Proposal Details:

Proposal Number:
P-004717
Proponent Name:
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Proposal Status:
In Consultation
Proposal Cancellation Reason(s):

Submitted Date:
2024-11-13
Submitted on behalf of Nominating Organisation:
Australian Industry Group
Consultation Start Date:
2024-11-14
Consultation End Date:
2024-12-05
Approved Date:

Completed Date:

Project 1: AS/NZS 3000:2018 Electrical installations (known as the Australian/New Zealand Wiring Rules)
Project Number:
P-004717-01
Project Type:
Revision
Project Pathway:
Traditional
Project Status:
Proposal
Existing Publication to Revise/Amend:
AS/NZS 3000:2018 • Electrical installations (known as the Australian/New Zealand Wiring Rules)
National Committee:

Is this a Watermark referenced Standard proposal?
No
Is this a National Construction Code (NCC) referenced Standard proposal?
No

Why does publication need changes?

The AS/NZS 3000 Wiring Rules are essential for ensuring electrical safety and compliance across Australia and New Zealand. To maintain its relevance and effectiveness, EL-001 must conduct regular maintenance to address several key issues:

1. Correction of known errors: Since the last publication of AS/NZS 3000 the committee has been made aware of several editorial and technical errors that need to be rectified to ensure clarity and accuracy. Correcting these errors will enhance the reliability and usability of the document.

2. Review imagery throughout the standard: review imagery to ensure the standard reflects current practices and technologies. Modern, clear, accurate and in some cases interactive images will improve comprehension and application of the rules.

3. Review of terms and definitions: a review of some terms and definitions is needed to ensure they remain fit for purpose and align with the content and intention of the standard.

4. Incorporation of requirements and guidance for new and emerging technology: The rapid advancement and adoption of new technology necessitates the inclusion of requirements and guidance for emerging technologies. This will ensure the standard remains relevant and provides adequate safety measures for new electrical installations and systems.

5. Improve alignment of AS/NZS 3000 to IEC electrical standards to ensure the Australian and New Zealand industry adopts international best practice.

6. Review AS/NZS 3000 to ensure resilience of supply is considered for all installations. The resilience of electricity supply is crucial for several reasons. It ensures that essential services such as hospitals, emergency services, and communication networks remain operational during disruptions,

safeguarding public health and safety

Updating the AS/NZS 3000 Wiring Rules in these areas will ensure the standard continues to provide robust, clear, and up-to-date guidance for the electrical industry, thereby enhancing safety and compliance.

Who are the intended users of the document?

Primarily used by professionals involved in electrical design, installation, and maintenance within Australia and NZ - key users:
1. Electricians/Electricians Contractors
2. Electrical engineers and designers
3. Inspectors and compliance officers
4. Building and construction companies
5. Facility management and maintenance personnel
6. Educators/trainers in technical colleges/trade schools

What evidence exists?

Throughout 2024 EL-001 has conducted an in-depth scoping exercise identifying a robust scope of work to be addressed during this revision of AS/NZS 3000. The committee is committed to developing a long-term strategic plan for the maintenance of AS/NZS 3000, see the accompanied Maintenance Strategy Document, with this revision marking the first step in that journey.

What is your Proposed Solution?

To ensure efficient management and delivery timeframes it is proposed the committee revise the following aspects of the standard. These items have been identified as critical issues to be addressed from over 500 items of feedback received on AS/NZS 3000 and are the focus for this project. The consultation of this proposal is on the items listed. Any new items raised will be added to an issues register for AS/NZS 3000 and, along with other unaddressed items, will be reviewed in future projects.

General:
• Correct known editorial and technical errors.
• Review some terms and definitions to ensure they remain fit for purpose and align with the content and intention of the standard.
• Review of imagery and where required update throughout the standard.
• Review the definitions of repair and alteration, and how they are applied. Review all mandatory requirements for additional protection against electric shock under repair, alteration and replacement conditions.
• Clarify definition for “Switchboard” and define “Control cabinet” to address misunderstanding in industry.
• Include additional information to cover switchboard alterations, repairs and reverification that do not conform to AS/NZS 61439.
• Clearly delineate between installation wiring and equipment wiring through review of existing definitions and incorporation of new definitions.
• Clause 2.2.1.2 Improve the clarity in the delineation between submains and final subcircuits.

