

Electric cables — Calculation of the current rating —

Part 3: Sections on operating conditions —

Section 3.1 Reference operating conditions and selection of cable type

ICS 29.060.20

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee GEL/20, Electric cables, upon which the following bodies were represented:

- Association of Consulting Engineers
- Association of Manufacturers of Domestic Electrical Appliances
- BEAMA Electrical Cable and Conductor Accessory Manufacturers' Association
- British Approvals Service for Cables
- British Cable Makers Confederation
- British Iron and Steel Producers Association
- British Plastics Federation
- Department of Trade and Industry (Consumer Safety Unit, CA division)
- Electricity Association
- London Regional Transport

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- ERA Technology Ltd.
- Institution of Incorporated Executive Engineers
- London Underground Ltd.

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 February 1997

© BSI 2 October 2002

The following BSI references relate to the work on this standard:
Committee reference GEL/20
Draft announced in BSI *Update* November 1996

ISBN 0 580 26924 8

Amendments issued since publication

Amd. No.	Date	Comments
13682	2 October 2002	Replacement of Clause 4.11

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Introduction	1
1 Scope	1
2 Normative reference	1
3 Reference ambient temperatures and thermal resistivities of soil in various countries	1
3.1 Standard operating conditions	2
3.2 Procedure when values are not provided in national tables	2
4 Values relating to the operating conditions in various countries	2
5 Information required from the purchaser for the selection of the appropriate type of cable	10
5.1 Background	10
5.2 Operating conditions	10
5.3 Installation data	11

National foreword

This Section of BS 7769 has been prepared by Technical Committee GEL/20. It is identical with IEC 60287-3-1:1995, *Electrical cables — Calculation of the current rating — Part 3: Sections on operating conditions — Section 1: Reference operating conditions and selection of cable type*, including amendment 1:1999, published by the International Electrotechnical Commission (IEC).

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 11 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

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 divided into sections 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 section 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 section.

1 Scope

This section 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.

2 Normative reference

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).

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

3.1 Standard operating 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 liable to vary considerably from one country to another. An enquiry into this subject has been carried out and a number of countries have replied.