

Australian/New Zealand Standard™

**Tunnel type terminal neutral bars for low
voltage switchboards—Requirements
for termination of copper conductors up
to 50 mm²**



AS/NZS 5112:2015

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-004, Electrical Accessories.

The objective of this Standard is to provide requirements and methods of test for tunnel type terminal neutral bars for low voltage switchboards for termination of copper conductors up to 50 mm².

The Standard is suitable for referencing in AS/NZS Standards associated with low voltage installations.

The essential safety requirements in AS/NZS 3820, *Essential safety requirements for electrical equipment* that could be applicable to terminals for low voltage switchboard circuits are covered by this Standard.

The term ‘informative’ has been used in this Standard to define the application of the appendices to which it applies. An ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Tunnel type terminal neutral bars for low voltage switchboards—
Requirements for termination of copper conductors up to 50 mm²****1 SCOPE**

This Standard specifies requirements and methods of test for tunnel type terminal neutral bars for low voltage switchboards for termination of copper conductors up to 50 mm². It applies to bars of the tunnel terminal type for connection to copper conductors—

- (a) of the rigid, stranded or flexible type; and
- (b) with a cross-sectional area of 1.0 mm² up to and including 50 mm².

NOTES:

- 1 Preferred current ratings are 63 A, 80 A, 100 A and 125 A.
- 2 This Standard is for tunnel terminal type neutral bars for use as components in switchboards, panel boards, load centres, meter boxes and the like.
- 3 The current ratings in this Standard apply to bars with a maximum temperature rise of 45 K when tested at ambient temperature in open air.

The ratings obtained in this Standard are applicable to switchboards with an internal air temperature rise of up to 25 K.

NOTE: Refer to Appendix A of this document for further details.

2 NORMATIVE REFERENCES

The following are the normative documents referred to in this Standard:

NOTE: Documents for informative purposes are listed in the Bibliography.

AS/NZS

1567	Copper and copper alloys—Wrought rods, bars and sections
3000	Wiring Rules
3100	Approval and test specification—General requirements for electrical equipment
60695	Fire hazard testing
60695.2.11	Part 2.11: Glowing/hot wire based test methods—Glow-wire flammability test method for end-products (IEC 60695-2-11:2000, MOD)

3 TERMS AND DEFINITIONS

For the purpose of this Standard, the terms and definitions given in AS/NZS 3000 and AS/NZS 3100 and the following apply.

3.1 Conductor, prepared

A conductor which has been cut and the insulation of which has been removed over a certain length and fitted with an eyelet, cable lug, shoelace ferrule or the like.

3.2 Conductor, unprepared

A conductor which has been cut and the insulation of which has been removed over a certain length for insertion into a terminal.

NOTE: A conductor, the shape of which is arranged for introduction into a terminal, is considered to be an unprepared conductor, e.g. the strands may be twisted or formed into a 'U' shape.

3.3 Main earthing conductor

The connection to the installation earth electrode.

3.4 Main neutral conductor

The incoming supply conductor which is a combined Protective Earth and Neutral (PEN) conductor which is connected to the main neutral bar.

3.5 Maximum connecting capacity

The size of the largest unprepared stranded copper conductor in Table 1 that can be clamped.

3.6 Multiple earthed neutral (MEN) connection

The MEN connection is the connection in the main switchboard between the main neutral bar and the main earthing bar or conductor.

3.7 MEN system

A system of earthing in which the parts of an electrical installation required to be earthed are connected together to form an equipotential bonded network and this network is connected to both the neutral conductor of the supply system and the general mass of earth.

NOTE: The MEN system is similar in principle but not in detail to an IEC TN-C-S system.

3.8 Screw-type terminal

Terminal for the connection and subsequent disconnection of one conductor or the interconnection of two or more conductors capable of being dismantled, the connections being made, directly or indirectly, by means of screws or nuts of any kind.

NOTE: Refer to Table 2.

3.9 Tunnel terminal

A terminal in which the conductors are inserted into a hole or cavity, where they are clamped by a screw or screws.

The clamping pressure may be applied to the conductor directly by the screw(s) in direct contact with the conductor [refer to Figure 1(a)] or indirectly by the screw(s) through a plate or ferrule [refer to Figure 1(b)].

A tunnel terminal bar includes the type where the outgoing conductors are in tunnels and the incoming conductor is connected by other means such as a cable lug or a saddle terminal.

A saddle terminal is regarded as a tunnel terminal for the purpose of this Standard.