• Clause 2.3.2.1.1, include an informative note to improve the understanding of circumstances that require a warning notice in the presence of multiple supplies.
• Clause 2.6.3, simplify the clause topology and structure to improve readability.
• Clause 2.6.3.2.2 Add wording from NZ section (exception 1, clause 2.6.3.3.1) for other means of fault protection for isolated supplies
• Clause 2.6 Include a guidance note identifying impacts of cumulative leakage currents from lighting equipment in subcircuits.
• Incorporate ruling #1 in Clause 2.6.3.2.3.2.
• In clause 2.6.2.2.2 remove type AC RCD and move reference to not using the product to clause 1.7.2 and 2.4. Add information on replacement or reuse of existing type AC in situations of sites that are reenergised.
Note: state legislation may treat the use of type AC RCDs differently.
• Clause 2.6.3.2.2, include an exception to the requirements of clause as EL-001 has determined that within domestic and residential installations additional protection against electric shock by electrical separation or by the use of RCDs shall not be required for final sub circuits that:
a) are contained entirely in or on a main switchboard or distribution board, and
b) supply current use equipment of Class II construction only, and
c) do not supply any low voltage socket outlets
• In clause 2.6.3.2.5 a) For alterations provide further clarity for replacement circuit protection devices. Update NZ equivalent clauses as required.
• EL-001 will consider recommending or requiring "additional protection" from AS/NZS 3112 regarding socket outlets in particular locations, ie child accessible locations.
If required, define a "child accessible location", see clause 2.6.3.3.2 b) , using location type.
Note: See RCD requirements in NZ for childcare centres.
• Clause 2.10.2.2.1 Update and clarify the requirements for contemporary switchboard locations.
• Clause 2.10.3
Remove mandatory references to AS/NZS 3439 from AS/NZS 3000 and include an exception to the principle that a switchboard is deemed to be new when installed. Include additional information to cover switchboard alterations, repair, relocations and reverification that do not conform to AS/NZS 61439. Provide additional information for alterations/additions to existing switchboards.
Note: changes may impact 3002 and 3012.
• Clause 3.8 Improve marking an identification of wiring using colour coded and labelled wiring through a review of existing requirements, with the intent to clarify conductor colours based on equipment (where possible) and voltage type. (related to equipment wiring vs installation wiring)
• Review clause 3.9.4 to improve clarity, in particular the requirements for mechanical protection of specific circuits in specific circumstances. Consider: "prohibited locations", "adjacent building surfaces", "likely to be disturbed".
• Review of cl 3.9.8 to improve clarity regarding LV-ELV and ELV-comms wiring segregation requirements.
• Review of cl 3.11.2 for contemporary wiring enclosures and to improve clarity, for example including HDPE pipe for bored UG system enclosures.
• Review of clauses 3.8, 3.12, 3.13 to allow for contemporary cable types and to improve clarity on appropriate use cases.
• Clause 4.7.1 review of the requirements to accommodate alternative methods of compliance.
• Review of section 6 to incorporate contemporary arrangements of services in damp situations, particularly the installation of over-stove pot filling water outlets and basins that do not have a water container.

• Update section 6 to improve IEC alignment, particularly in regard to prescribed zone dimensions in baths and showers.
• Update section 6 to include zones associated with natural water bodies.
• Update section 6, to include contemporary arrangements of fixtures and equipment, newer styles of hand washing stations, such as those that are found in modern public toilets and an intent to provide further clarification.
• Clause 8.3.10 Include guidance for testing of the operation of RCDs where no supply is available. Note: related to an exception removed in amd 2.
• EL-001 will monitor the regulatory position on the use of POE devices, and the work emerging internationally and if required incorporate new requirements or guidance.
Earthing:
• Incorporate new requirements and guidance for new earthing systems; TT, IT, TN aligning with existing Australian Standards, IEC and international practices allowing for optionality for specific and special installations to utilize alternate earthing systems.

