

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electric cables – Calculation of the current rating –
Part 3-1: Operating conditions – Site reference conditions**

**Câbles électriques – Calcul du courant admissible –
Partie 3-1: Conditions de fonctionnement – Conditions du site de référence**





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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.20

ISBN 978-2-8322-4348-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRIC CABLES –
CALCULATION OF THE CURRENT RATING –****Part 3-1: Operating conditions –
Site reference conditions**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60287-3-1 has been prepared by IEC technical committee 20: Electric cables.

This second edition cancels and replaces the first edition published in 1995 and Amendment 1:1999. This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- a) the updated list of national laying conditions is now covered in Annex A;
- b) Clause 5 about the information required from the purchaser for the selection of the appropriate type of cable has been removed.

The text of this standard is based on the following documents:

FDIS	Report on voting
20/1714/FDIS	20/1730/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60287 series, published under the general title *Electric cables – Calculation of the current rating*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex A lists all of the “in-some-country” clauses on differing practices of a less permanent nature relating to the subject of this standard.

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

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

INTRODUCTION

IEC 60287 has been divided into three parts so that revisions of, and additions to the document can be carried out more conveniently.

Each part is subdivided into subparts which are published as separate standards.

Part 1: Formulae for ratings (100 % load factor) and power losses

Part 2: Formulae for thermal resistance

Part 3: Operating conditions

This part of IEC 60287-3 contains reference ambient temperatures and thermal resistivities of soil in various countries.

Quantities related to the operating conditions of cables are liable to vary considerably from one country to another. For instance, with respect to the ambient temperature and soil thermal resistivity, the values are governed in various countries by different considerations. Superficial comparisons between the values used in the various countries may lead to erroneous conclusions if they are not based on common criteria: for example, there may be different expectations for the life of the cables, and in some countries design is based on maximum values of soil thermal resistivity, whereas in others average values are used. Particularly, in the case of soil thermal resistivity, it is well known that this quantity is very sensitive to soil moisture content and may vary significantly with time, depending on the soil type, the topographical and meteorological conditions, and the cable loading.

The following procedure for choosing the values for the various parameters should, therefore, be adopted.

Numerical values should preferably be based on results of suitable measurements. Often such results are already included in national specifications as recommended values, so that the calculation may be based on these values generally used in the country in question; a survey of such values is given in this part of IEC 60287-3.

ELECTRIC CABLES – CALCULATION OF THE CURRENT RATING –

Part 3-1: Operating conditions – Site reference conditions

1 Scope

This part of IEC 60287-3 is applicable to the conditions of steady-state operation of cables at all voltages, buried directly in the ground, in ducts, troughs or in steel pipes, both with and without partial drying-out of the soil, as well as cables in air. The term "steady state" is intended to mean a continuous constant current (100 % load factor) just sufficient to produce asymptotically the maximum conductor temperature, the surrounding ambient conditions being assumed constant.

This document defines site reference conditions, however the general values are superseded by specific national requirements.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Reference ambient temperatures and thermal resistivities of soil in various countries

4.1 Operating conditions – Site reference conditions

In order to use the formulae given in the various parts of IEC 60287, numerical values for the physical quantities should be chosen relating to the operating conditions.

It is obviously possible to compare the results of two calculations of current rating only when the assumptions made and the numerical values of the parameters are known.

In particular, the quantities related to the operating conditions of cables are likely to vary considerably from one country to another. An enquiry into this subject has been carried out and a number of countries have replied.

Annex A summarizes the operating conditions used in various countries. Attention is drawn to the fact that the information in Annex A is intended only as a guide for cable installation designers when data provided by a user is incomplete. Care should be taken not to draw unjustified conclusions from comparisons of values for different countries. It should be remembered that the values adopted in any particular country are governed by many factors some of which might not be of equal importance in other countries.

Values relating to the operating conditions are given in Annex A for the following countries:

Australia
Austria

Italy
Japan

Portugal
Spain