IEC 60287-3-1

Edition 2.0 2017-06

REDLINE VERSION

colour inside

Electric cables – Calculation of the current rating – Part 3-1: ~~Sections on~~ Operating conditions – Site reference ~~operating~~ conditions ~~and selection of cable type~~

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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ELECTRIC CABLES – CALCULATION OF THE CURRENT RATING –

Part 3-1: ~~Sections on~~ Operating conditions – Site reference ~~operating~~ conditions ~~and selection of cable type~~

FOREWORD

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This Redline version is not an official IEC Standard and is intended only to provide the user with an indication of what changes have been made to the previous version. Only the current version of the standard is to be considered the official document.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

IEC 60287 has been divided into three parts ~~and sections~~ 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: ~~Sections on~~ Operating conditions

This part of IEC 60287-3 contains reference ambient temperatures and thermal resistivities of soil in various countries. ~~Also in this section is an outline of the information required from the purchaser for the selection of the appropriate type of cable.~~

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: ~~Sections on~~ Operating conditions – Site reference ~~operating~~ conditions ~~and selection of cable type~~

1 Scope

This part of IEC 60287-3 is applicable to the conditions of steady-state operation of cables at all ~~alternating~~ voltages~~, and direct voltages up to 5 kV~~, 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 section concerns reference operating conditions and selection of cable type.~~

This document defines site reference conditions, however the general values are superseded by specific national requirements.

2 Normative references

~~The following normative document contains provisions which, through reference in this text, constitute provisions of this section of IEC 60287-3. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 60287-3 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.~~

~~IEC 60183:1984, *Guide to the selection of high-voltage cables*~~
~~Amendment 1 (1990)~~

There are no normative references in this document.

IEC 60287-3-1

Edition 2.0 2017-06

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



IEC 60287-3-1:2017-06(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRIC CABLES – CALCULATION OF THE CURRENT RATING –

Part 3-1: Operating conditions – Site reference conditions

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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.

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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

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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CÂBLES ÉLECTRIQUES – CALCUL DU COURANT ADMISSIBLE –

Partie 3-1: Conditions de fonctionnement – Conditions du site de référence

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La Norme internationale IEC 60287-3-1 Ed.2 a été établie par le comité d'études 20 de l'IEC: Câbles électriques.

Cette deuxième édition annule et remplace la première édition publiée en 1995 et l'Amendement 1:1999. Cette édition constitue une révision technique. Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) la liste mise à jour des conditions de pose nationales est maintenant couverte par l'Annexe A;
b) l'Article 5 relatif aux informations exigées de l'acheteur pour permettre la sélection du type approprié de câble a été supprimé.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
20/1714/FDIS	20/1730/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60287, publiées sous le titre général *Câbles électriques –Calcul du courant admissible*, peut être consultée sur le site web de l'IEC.

L’attention du lecteur est attirée sur le fait que l’Annexe A énumère tous les articles traitant des différences à caractère moins permanent inhérentes à certains pays, concernant le sujet de la présente norme.

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- amendée.

INTRODUCTION

L'IEC 60287 a été divisée en trois parties de manière à faciliter les révisions et les adjonctions.

Chaque partie est subdivisée en sous-parties qui sont publiées en tant que normes séparées.

Partie 1: Équations de l'intensité du courant admissible (facteur de charge 100 %) et calcul des pertes

Partie 2: Équations de la résistance thermique

Partie 3: Conditions de fonctionnement

La présente partie de l'IEC 60287-3 contient des valeurs des températures ambiantes de référence et des résistivités thermiques des sols dans divers pays.

Les données relatives aux conditions de fonctionnement des câbles sont susceptibles de varier considérablement d'un pays à l'autre. Par exemple, pour ce qui est de la température ambiante et de la résistivité thermique du sol, les valeurs sont régies dans les différents pays par diverses considérations. Des comparaisons superficielles entre les valeurs utilisées dans les différents pays peuvent conduire à des conclusions erronées, si elles ne sont pas fondées sur des critères communs: par exemple, il peut y avoir des attentes différentes pour la durée de vie des câbles, et dans certains pays, la conception est basée sur les valeurs maximales de résistivité thermique du sol, alors que dans d'autres pays, les valeurs moyennes sont utilisées. En particulier, dans le cas de la résistivité thermique du sol, il est bien connu que celle-ci est très sensible au taux d'humidité et peut varier sensiblement dans le temps suivant le type de sol, les conditions topographiques et météorologiques et la charge du câble.

Il convient par conséquent d'adopter la méthode suivante pour le choix des valeurs des différents paramètres.

Il convient que les valeurs numériques soient, de préférence, basées sur des résultats de mesures valables. De tels résultats sont déjà souvent inclus dans les spécifications nationales sous forme de valeurs recommandées, de telle sorte que le calcul peut être exécuté sur la base de ces valeurs, généralement utilisées dans le pays en question; un examen de ces valeurs est donné dans la présente partie de l'IEC60287-3.

CÂBLES ÉLECTRIQUES – CALCUL DU COURANT ADMISSIBLE –

Partie 3-1: Conditions de fonctionnement – Conditions du site de référence

1 Domaine d'application

La présente partie de l'IEC 60287-3 s'applique aux conditions de fonctionnement en régime permanent des câbles de toutes tensions enterrés directement dans le sol, placés dans des fourreaux, caniveaux ou tubes d'acier, avec ou sans assèchement partiel du sol, ainsi que les câbles posés à l'air libre. On entend par «régime permanent» la circulation continue d'un courant constant (facteur de charge 100 %) assez suffisant pour produire asymptotiquement la température maximale à l'âme en supposant que les conditions du milieu ambiant restent constantes.

Le présent document définit les conditions du site de référence, cependant les valeurs générales sont remplacées par les exigences spécifiques nationales.

2 Références normatives

Le présent document ne contient aucune référence normative.