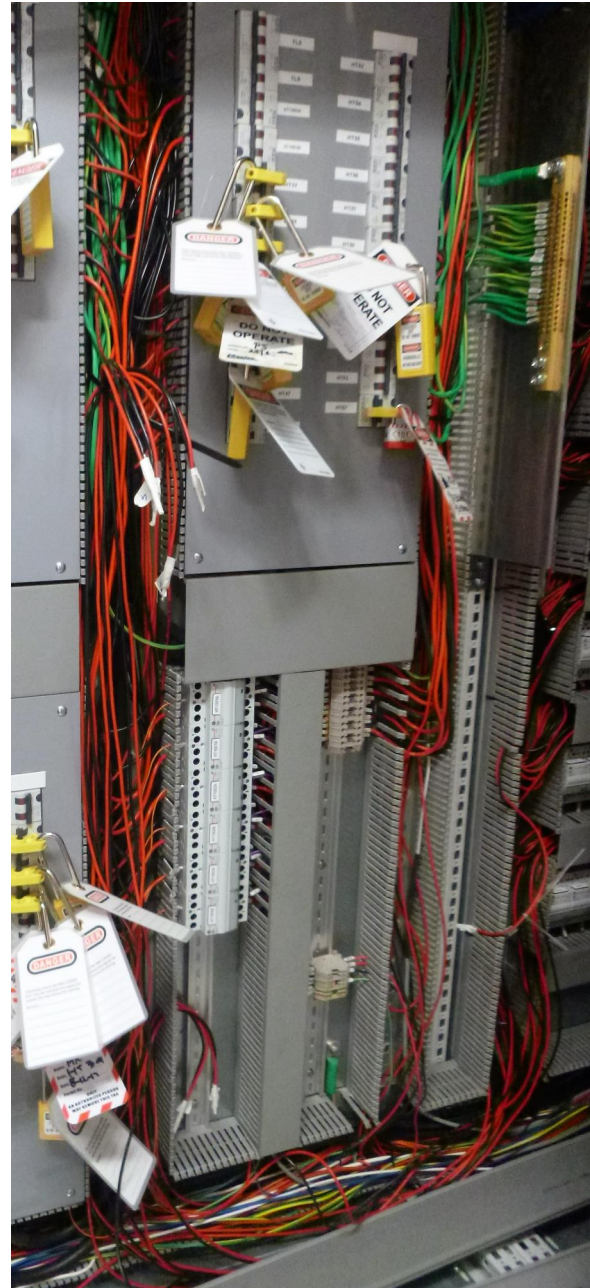




Revision Summary

Version	Author	Reasons for Change	Approver	Date Approved
1.0	M Imamura	New document	M Guantero	29 Aug 2018
1.1		Remove use of shock and flash hazard form	M Guantero	1 Oct 2019

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1.2	G. Knox	Reviewed as part of Z PTW uplift. Removed all reference to live line work, updated language to align with AS/NZS4836 and Energy Solutions electrical standard	A Shand	30 May 2025
2	G. Knox, D. McIntyre, M Wilde	Technical review resulting in full update/rewrite based on Electrical safety Standard- Energy Solutions as agreed by SPI group. Document reviewed and approved based on the advice of the content SME Duncan McIntyre and the review and approval of the Senior Permit Issuer group	A Shand	21 May 2026

1: Purpose & scope

This document sets the requirements for performing electrical work for and on behalf of Z Energy Limited (Z).

This Safe Work practice details the controls, that when applied effectively, provide practical measures to limit the risk of personal injury, damage to assets and other undesirable events related to electrical tasks.

For High voltage electrical works, this document is to be used in conjunction with Z Energy Safe Work On or Near High Voltage Electrical Apparatus Procedure.

1.1 Applicability

This document applies to all persons working for and on behalf of Z or its subsidiaries, i.e. employees, contractors, sub-contractors, franchisees, and retail site staff.

The requirements of this document, shall apply in addition to any applicable laws and regulatory requirements, including the latest electrical codes of practice as issued by WorkSafe. This document takes precedence only where its requirements exceed those of applicable laws and regulatory requirements.

All applicable laws and regulations shall be complied with when performing any work, either within or beyond the scope of this document.

1.2 Definition of Electrical Work

Electrical work is the physical work of installing, maintaining, repairing, altering, removing or adding to an electrical installation, or supervision of that work.

1.3 Definition of Operating Work

Operating work is the operation of switching devices, links, fuses or other connections intended for ready removal or replacement, proving that electrical conductors are de-energized, earthing or short-circuiting, locking or tagging of electrical apparatus and erection of barriers or signs

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1.4 Definition of Fault Finding

Fault finding is the process of taking measurements or carrying out tests on electrical installations and equipment to locate faults or prove operability. This may also include the process of applying testing instruments or devices to various parts of the electrical installation and equipment to determine how the electrical installation and equipment are operating. This includes the application of instruments for commissioning purposes

1.5 Definition of Live Electrical Work

For purposes of this document, “live electrical work” is defined as any task that involves electrical work performed on or near exposed and energised conductive parts exceeding 50V AC. or 120 V

Note: Live electrical work is not allowed at Z without an approved derogation

ripple-free DC. Further clarification is provided in section 6.5.

