

**Table 4B3 – Rating factors for cables buried direct in the ground  
or in an underground conduit system to BS EN 50086-2-4  
for soil thermal resistivities other than 2.5 K.m/W  
to be applied to the current-carrying capacities for Reference Method D**

| Thermal resistivity, K.m/W               | 0.5  | 0.8  | 1    | 1.5  | 2    | 2.5 | 3    |
|--|------|------|------|------|------|-----|------|
| Rating factor for cables in buried ducts | 1.28 | 1.20 | 1.18 | 1.1  | 1.05 | 1   | 0.96 |
| Rating factor for direct buried cables   | 1.88 | 1.62 | 1.5  | 1.28 | 1.12 | 1   | 0.90 |

**NOTE 1:** The rating factors given have been averaged over the range of conductor sizes and types of installation included in the relevant tables in this appendix. The overall accuracy of rating factors is within  $\pm 5\%$ .

**NOTE 2:** The rating factors are applicable to cables drawn into buried ducts. For cables laid direct in the ground the rating factors for thermal resistivities less than 2.5 K.m/W will be higher. Where more precise values are required they may be calculated by methods given in BS 7769 (BS IEC 60287).

**NOTE 3:** The rating factors are applicable to ducts buried at depths of up to 0.8 m.

**Table 4C1 – Rating factors for one circuit or one multicore cable  
or for a group of circuits, or a group of multicore cables,  
to be used with current-carrying capacities of Tables 4D1A to 4J4A**

| Arrangement<br>(cables touching)  | Number of circuits or multicore cables |      |      |      |      |      |      |      |      |      |      |      | To be used with<br>current-carrying<br>capacities,<br>Reference |
|---|--|------|------|------|------|------|------|------|------|------|------|------|---|
|   | 1                                      | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 12   | 16   | 20   |   |
| Bunched in air, on a surface, embedded or enclosed                              | 1.00                                   | 0.80 | 0.70 | 0.65 | 0.60 | 0.57 | 0.54 | 0.52 | 0.50 | 0.45 | 0.41 | 0.38 | Methods A to F  |
| Single layer on wall or floor   | 1.00                                   | 0.85 | 0.79 | 0.75 | 0.73 | 0.72 | 0.72 | 0.71 | 0.70 | 0.70 | 0.70 | 0.70 | Method C  |
| Single layer multicore on a perforated horizontal or vertical cable tray system | 1.00                                   | 0.88 | 0.82 | 0.77 | 0.75 | 0.73 | 0.73 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | Methods E and F   |
| Single layer multicore on cable ladder system or cleats etc.,                   | 1.00                                   | 0.87 | 0.82 | 0.80 | 0.80 | 0.79 | 0.79 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 |   |

**NOTE 1:** These factors are applicable to uniform groups of cables, equally loaded.

**NOTE 2:** Where horizontal clearances between adjacent cables exceeds twice their overall diameter, no rating factor need be applied.

**NOTE 3:** The same factors are applied to:

- groups of two or three single-core cables;
- multicore cables.

**NOTE 4:** If a system consists of both two- and three-core cables, the total number of cables is taken as the number of circuits, and the corresponding factor is applied to the tables for two loaded conductors for the two-core cables, and to the Tables for three loaded conductors for the three-core cables.

**NOTE 5:** If a group consists of  $n$  single-core cables it may either be considered as  $n/2$  circuits of two loaded conductors or  $n/3$  circuits of three loaded conductors.

**NOTE 6:** The rating factors given have been averaged over the range of conductor sizes and types of installation included in Tables 4D1A to 4J4A the overall accuracy of tabulated values is within 5%.

**NOTE 7:** For some installations and for other methods not provided for in the above table, it may be appropriate to use factors calculated for specific cases, see for example Tables 4C4 and 4C5.

**NOTE 8:** When cables having differing conductor operating temperature are grouped together, the current rating is to be based upon the lowest operating temperature of any cable in the group.

**NOTE 9:** If, due to known operating conditions, a cable is expected to carry not more than 30 % of its *grouped* rating, it may be ignored for the purpose of obtaining the rating factor for the rest of the group.

For example, a group of  $N$  loaded cables would normally require a group rating factor of  $C_g$  applied to the tabulated  $I_t$ . However, if  $M$  cables in the group carry loads which are not greater than  $0.3 C_g I_t$  amperes the other cables can be sized by using the group rating factor corresponding to  $(N-M)$  cables.

**TABLE 4D5 – 70 °C thermoplastic insulated and sheathed flat cable  
with protective conductor  
(COPPER CONDUCTORS)**

Ambient temperature: 30 °C  
Conductor operating temperature: 70 °C

CURRENT-CARRYING CAPACITY (amperes) and VOLTAGE DROP (per ampere per metre):

| Conductor cross-sectional area | Reference Method 100#<br>(above a plasterboard ceiling covered by thermal insulation not exceeding 100 mm in thickness) | Reference Method 101#<br>(above a plasterboard ceiling covered by thermal insulation exceeding 100 mm in thickness) | Reference Method 102#<br>(in a stud wall with thermal insulation with cable touching the inner wall surface) | Reference Method 103#<br>(in a stud wall with thermal insulation with cable not touching the inner wall surface) | Reference Method C*<br>(clipped direct) | Reference Method A*<br>(enclosed in conduit in an insulated wall) | Voltage drop (per ampere per metre) |
|--------------------------------|---|---|--|--|---|---|-------------------------------------|
| 1                              | 2   | 3   | 4  | 5  | 6                                       | 7   | 8                                   |
| (mm <sup>2</sup> )             | (A)   | (A)   | (A)  | (A)  | (A)                                     | (A)   | (mV/A/m)                            |
| 1                              | 13  | 10.5  | 13   | 8  | 16                                      | 11.5  | 44                                  |
| 1.5                            | 16  | 13  | 16   | 10   | 20                                      | 14.5  | 29                                  |
| 2.5                            | 21  | 17  | 21   | 13.5   | 27                                      | 20  | 18                                  |
| 4                              | 27  | 22  | 27   | 17.5   | 37                                      | 26  | 11                                  |
| 6                              | 34  | 27  | 35   | 23.5   | 47                                      | 32  | 7.3                                 |
| 10                             | 45  | 36  | 47   | 32   | 64                                      | 44  | 4.4                                 |
| 16                             | 57  | 46  | 63   | 42.5   | 85                                      | 57  | 2.8                                 |

A\* For full installation method refer to Table 4A2 Installation Method 2 but for flat twin and earth cable  
 C\* For full installation method refer to Table 4A2 Installation Method 20 but for flat twin and earth cable  
 100# For full installation method refer to Table 4A2 Installation Method 100  
 101# For full installation method refer to Table 4A2 Installation Method 101  
 102# For full installation method refer to Table 4A2 Installation Method 102  
 103# For full installation method refer to Table 4A2 Installation Method 103

Wherever practicable, a cable is to be fixed in a position such that it will not be covered with thermal insulation.  
 Regulation 523.7, BS 5803-5: Appendix C: Avoidance of overheating of electric cables,  
 Building Regulations Approved document B and Thermal insulation: avoiding risks, BR 262, BRE, 2001 refer.