o The new earthing systems will not replace the use of the existing MEN system for general installations, rather refer the reader to the relevant section 7 clause that will outline the rules and requirements for alternate earthing systems based on the energy system that is being implemented.
o Where applicable provide requirements and guidance for switching earthing neutrals between earthing systems provided with several energy sources or specific equipment connected to the installation (EVs).
o The new clauses must align with the technologies and companion standards as required e.g. solar, wind, battery, etc.
o Content should align with requirements in IEC documents as applicable to the Australian and New Zealand industry, such as IEC 60364 Part 5-54 and Part 4-41, BS 7671.
o Align with the requirements of the companion standards and ensure that consistency is applied.
o Include guidance and requirements for protective earth conductor with reference to the earthing system.
o Update clause 5.1.4 to align with the new guidance and requirements for specific and special installations earthing systems.
• Review clause 5.5.3.1 and update the earthing requirements for existing out building provisions using a TNC earthing system to ensure safe operating conditions including interconnecting conductive parts, eg: waterpipes.

• Review and update Table 5.1 to:
o Reassess the size of the earthing conductor to be more aligned with the size of the neutral.
o Review the sizing to consider the XLPE, high temperature conductors.
o Reintroduce the use of aluminium earthing conductors and conditions.
o Review and clarify the use of parallel cables and earth sizing in this condition.
o Clarify the methods of parallel installation relating to derating and fault level requirements.

• Review and update the requirements and guidance for extraneous and exposed conductive parts.
o Provide clarity on what parts the standard is concerned regarding what is an earth situation.
o Identification and treatment of extraneous and exposed conductive parts.
o Incorporate safety requirements and considerations for Conductive building material and electrical equipment.
o Review all bonding requirements and align with current industry installation and safety practices.

• Review the method of earthing concrete slabs.
o Review and update the current bonding requirements and guidance for earthing concrete slabs.
o Include new requirements and guidance for new industry techniques such as concrete slab tensioning and use of insulated reinforcement rods, see the link.
o Examine and include as required regulator exemptions for the current system, such as WA electrical requirements.
o Expand the bonding requirements for wet areas to apply to the whole concrete slab.
o Include new testing of the bonding system used in concrete slabs as applicable.
o Provide requirements and guidance where the slab is used as the earth electrode.

• Revision of bonding for pool, spa and fencing and all equipment within the relevant zone and clarification when and why the bonding is required.
o Clarify the elements of the pool and the types of pool covered by the requirements.
o Review and clarify testing point requirements, ie Use of two bond points.
o Use of examples in appendix showing requirements.
o Clearly define direct and indirect connections to the general mass of earth.

Energy Systems
• Review and update the structure for section 7.3. Where possible referring the reader to an appropriate companion standard rather than including the content within the 3000 document.
• Incorporate a structure that is based on supply definitions, similar to the following:
o General (Overview and Common requirements across all supply types i.e. isolation / control Protection)
o Supply, Alternative
♣ Inverter Energy System (IES) (AS/NZS 4777.1)
♣ Engine Driven Generator (EDG) (AS/NZS 3010)
♣ UPS systems
o Supply, Independent
♣ Inverter Energy System (IES) (AS/NZS 4777.1)
♣ Engine Driven Generator
o Supply, Island grid
♣ Inverter Energy System (IES) (AS/NZS 4509)
♣ Engine Driven Generator
o Supply, Supplementary
♣ Inverter Energy System (IES) (AS/NZS 4777.1)
♣ Engine Driven Generator
• Include new recommendations and requirements for additional loads and multiple supplies applied to busbars with the presence of multiple sources of energy supply.
• Review and consider alignment of supply definitions to that within AS/NZS 4777.
• Mandating the separation by 50mm distance or physical barrier of final sub-circuits connected to different supplies within the same enclosure (Grid supply / Battery backup supply).
• Review and further clarify both 7.3.8.1.1 and where exception 1 applies, to remove potential ambiguity from interpretation. Consider using language of Neutral-Earth connection rather than MEN in the context of alternate supplies.
• To improve system resilience, provide additional earthing requirements and prescribed methods of switching consumer mains neutral for alternative supplies where the loss of service mains is possible.