2: Hazards & Z Lifesavers

Applicable LifeSavers



Electrical



3: References

3.1 External References

- Health and Safety at Work Act 2015
- Electricity (Safety) Regulations 2010 (<http://www.legislation.govt.nz/regulation/public/2010/0036/latest/whole.html>)
- New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34:2001) <https://worksafe.govt.nz/dmsdocument/1565-new-zealand-electrical-code-of-practice-for-electrical-safe-distances-nzecz-34-2001>
- OSHA’s Train-the-Trainers Guide to Electrical Safety For General Industry (https://www.osha.gov/dte/grant_materials/fy07/sh-16615-07/train-the-trainer_manual2.pdf)
- AS/NZS 3000 Electrical installations (known as Australian/New Zealand Wiring Rules).
- AS/NZS 60079 Series
- AS/NZS 61439 series
- AS/NZS 2978 Insulating mats for electrical purposes.
- AS/NZS 3012 Electrical installations - construction and demolition sites.

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- AS/NZS 3017 Electrical installations - verification by inspection and testing
- AS/NZS 3760 In-service safety inspection and testing of electrical equipment and RCDs.
- AS/NZS 4836 Safe work on or near low voltage and extra-low voltage electrical installations and equipment
- AS/NZS 3100 Approval and test specification - General requirements for electrical equipment
- AS/NZS 1337.1 Personal eye protection
- AS/NZS 3010 Electrical installations - Generating sets
- IEC 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use
- AS/NZS IEC 31010 Risk management - Risk assessment techniques
- ISO 31000 Risk management - Guidelines.
- NFPA 70E-2024 Standard for Electrical Safety in the Workplace.

3.2 ZORM Documents

- Z's Control of Work Standard
- Approach to managing operational risks
- Z's Approach to managing operational integrity
- Z's Permit to Work Manual
- Z's Drug and Alcohol Policy
- Z Safe Work on or near low voltage and High voltage electrical equipment minimum expectations
- Z High voltage Electrical Work

4: Roles and responsibilities

General Manager-BU	• Ensure business unit compliance to this procedure
Control of Work & PCBU Specialist	• Responsible for maintaining and confirming the implementation of this procedure
Senior Permit Issuer	• Ensure any tasks that involves working at heights is managed under the Z Permit to Work System (PTW)
Permit Issuer	• Confirm that the hazards associated with the electrical work have been identified and assessed and that the identified controls are adequate to perform the work in a safe and environmentally-sound manner prior to authorising and issuing the Permit to Work • Ensure that the contractor complies with the requirements stipulated in this document • Ensure only a competent person performs electrical work and/or electrical isolations
Permit Holder	• Completes a Safe Work Method Statement (SWMS)/Hazard Identification and Task Risk Assessment (HITRA)/Job Safety Analysis (JSA) that reflects the Hierarchy of Control before electrical work commences

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	• Ensure all equipment used comply with relevant code of practice or regulation, be fit for purpose, well maintained and certified where required
Qualified and Authorised Electrical Person	• Competent in isolation of hazardous energy and is capable of recognizing electrical hazards • Holds current license and registration as an electrical worker (including H Endorsement for hazardous areas where applicable) • Knows and understands the content of this Electrical Safe Work Practice and Z Safe work On or Near low voltage and High voltage electrical equipment- Minimum expectations standard • Accesses the appropriate reference materials if needed • Conducts tests to verify the equipment is in an electrically safe work condition • Installs and removes isolation devices and safely returns equipment to operational condition • Has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved • Identifies and communicates any needed changes in work scope or changes in conditions to their supervisor immediately • Reviews and participates in hazards assessment and in identifying controls to be implemented • Verifies equipment is properly de-energized, isolated, and locked and tagged before applying personal locks • Tests equipment before touching it to ensure it has been properly de-energized • Carry out electrical isolations or tripping of circuits operated at low voltage circuits (any voltage exceeding 50 volts A.C. or 120 volts D.C. but not exceeding 1000 volts A.C. or 1500 volts D.C.) or high voltage circuits (exceeding 1000 volts A.C. or 1500 volts D.C.).
Standby person	• Safety observers are responsible for overseeing electrical tasks where a risk assessment deems it necessary. Safety observers require low voltage rescue and cardiopulmonary resuscitation (CPR) qualifications. The duties and responsibilities of safety observers are outlined in AS/NZS 4836:2023. • Alert the work team to any potentially unsafe actions or lack of compliance with an approved work procedure or technique. • Be positioned at a suitable location to observe the work being performed; • Have the authority to temporarily suspend the work at any time; • Maintain effective and immediate communication with the work team at all times; • Not perform any other task whilst the work is in progress • Suspend all work in the event of having to leave the site or significantly change position until he/she has returned/reached a new location or has been replaced. • If filling a dual role as a rescue person ensures that CPR and AED equipment (if available) is immediately available outside the space for rescue and knows how to use it The Safety observers role may be rotated among members of the work team, for example to reduce fatigue. When this occurs it shall be formally handled such that all members of the work party are aware at all times who is performing the role of the safety observer Person.

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5: Electrical risks

5.1 Significant risks

Electricity can cause serious injuries or death from incidents such as electric shock, explosions, electrical burns, and toxic inhalation.

