between tests and turned through an angle of 120°, always in the same direction. The mean load measured during the 9 tests shall not be less than the relevant value specified in the Detail Specification.

Proposed wording:

Delete Figure I.

Amend Para 9.18 to read as follows:

### CUT-THROUGH RESISTANCE

This test shall be performed to check the behaviour of the finished wire or core when it comes into contact with metal cutting edges.

It shall be performed on 3 samples, each 30cm long, using suitable test equipment. Each sample shall be positioned on the test equipment such that a cutting needle is perpendicular to the cable axis. The needle used shall have a diameter of 0.45mm (size No. 10). The test shall be carried out at  $T_{amb} = +23 \pm 3$ °C.

The needle shall be gradually loaded until contact is made between the needle and the conductor. The test shall be performed 3 times on each of the 3 samples; each sample shall be moved forward 75mm between tests and turned through



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an angle of 120°, always in the same direction. The cut-through load shall be recorded for all 9 tests.

The mean cut-through load calculated from the 9 tests shall not be less than the relevant value specified in the Detail Specification.

### Justification:

The test method is modified to permit Manufacturers to apply alternate, suitable test methods and also to clarify that the limits for mean cut-through load specified in the Detail Specifications refer to the load applied at the needle.

i.e.

- The 10:1 beam/lever test equipment is no longer mandatory.
- The requirement to apply the beam load at a uniform rate of 600g/minute (=6kg/minute at the needle) is replaced by gradually loaded.

Some Manufacturers use a test set-up that applies the cut-through force directly to the needle using a tensile machine rather than the beam/lever set-up described in Para 9.18 & Figure I.

Some Manufacturers apply the cutting force based on a constant speed of the needle rather than a constant rate of loading. Hence the use of the term gradual to provide flexibility to the Manufacturers.

Note: The arbitrary use of the term load in the current Para 9.18 could possibly result in some confusion as to what should actually be measured during the test; should it be the force applied at the end of the lever (= the input or effort force) or the force applied at the needle (= the output or load force)?

i.e.

“The end of the beam shall be loaded ...”

“The mean load measured during the 9 tests shall not be less than the relevant value specified in the Detail Specification.”

This DCR clarifies that the Detail Spec mean load limits refer to the force that is applied at the needle, not at the end of the beam/lever.

### Attachments:

3901\_issue\_3\_done.docx

### Modifications:

Agreed text:

#### 9.18 CUT-THROUGH RESISTANCE

This test shall be performed to check the behaviour of the finished wire or core when it comes into contact with metal cutting edges.

It shall be performed on 3 samples, each 30cm long, using suitable test equipment. Each sample shall be positioned on the test equipment such that a cutting needle is perpendicular to the cable axis. The needle used shall have a diameter of 0.45mm (size No. 10). The test shall be carried out at  $T_{amb} = +23 \pm 3^{\circ}\text{C}$ .

The needle shall be gradually loaded until contact is made between the needle and the conductor. The needle shall either

be loaded at a maximum rate of 6kg/minute or moved at a maximum speed of 2mm/minute. The test shall be performed 3 times on each of the 3 samples; each sample shall be moved forward 75mm between tests and turned through an angle of 120°, always in the same direction. The cut-through load shall be recorded for all 9 tests.

The mean cut-through load calculated from the 9 tests shall not be less than the relevant value specified in the Detail Specification.

Approval signature:



Date signed:

2017-01-16