

# INTERNATIONAL STANDARD

**IEC**  
**60287-2-2**

First edition  
1995-05

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**Electric cables –  
Calculation of the current rating –**

**Part 2-2:  
Thermal resistance –  
A method for calculating reduction  
factors for groups of cables in free air,  
protected from solar radiation**

*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ELECTRIC CABLES -

## CALCULATION OF THE CURRENT RATING -

## Part 2: Thermal resistance -

**Section 2: A method for calculating reduction factors  
for groups of cables in free air, protected  
from solar radiation**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 287-2-2 has been prepared by sub-committee 20A: High-voltage cables, of IEC technical committee 20: Electric cables.

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

| Six months' Rule | Report on voting |
|------------------|------------------|
| 20A(CO)125       | 20A(CO)135       |

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 section was published initially as IEC 1042.

## INTRODUCTION

This section provides a method and data for calculating group reduction factors for cables in groups running horizontally in free air. Dielectric losses are neglected. It should be read in conjunction with part 2, section 1.

## **ELECTRIC CABLES – CALCULATION OF THE CURRENT RATING –**

### **Part 2: Thermal resistance –**

#### **Section 2: A method for calculating reduction factors for groups of cables in free air, protected from solar radiation**

##### **1 Scope**

The method described in this International Standard is applicable to any type of cable and group running horizontally, provided that the cables are of equal diameter and emit equal losses.

Information is provided on the reduction in permissible current when cables are mounted adjacent to each other. It is limited to the following cases:

- a) a maximum of nine cables in a square formation, see figure 1, and
- b) a maximum of six circuits each comprised of three cables mounted in trefoil, with up to three circuits placed side by side or two circuits placed one above the other, see figure 2.

Caution is advised where air flow around the cables may be restricted by proximity to neighbouring objects.

NOTE – Further work is to be done to extend and refine the data and to include the effect of dielectric loss.

Information is provided for the following situations:

- Where a rating for one cable or circuit assumed to be isolated exists, group reduction factors can be derived for the same type of cable, see 4.1.
- Where previously calculated ratings are not available, the data provided can be used to calculate permissible currents for groups of cables, using the formulae in parts 1 and 2, see 4.2.
- Where adequate clearances can be provided between cables to avoid a reduction in permissible current, see clause 5.

##### **2 Normative references**

IEC 287-1-1: 1994, *Electric cables – Calculation of the current rating – Part 1: Current rating equations (100 % load factor) and calculation of losses – Section 1: General*

IEC 287-2-1: 1994, *Electric cables – Calculation of the current rating – Part 2: Thermal resistance – Section 1: Calculation of thermal resistance*