The most common electrical risks and causes of injury are:

- Electric shock causing injury or death. Electric shock may be received by direct contact, tracking through or across a medium, or by arcing.
- Arc flash, electrical explosions or electrical fires causing burns. The injuries are often suffered because arcing, arc flash or explosion or both occur when high fault currents are present.
- Fall from height as a result of electric shock while working on an elevated platform.
- Toxic gases causing illness or death. Burning and arcing associated with electrical equipment may release various gases and contaminants. Refer to Safe Work on or near low voltage and High voltage electrical equipment minimum expectations.

The briefest contact with electricity at 50 volts for alternating current (AC) or 120 volts for direct current (DC) can have serious consequences to a person's health and safety. High voltage shocks involving more than 1000V AC or 1500V DC can cause contact burns and damage to internal organs. Injuries and illnesses from contacting electricity may include muscle spasms, palpitations, nausea and vomiting, collapse, and unconsciousness. Workers using electricity may not be the only ones at risk, faulty electrical equipment and poor electrical installations can lead to fires, which may also cause death or injury to others. If these occur in hazardous zones, may lead to catastrophic consequences.

An arc flash hazard may exist when energised electrical conductors or circuit parts are exposed, or when a person interacts with live conductors within equipment that is guarded or in an enclosed condition. Arc flash can also occur where electro-mechanical equipment failure such as when a circuit-breaker fails mid operation. Under normal operating conditions, properly designed, installed, and maintained enclosed energized equipment is not likely to pose an arc flash hazard.

5.2 Minimum expectations for Safe Work On, or Near electrical equipment

The standard Safe Work On, or Near low voltage and high voltage Electrical Equipment- minimum expectations provides specific requirements for safe work on or near electrical equipment, which should be referred to in conjunction with this document.

5.3 Notifying WorkSafe of danger

Electricity (Safety) Regulations 2010 stipulates that if a person carrying out the following works listed below has reasonable grounds to believe that the works, installation, fitting, or appliance presents an immediate danger to life or property, the person must, as soon as practicable, advise Z and WorkSafe of the danger. This applies to the following:

- When carrying out prescribed electrical work, including while acting under an exemption:
- When carrying out a periodic assessment under regulations 75, 78D, 78G, and 78K:
- When examining a connectable installation with a view to issuing a warrant of electrical fitness under regulation 78.

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The advice must include:

- details of the nature of the danger; and
- how and why the works, installation, fitting, or appliance presents an immediate danger to life or property; and
- any steps that have been taken, or that the person reasonably believes should be taken, to minimise or eliminate the danger.

6: Control of electrical risks

6.1 Z PTW System

At bulk fuel locations, all electrical works shall be managed under the **Z Permit to Work System** (PTWS).

At Network locations, the requirements for working on **Low Voltage** systems – (Exceeding 50V AC. or 120 V ripple-free but not exceeding 1000V AC or 1500V DC). are;

- Work clearance form
- Task specific risk assessment
- Compliance with this safe work practice

All work on **High Voltage** systems (- Exceeding 1000V AC or 1500V DC) require a Z Permit to Work.

Live electrical work is not allowed at Z without an approved derogation

6.2 Requirements for the management of electrical risks

Z Energy is committed to providing a safe and healthy workplace for all its employees, contractors, and visitors, and to operate in a way that will not adversely affect the health and safety of its customers, neighbours, the community, or the public. Risk management requirements include:

- “Identifying” the hazards.
- “Assessing” the risk associated with the hazards.
- “Controlling”, implementing & maintaining appropriate risk controls to allow the work to proceed at an acceptable level of risk; and
- “Monitoring” periodically the risk controls to ensure they remain effective.

Risk management principles are defined in Z’s Organisational Risk Management System (ZORM). These must be applied in conjunction with this standard.

6.3 Hierarchy of controls

Once hazards have been identified and the risks assessed, appropriate control measures must be put in place. Electrical safety generally depends on appropriate training, effective work planning and correct testing procedures and techniques.

The hierarchy of risk control should be considered to determine the control that most effectively eliminates or minimises the risk in the work circumstance. This may involve a single control measure or a combination of two or more different controls.

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- **Elimination:** The most effective control measure is to remove the hazard or the hazardous work altogether. For example, following Lock out Tag out & Prove test prove process to ensure there is no live exposed conductive parts
- **Substitution:** Replacing a hazardous process or material with one that is less hazardous will reduce the hazard, and hence the risk. For example, it may not be reasonably practicable to eliminate energised electrical work altogether, however if it is necessary (for one of the legally permissible reasons) to work on an energised electrical part, it may be possible to de-energise the surrounding parts.
- **Isolation:** Isolating workers from coming into contact with the source of the electrical hazard will reduce the relevant risks. For example, it may be reasonably practicable to install shrouds around an area where electrical work is being carried out.
- **Engineering:** Use engineering control measures to minimise the risk. For example, installation of insulation, guarding and residual current devices.
- **Administrative:** Administrative controls involve the use of safe work practices to control the risk. For example, training in safe work procedures, testing, and the use of warning signs.
- **Personal protective equipment (PPE):** Wearing of PPE, for example, includes protective eyewear or face shield, insulated gloves, hard hats, arc resistant clothing or aprons and breathing protection.

