

SECTION 2 CABLE SELECTION PROCEDURE

2.1 GENERAL The cable selection procedures set out in this Section detail the guidelines to be followed to determine the minimum size of cable required to satisfy a particular installation condition.

2.2 SELECTION PROCESS The following three main factors influence the selection of a particular cable to satisfy the circuit requirements:

- (a) *Current-carrying capacity*—dependent upon the method of installation and the presence of external influences, such as thermal insulation, which restrict the operating temperature of the cable.
- (b) *Voltage drop*—dependent upon the impedance of the cable, the magnitude of the load current and the load power factor.
- (c) *Short-circuit temperature limit*—dependent upon energy produced during the short-circuit condition.

The minimum cable size will be the smallest cable that satisfies the three requirements. However, with experience it will become apparent that the different nature of installations will determine which of the requirements predominate. In general, the current-carrying capacity requirement will be the most demanding in the relatively shorter route lengths of domestic premises and the like where factors such as semi-enclosed rewirable fuse protection, cable grouping, and thermal insulation occur. On the other hand the voltage drop limitation is usually the deciding factor for longer route lengths which are not subject to the factors mentioned above. The need to increase cable size to meet the short-circuit temperature rise requirements will only occur in special situations for the voltage ratings of the cables covered by this Standard.

2.3 DETERMINATION OF MINIMUM CABLE SIZE BASED ON CURRENT-CARRYING CAPACITY CONSIDERATIONS To satisfy the current-carrying capacity requirements of a circuit it is necessary to take into account a number of factors, as follows:

- (a) Determine the current requirements of the circuit.

NOTES:

- 1 NZS 3000 makes requirements concerning the relationship between the current required by the load connected to the circuit, the type and current rating of the overcurrent protective device, and the current-carrying capacity of the cable. Such factors will invariably determine the minimum current requirements for the application of this Standard.
- 2 Where rewirable fuses form the circuit-protection, NZS 3000 makes provision for a derating factor to be applied to the current-carrying capacity of cable determined from this Standard. This derating factor is necessary because of the desire to limit the maximum permissible temperature rise under overload conditions.

- (b) Determine the method of cable installation to be used, as follows:

- (i) For a single circuit, determine if the method of installation requires the application of a derating factor selected from Tables 22, 23 or 24. Where applicable, divide the value of current determined in Step (a) by the derating factor so determined.