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Overhead electrical conductors – Calculation methods for stranded bare conductors

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CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
4 Symbols, units and abbreviated terms 7
4.1 Symbols and units 7
4.2 Abbreviated terms 8
5 Current carrying capacity 8
5.1 General 8
5.2 Heat balance equation 8
5.3 Calculation method 9
5.4 Joule effect 9
5.5 Solar heat gain 9
5.6 Radiated heat loss 9
5.7 Convection heat loss 10
5.8 Method to calculate current carrying capacity (CCC) 10
5.9 Determination of the maximum permissible aluminium temperature 10
5.10 Calculated values of current carrying capacity 11
6 Alternating current resistance, Inductive and capacitive reactances 11
6.1 General 11
6.2 Alternating current (AC) resistance 11
6.3 Inductive reactance 12
6.4 Capacitive reactance 14
7 Elongation of stranded conductors 14
7.1 General 14
7.2 Thermal elongation 15
7.3 Stress-strain properties 18
7.4 Assessment of final elastic modulus 20
8 Conductor creep 22
8.1 General 22
8.2 Creep of single wires 23
8.3 Total conductor creep 24
8.4 Prediction of conductor creep 24
8.5 Creep values 24
9 Loss of strength 25
Annex A (informative) A practical example of CCC calculation 27
A.1 Basic Assumptions 27
A.2 CCC calculation 27
Annex B (informative) Indicative conditions for CCC calculation 29
Bibliography 30

Figure 1 – Typical creep curve 23
Figure 2 – Loss of strength of aluminium A1 as a function of temperature 26
Figure 3 – Loss of strength of aluminium A2 26

Table 1 – Values of K_g for inductive reactance calculations 13
Table 2 – Coefficient of linear expansion β of inhomogeneous conductors designated Ax/Sxy 17
Table 3 – Coefficient *of* linear expansion β of inhomogeneous conductors designated Ax/20SA 18
Table 4 – Typical stress-strain data of stranded conductors based on published test results 21
Table 5 – Final modulus of elasticity calculated with E_a= 55000 MPa and E_s= 190000 MPa 22
Table 6 – Final modulus of elasticity calculated with E_a= 55000 MPa and E_s= 159000 MPa (20SA) 22
Table 7 – Indicative creep values of stranded conductors(25 %RTS, 20 ℃) 25
Table B.1 – Indicative conditions for CCC calculation 29

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OVERHEAD ELECTRICAL CONDUCTORS – CALCULATION METHODS FOR STRANDED BARE CONDUCTORS

FOREWORD

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IEC TR 61597 has been prepared by IEC technical committee 7: Overhead electrical conductors. It is a Technical Report.

This second edition cancels and replaces the first edition published in 1995. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Addition of Clause 2 and Clause 3 since the "Normative references" and "Terms and definitions" clauses are mandatory elements of the text according to the new IEC template.
b) In Clause 6, addition of new kinds of aluminium alloy and aluminium clad steel and their values of temperature coefficients of resistance.
c) In Clause 6, addition of guidelines for the calculation of AC resistance taken into account hysteresis and eddy current losses.

d) In Clause 7, addition of the values of coefficient of linear expansion of aluminium alloy conductor aluminium-clad steel reinforced series.

e) Deletion of Clause 8 “Calculation of maximum conductor length on drums” in the last version.

f) Annex A, replaced by “A practical example of CCC calculation”.

g) Annex B, replaced by “Indicative conditions for CCC calculation”.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
7/704/DTR	7/707/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

OVERHEAD ELECTRICAL CONDUCTORS – CALCULATION METHODS FOR STRANDED BARE CONDUCTORS

1 Scope

This document, which is a Technical Report, provides information with regard to conductors specified in IEC 61089 and other aluminium and aluminium steel conductors. Such information includes properties of conductors and useful methods of calculation. The following chapters are included in this document.

– current carrying capacity of conductors: Calculation method and typical example
– alternating current resistance, inductive and capacitive reactances
– elongation of conductors: Thermal and stress-strain data
– conductor creep
– loss of strength of aluminium wires due to high temperatures

It is noted that this document does not discuss all theories and available methods for calculating conductor properties, but provides users with simple methods that provide acceptable accuracies.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TR 60943:1998, *Guidance concerning the permissible temperature rise for parts of electrical equipment, in particular for terminals*
IEC TR 60943:1998/AMD1:2008

IEC 61089:1991, *Round wire concentric lay overhead electrical stranded conductors*
IEC 61089:1991/AMD1:1997

IEC 60104:1987, *Aluminium-magnesium-silicon alloy wire for overhead line conductors*

IEC 60889:1987, *Hard-drawn aluminium wire for overhead line conductors*

IEC 61232:1993, *Aluminium-clad steel wires for electrical purposes*

IEC 61395:1998, *Overhead electrical conductors – Creep test procedures for stranded conductors*

IEC 62004:2007, *Thermal-resistant aluminium alloy wire for overhead line conductor*