6.4 Electrical Isolations

All electrical isolations at Z **must** be proven using the prove test prove method (preferably using battery operated proving unit) for ensuring effective isolation. Effective electrical isolations ensure both personal and property are protected against equipment and process hazards by achieving positive equipment isolation of machinery and equipment from electrical sources of energy prior to work commencing. Even if the electrical supply is believed to be off and locked out of service it must be assumed that all conductors and electrical components are energised until they have been proven to have been de-energised. Workers carrying out electrical testing must be appropriately trained and competent in test procedures and in the use of testing instruments and equipment.

- 6.4.1 **Prove, Test, Prove:** The Prove-Test-Prove (PTP) method is a critical safety procedure in electrical work to confirm a circuit is de-energized. It involves verifying the test instrument works on a known live source, testing the target circuit for isolation, and then re-verifying the instrument on the live source to ensure it did not fail during the test.

Key Components of the PTP Method

1. **Prove (Initial):** Test your voltage indicator or multi-meter on a known, functioning live source (such as a proving unit or known live socket) to ensure it is operating correctly.
2. **Test:** Test the circuit you intend to work on, ensuring it is isolated, dead, and safe.
3. **Prove (Final):** Re-test your voltage indicator on the known live source again to confirm it did not fail or blow a fuse while testing the target circuit, which could have produced a false "dead" reading.

6.5 Live electrical work

Live electrical work is not allowed at Z. For clarity, at Z;

live electrical work is defined as any task that involves electrical work performed on or near exposed and energised conductive parts exceeding 50V AC. or 120 V ripple-free DC

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If live electrical work cannot be avoided, a derogation is required to be in place before the work can be started.

Note: Testing & fault finding are not considered as live electrical work (See definitions).

The diagrams below are excerpts from AS/NZS4836 and represent the definitions of “working on” and “working Near”.

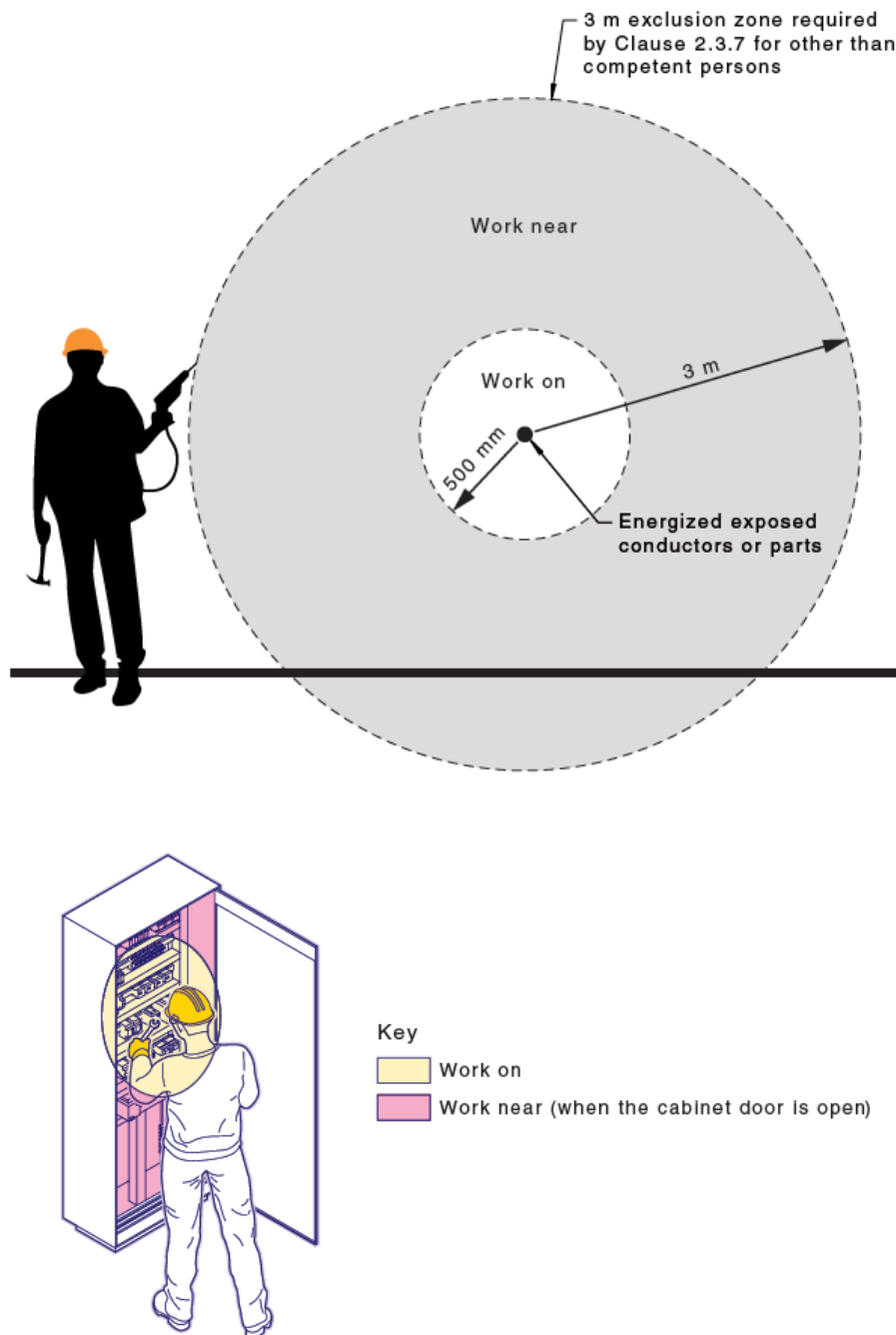


Figure 2.2 — 500 mm electrical work zone for work on low-voltage and extra-low voltage equipment within an enclosed switchboard panel

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6.6 Test equipment

Test equipment and accessories (such as leads and probes) used on Low Voltage electrical installations must be appropriately rated (e.g., as under IEC 61010-1).