• Clarify the application and installation criteria for source selection devices such as changeover switches. Include further guidance around when switching of neutral conductor is acceptable.
Electric vehicles
• Electric shock and protection
Adopt additional protection requirements from IEC 60364-7-722 as normative requirements.
• Referencing developments in BS 7671 and IEC 60364, determine if TN-C-S earthing system provides adequate electric shock protection for all EV charging applications.
• Review if existing additional protection by RCD requirements are sufficient for bidirectional EVSE.
• Review and align definitions with existing local and international work to ensure AS/NZS 3000 remains the primary source of definitions relating to electrical installations. This may include some new definitions and removing some existing definitions.
• Phase Balance: Sites with large numbers of 3 phase chargers could have a phase balance issue when operating with a high volume of cars that only have a single-phase rectifier. Develop guidance to address phase balance, including:
• Physical phase rotation
• Load Management Systems
• Determine appropriate installation requirements for EV charging including:
• Local isolation requirements (what is the motivation for isolation)
• Emergency shutdown requirements
• Harmonics: Consider how multiple vehicles can influence overall harmonics within the installation as they relate to load management systems. Review and where appropriate align with international work completed by IEC TC 64, and TC 69.
Note: This topic should consider the impact of all technologies.
• Harmonics to be considered when multiple chargers exist within an installation.
Maximum demand
• Review and consider update Appendix C to meet the changes that effect loads:
o Equipment efficiency
o Building efficiency
o Usage profile
o Load management systems
o Climate
• Update examples in appendix c.
• Implement consistent unit of measurement (% / Amperage / Watts).
• Consider converting domestic lighting to % of connected load. Update table C1 and C2 with a methodology and calculation method to accommodate the electrification of Gas appliances. (Heating / cooking / HWS / EV / Swimming pools heaters).
• Review and develop specific maximum demand determination methods for EV charging applications considering contemporary approaches such as Load Management Systems. This may include adjust/amendment of 2.2.2 and/or adjust/expansion of Appendix C.

Net Benefit & Consultation

What impact will these new Standard(s) or Publication(s) have on public health and safety in Australia? (positive and negative?)
Updating AS/NZS 3000, is crucial for public health and safety. Regular maintenance to the standard helps to create safe conditions for both industry experts and consumers by reducing the risk of electrical fires, shocks, and other hazards. By incorporating new technologies and addressing

emerging risks, the updated standard help protect both residential and commercial properties. This proactive approach not only safeguards lives but also enhances the reliability and efficiency of electrical systems, contributing to overall public well-being and safety.

What impact will these new Standard(s) or Publication(s) have on the broader community in Australia from a social perspective? (positive and negative?)
By ensuring that electrical installations meet the latest safety standards, these updates help create safer living and working environments. This not only reduces the risk of accidents and injuries but also fosters a sense of security and trust within communities.

What impact will these new Standard(s) or Publication(s) have on the natural environment in Australia? (positive and negative?)
Updating the Australian/New Zealand Wiring Rules, has a positive environmental impact by providing pathways to use energy-efficient technologies and sustainable practices. These updates could encourage the adoption of modern electrical systems that consume less energy, thereby reducing greenhouse gas emissions and lowering the overall carbon footprint.

What impact will these new Standard(s) or Publication(s) have on market competition in Australia? (positive and negative?)
Updating AS/NZS 3000 enhances commercial competition by setting a level playing field for businesses. It fosters a competitive market where businesses strive to meet and exceed these standards, driving overall industry growth.

What impact will these new Standard(s) or Publication(s) have on the economy in Australia? (positive and negative?)
The maintenance of AS/NZS 3000 enables all stakeholders within the electrical industry, both nationally and internationally, to have a common platform of understanding to bring them into line with the best practice ideals outlined in the Wiring Rules.
These updates could encourage the adoption of advanced technologies and best practices, which can lead to cost savings through improved energy efficiency and reduced maintenance needs. Overall, these updates contribute to economic growth by fostering a more competitive and technologically advanced market.

Who has been consulted and what are their views?
EL-001 committee
All EL-001 liaison committees
EL-001 community members