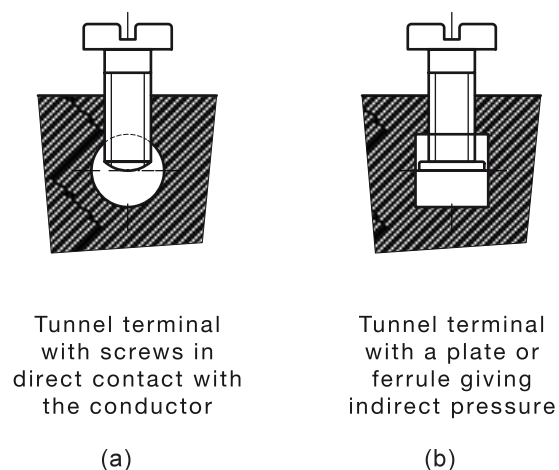


FIGURE 1 TUNNEL TERMINAL TYPES

4 COMPLIANCE WITH AS/NZS 3100

Tunnel type terminal bars shall comply with the relevant requirements of AS/NZS 3100.

5 MARKING

5.1 Required marking

The following marking information shall be provided:

- (a) Type reference (e.g. a catalogue number).
- (b) Manufacturer's or responsible vendor's name or trade mark or identification mark.
- (c) The rated current in amps, e.g. 63 A.
- (d) Terminals:
 - (i) The terminal for the MEN connection to the main earth, the letter 'E' or the symbol .
 - (ii) The terminal for the supply main neutral connection, the letter 'N'.
 - (iii) Every other terminal, from 1 in numerical sequence (see Note).

Exception: The marking of the MEN (E) and main neutral terminal (N) is not required if the MEN connection is at one extremity and the main neutral is the next adjacent terminal.

NOTE: Conventionally the terminals are marked in sequence from the left hand end or from the main neutral.

- (e) AS/NZS 5112 (the number of this Standard).
- (f) Rated connecting capacity.

5.2 Location of marking

The marking shall be clearly discernible from the outside after the bar has been fixed as in normal use, but, if necessary, after removal of a cover.

Items (b), (c) and (d) shall be on the bar itself or may be on the bar support if the bar is supplied integral with a complete assembly (e.g. moulded into the support or by labelling).

Items (a), (e) and (f) may be in the manufacturer's or responsible vendor's data.

5.3 Method of marking

The marking shall be legible and durable and shall be in accordance with AS/NZS 3100.

5.4 Manufacturer's instructions and data

Instructions shall be provided with the product or in the manufacturer's data for the following:

- (a) The maximum connecting capacity, in mm².
- (b) Any requirements for prepared conductors, e.g. shoelace ferrules for flexible cables, lug sizes for bolted terminals. Conductors solidified by solder are not permitted.

The following recommendations apply:

- (i) It is recommended that Table 1 be supplied to show cable sizes for connection limits.
- (ii) It is recommended that Table 2 be supplied to show the maximum torques with a note that the torque must not be below 2/3 of these values.

6 REQUIREMENTS

6.1 General

The bars shall be provided with clamping facilities for securely terminating the conductors used in normal service.

The clamping of conductors shall be secure, not loosen in normal service and not exceed the allowable temperatures.

6.2 Range of conductors and connection requirements

6.2.1 *Range of conductors to be connected*

The bars shall be provided with means to clamp stranded, solid and flexible copper conductor as shown in Table 1. The conductors shall be unprepared and prepared conductors in accordance with the manufacturer's instructions.

The maximum size of an unprepared conductor to be clamped shall be at least one size larger than the conductor with a current rating in Table 4 corresponding to the rated current of the neutral bar.

Compliance shall be established in accordance with Clauses 7.3.1.1 and 7.3.1.2.

NOTE: The test of 7.10 is carried out on the cable size corresponding to the rated current in Table 4, e.g. A 250A test is carried out on a 35 mm² in Table 4, and not on the maximum connecting capacity of 50 mm² which relates to Table 1, Clause 6.2.2 and 7.3.2.

6.2.2 *Maximum connecting capacity*

The maximum connecting capacity is the largest unprepared stranded copper conductor size in Table 1 that can be clamped.

Compliance shall be established in accordance with Clause 7.3.2.

6.2.3 *Separate terminals for individual conductors*

The bars shall be provided with separate terminals for connecting each individual incoming and outgoing cable.

Compliance shall be established in accordance with Clause 7.3.3.

6.2.4 *Tunnel terminal types*

One or more of the following tunnel terminal types, as defined in Clause 3.9, may be used:

- (a) Tunnel terminal with screws in direct contact with the conductors.
- (b) Tunnel terminal with a ferrule or plate giving indirect pressure on the conductors from the screw.
- (c) Saddle terminals for incoming conductors.

Compliance shall be established in accordance with Clause 7.3.4.