All electrical test equipment used to verify the safety of electrical installations and to prove isolations must be tested six monthly, visually inspected before every use and records kept for a minimum of seven years. When testing for de-energisation the test equipment used must be tested before and after testing as defined in AS/NZS 4836:2023 3.1.5 Proving De-energization.

Test equipment must be kept in good condition. Any test equipment found to be defective must including having damaged leads or cracked cases must be tagged as defective, removed from service and either repaired or replaced. Fuses within test equipment must only be replaced with fuses specified by the equipment manufacturer.

6.7 Electrical work in Hazardous areas

Specific competencies are required for working with electrical equipment in hazardous areas (EEHA) as outlined in AS/NZS 4761.1:2018. An “H” endorsement for electrical workers granted by the [Electrical Workers Registration Board \(EWRB\)](#), is required for working in hazardous areas. Proof of competency and endorsement must be provided to Z Energy if requested.

Measures must be taken to identify and monitor potentially hazardous areas where electrical tasks are conducted. Due to the nature of Z’s operations, many tasks will be conducted in proximity to explosive gases. The requirements for construction, testing and performance of equipment used to detect and measure flammable gas or vapour concentrations in the air are stated in AS/NZS 60079.29.1:2008.

6.8 Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) must be selected in accordance with the nature of the task and the risks involved and as outlined in the table below.

PPE must be correctly fitted for the person carrying out the task and in good condition. Exclusive reliance on PPE should only occur where other measures are not reasonably practicable or as an interim control while the preferred control measure is being implemented

The table below may be used as a guide for the selection of minimum PPE arc rating by comparing the task to be undertaken with the voltage and current rating of the equipment to be worked on or near. The voltage and current rating can be found on the upstream protective devices e.g. circuit breaker supplying the equipment.

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Task	Single-phase installations	Three-phase installations (No intentional protective device delay)				
	≤ 230 Vac, ≤ 63 A	≤ 400 Vac, ≤ 63 A	≤ 400 Vac, > 63 A, ≤ 160 A	≤ 400 Vac, > 160 A, ≤ 250 A	≤ 400 Vac, > 250 A, ≤ 800 A	≤ 400 Vac, > 800 A, ≤ 2 000 A
Work (isolated and tested)	PPE based on electrical risk	PPE based on electrical risk	PPE based on electrical risk	PPE based on electrical risk	PPE based on electrical risk	PPE based on electrical risk
Switching, isolating, removing fuses or links (in normal operating condition ^a)	PPE based on electrical risk	PPE based on electrical risk	Minimum arc rated PPE 4 cal/cm ² Arc rated long sleeve shirt and pants (or coverall) Arc rated face shield with chin return Arc rated, leather, or voltage rated rubber gloves with leather protective outer Safety glasses	Minimum arc rated PPE 4 cal/cm ² Arc rated long sleeve shirt and pants (or coverall) Arc rated face shield with chin return Arc rated, leather, or voltage rated rubber gloves with leather protective outer Safety glasses	Minimum arc rated PPE 4 cal/cm ² Arc rated long sleeve shirt and pants (or coverall) Arc rated face shield with chin return Arc rated, leather, or voltage rated rubber gloves with leather protective outer Safety glasses	Minimum arc rated PPE 4 cal/cm ² Arc rated long sleeve shirt and pants (or coverall) Arc rated face shield with chin return Arc rated, leather, or voltage rated rubber gloves with leather protective outer Safety glasses
Authorized live work, proving isolation, energized testing or fault-finding Racking of withdrawable circuit breakers and MCC units Work on or near isolated electrical equipment where energized equipment is within the same open metal clad enclosure	PPE based on electrical risk	PPE based on electrical risk	Minimum arc rated PPE 4 cal/cm ² Arc rated long sleeve shirt and pants (or coverall) Arc rated face shield with chin return Arc rated leather, or voltage rated rubber gloves with leather protective outer	Minimum arc rated PPE 8 cal/cm ² Arc rated long sleeve shirt and pants (or coverall) Arc rated face shield with chin return Arc rated, leather, or voltage rated rubber gloves with leather protective outer	Minimum arc rated PPE 40 cal/cm ² Arc flash suit and hood Arc rated leather, or voltage rated rubber gloves with leather protective outer Hearing protection Safety glasses Leather boots	Minimum arc rated PPE 75 cal/cm ² Arc flash suit and hood Arc rated, leather, or voltage rated rubber gloves with leather protective outer Hearing protection Safety glasses Leather boots

^a Normal operating condition exists when it is satisfied that the equipment is properly installed and maintained, used in accordance with the manufacturer's instructions, doors and covers are closed, in place and secured, and there is no evidence (such as unusual smells, sounds or temperatures) of impending failure.

NOTE 1 This table takes account of a maximum supply fault level of 28 kA (approximately that of a 1 MVA transformer). For higher fault levels and supply scenarios exceeding 800 A, a risk assessment including an arc flash incident energy analysis should be performed.

NOTE 2 Where significant motor load is present on three-phase installations, PPE for the next horizontal level (i.e. one column to the right) should be used.

WARNING: BRACELETS, RINGS, NECK CHAINS, EXPOSED METAL ZIPS, WATCHES AND OTHER CONDUCTIVE ITEMS SHALL NOT BE WORN WHILE WORKING ON OR NEAR EXPOSED ENERGIZED CONDUCTORS OR LIVE CONDUCTIVE PARTS.

WARNING: PPE SHALL BE WORN WITH COLLAR UP, TOP BUTTONS DONE UP AND SLEEVES DOWN. SYNTHETIC UNDER GARMENTS WORN UNDERNEATH PPE MAY BE A FIRE RISK.

Table 11.2 from AS/NZS 4836 - Guide to the selection of PPE based on electrical risk

6.9 Hazard Boundaries for electrical tasks

The identification & risk assessment of hazards associated with working in the vicinity of energised & exposed electrical equipment requires consideration of the hazards associated with shock hazard and arc flash hazard. The distance at which such hazards may exist from exposed & energized electrical equipment is dependent upon various factors including the supply voltage. Detailed calculation methods exist to determine the arc flash protection boundary.

The use of pre-defined approach boundaries (based upon detailed arc flash calculations) aids in the assessment of risks associated with shock and arc flash hazards in the vicinity of exposed & energized electrical equipment. Refer to Safe Work On, or Near, Low Voltage and High voltage Electrical Equipment Minimum expectations for a determination of these boundary distances. In the absence of an engineering study, recommended incident energy and arc flash boundaries can be identified using Table B.1 from AS/NZS 4836

6.10 Excavation near Underground Cables

Underground service location assessments must be conducted before a task begins to identify if the work scope is affected by underground services. Underground service scanning shall be carried out by a NULCA accredited Service locating supplier within 30 days of work commencing and a written

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report is required. GPR is preferred as a location method and other locating methods only used where GPR is not practical or possible. If excavation is required after removal of concrete slabs, Service locating shall be carried out again before excavating further. When excavating around cables or working in areas known to contain cables or other services, these cables must be treated as energised unless proven de-energised and must be treated with extreme caution as they may be defective. Before commencing work on a cable, the cable must be positively identified. The full procedures and requirements are outlined in section 6 of AS/NZS 4836:2023 and must be followed. The requirements for this type of task are outlined in Safe Work On, or Near, Low Voltage and High voltage Electrical Equipment Minimum expectations

6.11 Redundant electrical equipment

All redundant electrical equipment should be positively isolated and removed from facilities. The associated cabling must be removed or made safe in accordance with AS/NZS 3000:2018.

6.12 Temporary installations

Temporary electrical installations for activities associated with maintenance works, facilities shutdowns or project construction works must be installed and maintained in accordance with applicable Standards (e.g., AS/NZS 3000:2018, AS/NZS 3001:2008 and AS/NZS 3012:2019). If the temporary installation is in a hazardous area the requirements of AS/NZS 60079 Series also apply.

When portable low voltage generation is required as part of a temporary installation, the earthing must comply with the requirements of AS/NZS 3000:2018, AS/NZS 3012:2019 and AS/NZS 3010:2017.

7: Training and Competency of electrical workers

For all low voltage electrical tasks done on behalf of Z Energy, an authorised electrical person can demonstrate their competency by providing Z Energy evidence in the form of a current Electrical practising Licence. Elected Safety Observers as well as non-electricians (apprentices included) must have First Aid and CPR qualifications.

Restricted Electrical Licenses are recognized for applicable trades and allows for reconnection of some fixed electrical equipment. Workers with restricted electrical licenses are not permitted to undertake the following:

- Equipment that may have high fault currents present.
- Tasks that are complex or are connected to complex electrical apparatus.
- Tasks that are positioned within hazardous areas or on electrical equipment that is part of an explosion-protection technique.

The work carried out to install a photovoltaic (PV) system that operates at LV is Prescribed Electrical Work (PEW) and will require certification. The PV system must be installed to comply with the standards AS/NZS 3000:2018 and AS/NZS 5033:2021. Additionally, the LV-direct current (DC) component of the PV system is categorised as high-risk PEW which will require an inspection and the issuance of a Certificate of Compliance (CoC) or Report of Inspection (RoI). Specific competencies are required for working with Mains Parallel Generation Systems. An “MP” endorsement for electrical workers granted by the [Electrical Workers Registration Board \(EWRB\)](#), is required for working on mains parallel generation systems. Proof of competency and endorsement must be provided to Z Energy if requested.

For work on high voltage systems, Authorised Electrical Persons must be appointed in writing (certificated) by Ampol Group and issued with a safety training certificate stating the authorisation

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level as determined by the competency and qualification requirements specified in the Energy Solutions Standard for Work on or Near High voltage Electrical Apparatus.

8: Documentation and records

Electrical installation information must be managed and maintained as per the relevant Ampol Group Document Management Systems, Process Safety Information processes and and/or the Energy Solutions Maintenance Management System.

Electrical records must include:

- Hazardous Area Verification Dossier
- Hazardous Area Inspection Sheets
- Hazardous area classification documentation
- Drawings (Single line diagrams, Equipment & panel layouts, Wiring schematics, Control system logic diagrams, Termination lists, Cable schedules, Equipment data sheets)
- Earthing System details including drawings, procedures, and test results.
- High Voltage Switching procedures.
- Protection relay settings
- Original Equipment Manufacturers (OEM) manuals
- Mandatory test results as required by AS/NZS 3000:2018 Section 8.3

Local regulatory compliance documentation such as Electrical Certificates of Compliance must be managed in accordance with local regulatory requirements and provided to Z Energy.

9: Definitions

Term	Definition
Accessory	Any device, such as a switch, fuse, plug, socket-outlet, lamp holder, fitting, adaptor, or ceiling rose that is associated with wiring, luminaires, switchboards or appliances; but not including the lamps, luminaires, appliances or switchboards themselves (ref. AS/NZS 3000:2018)
Appliance	A consuming device, other than a lamp, in which electricity is converted into heat, motion, or any other form of energy, or is substantially changed in its electrical character. (ref. AS/NZS 3000:2018)
Arc Fault	Unintended and uncontrolled discharge through air (ref. AS/NZS 4836:2023)
Arc Fault Condition	Condition where arcs are produced through fault or failure of electrical equipment. (ref. AS/NZS 4836:2023)
Arc Flash	Generation and transfer of heat, plasma gas, light, and sound from an arc fault. (ref. AS/NZS 4836:2023)

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Arc Flash Boundary	Distances from the energised equipment that should be maintained to manage arc flash (ref. AS/NZS 4836:2023). Distance should be maintained such that the incident energy level is at most 1.2 Cal/cm2.
Aerial Conductor	Any stranded conductor (including aerial bundled conductors) that is supported by insulators or purpose-designed fittings above the ground and is directly exposed to the weather. (ref. AS/NZS 3000:2018)
Authorised Electrical Person	An Authorised Electrical Person is an Ampol Group employee or third-party contractor who has acquired through training, qualification and experience, the knowledge, and the skills to recognise electrical hazards and to carry out the task. The Authorised Electrical Person is given authority and responsibility to perform specific assignments in an electrical area before being assigned to any electrical tasks.
Cable	A single cable core, or two or more cable cores laid up together, either with or without fillings, reinforcements, or protective coverings. (ref. AS/NZS 3000:2018)
Circuit	A circuit comprises live conductors, protective conductors (if any), a protective device and associated switchgear, control gear and accessories. (ref. AS/NZS 3000:2018)
Circuit Breaker	A switch suitable for opening a circuit automatically, as a result of predetermined conditions, such as those of overcurrent or undervoltage, or by some form of external control. (ref. AS/NZS 3000:2018)
Competent Person	A person, who has acquired, through training, qualification or experience or a combination of these, the knowledge and skill enabling that person to perform the required task correctly. (ref. AS/NZS 4836:2023)
Conductor	A wire or other form of conducting material capable of carrying electrical current, but not including wire or metallic parts directly employed in converting electrical energy into another form. (ref. AS/NZS 3000:2018)
Conductor, Active	Any conductor that is maintained at a difference of potential from the neutral or earthed conductor. In a system that does not include a neutral or earthed conductor, all conductors are considered active conductors. (ref. AS/NZS 3000:2018)
Conductor, Exposed	An electrical conductor to which approach is not prevented by a barrier of rigid material or by insulation adequate under a relevant Australian standard. A conductor is exposed if any barrier or insulation is not sufficient to achieve the requirements of Australian Standard AS 60529 ingress protection rating IP2X (i.e. allow access to hazardous parts with a 12mm “standard” finger). Current, Alternate (AC) - is an electric current where the flow of electrons periodically reverses direction, unlike Direct Current (DC)

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	which flows in one direction, forming a continuous cycle that rises from zero to a peak, drops to zero, reverses to a negative peak, and returns to zero, often visualized as a sine wave. Current, Direct (DC) - is the unidirectional, constant flow of electric charge, typically produced by batteries, solar cells, and rectifiers. Unlike alternating current (AC), DC maintains a steady voltage and direction, making it essential for electronics, electric vehicles, and low-voltage devices.
Damp Situation	A situation in which moisture is either permanently present, or intermittently present such to an extent as would be likely to impair the effectiveness or safety of an electrical installation that complies with AS/NZS 3000:2018 for ordinary situations. (ref. AS/NZS 3000:2018)
De-energised	Separated from all sources of supply but not necessarily isolated, earthed or out of commission. (ref. AS/NZS 4836:2023)
Distribution Board	A switchboard other than a main switchboard. (ref. AS/NZS 3000:2018)
Earthed	Connected to the general mass of Earth. (ref. AS/NZS 4836:2023) The requirements for earthing are set out in AS/NZS 3000:2018.
Earth (Known)	Earth point previously tested to confirm that it is connected to the installation earthing system. (ref. AS/NZS 4836:2023)
Electrical Equipment	Wiring systems, switchgear, control gear, accessories, appliances, luminaires, and fittings used for such purposes as generation, conversion, storage, transmission, distribution, or utilization of electrical energy. (ref. AS/NZS 3000:2018)
Electrical Fault	An electrical failure, defect or flaw in an electrical circuit, equipment, fixture or fitting and any situation resulting in an unintentional (ref. AS/NZS 3000:2018): a) Loss, reduction or increase of voltage or current; b) Voltage exceeding the maximum of the rated voltage; c) Overcurrent or; d) Arcing fault current.
Electrical Installation	A group of items of electrical equipment that: a) are permanently electrically connected; and b) can be supplied with electricity. <i>NOTE: an item of electrical equipment connected to electricity by a plug and socket outlet is not permanently electrically connected.</i>

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Electrical Installation, Domestic	An electrical installation in a private dwelling or that portion of an electrical installation associated solely with a flat or living unit. (ref. AS/NZS 3000:2018).
Electrical Installation, Residential	An electrical installation or that portion of an electrical installation associated with a living unit or units. (ref. AS/NZS 3000:2018)
Electrically Safe Work Condition	State in which an electrical conductor or circuit part has been isolated from energized parts, locked or tagged in accordance with the relevant requirements, tested to confirm the absence of voltage, and if applicable, temporarily earthed for personal protection (must for HV and as necessary for LV). (ref. AS/NZS 4836:2023)
Electrical Work	The physical work of installing, maintaining, repairing, altering, removing, or adding to an electrical installation or supervision of that work. (ref. AS/NZS 4836:2023 1.4.17)
Electricity Distributor	Any person or organisation that provides electricity from an electricity distribution system to one or more electrical installations. Includes distributor, supply authority, network operator, local network service provider, electricity retailer or electricity entity, as may be appropriate in relevant jurisdiction. (ref. AS/NZS 3000:2018)
Electric Vehicle	Any vehicle propelled by an electric motor drawing current from a rechargeable storage battery, which is manufactured primarily for use on public or private streets, roads, or highways. Note: Electric Vehicles are all road vehicles, including plug-in hybrid road vehicles (PHEV) that derive all or part of their energy from on-board batteries. (ref. AS/NZS IEC 62196.2:2023)
Enclosure	A part providing an appropriate degree of protection of equipment against external influences and against contact with live parts. (ref. AS/NZS 3000:2018)
Energised	Connected to a source of electrical supply or subject to hazardous induced or capacitive voltages. (ref. AS/NZS 4836:2023)
Equipotential Bonding	Electrical connections intended to bring exposed conductive parts or extraneous conductive parts to the same or approximately the same potential, but not intended to carry current in normal service. (ref. AS/NZS 3000:2018)
Extraneous Conductive Part	A conductive part that does not form part of an electrical installation but that may be at the electrical potential of a local earth. (ref. AS/NZS 3000:2018).
Fault Finding	Process of taking measurements or carrying out tests on electrical installations and equipment to locate faults or prove operability. (ref. AS/NZS 4836:2023 1.4.20)
Fixed Electrical Equipment	Low or high voltage equipment directly installed into the site's power distribution system. (ref. AS/NZS 3000:2018)
Fuse	A device for protecting a circuit against damage from an excessive current flowing in it by opening the circuit on the melting of the fuse

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	element by such excessive current. The fuse comprises all the parts that form the protective device. (ref. AS/NZS 3000:2018)
Hazardous Area	Area in which an explosive atmosphere is present, or maybe expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment based on AS/NZS 60079 Series of Standards.
Hazardous Area Electrical Equipment	Electrical equipment for use in hazardous areas with specific measures applied to comply with Australian Standards to avoid ignition of a surrounding flammable atmosphere.
Hazardous Voltage	A voltage source with the capacity to produce a current greater than 30mA AC or 100mA DC in the human body.
High Fault Current	is an excessively high, uncontrolled flow of electricity occurring during a short circuit or equipment failure, often magnitude-times higher than normal operating current. It represents maximum energy transfer, resulting in severe overheating, arc flashes, and potential equipment explosions if not managed by protective devices.
Incident Energy	Amount of energy at a prescribed distance from the equipment generated during an electrical arc event. (ref. AS/NZS 3000:2018)
Induced Voltage	Induced voltage is a voltage generated in a conductor when subjected to a moving magnetic field.
Insulated	Separated from adjacent conducting material by a dielectric (non-conducting) substance or airspace permanently providing resistance to the passage of current or disruptive discharge through or over the surface of the substance or space to obviate danger of shock or injurious leakage of current. (ref. AS/NZS 3000:2018)
Insulated Tool	A tool designed to protect workers from electrical shocks up to 1000V AC and 1500V DC. Workers are only protected when contacting the insulated portion of the tool, not the entirety of the tool. Standards for suitable tools are defined in IEC 60900
Isolated	Separated from all possible sources of electrical energy (supply) and rendered incapable of being energised unintentionally. (ref. AS/NZS 3000:2018)
Isolation (Function)	Function intended to cut off the supply from the whole installation, or a discrete section of it, by separating it from every source of electrical energy for reasons of safety. (ref. AS/NZS 3000:2018)
Limited Approach Boundary	An approach limit at a distance from an exposed energised electrical conductor or circuit part within which a shock hazard exists.
Live	Energised or subject to hazardous induced or capacitive voltages. All electrical apparatus must be regarded as “Live” unless proven de-energised. (ref. AS/NZS 3000:2018)
Main Switch	A switch, the primary function of which is isolation of a supply of electricity to the electrical installation. This device may also fulfil

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	regulatory requirements provided it is labelled accordingly. (ref. AS/NZS 3000:2018)
Neutral	The conductor of a three-wire or multi-wire system that is maintained at an intermediate and approximately uniform potential in respect of the active or outer conductors, or the conductor of a two-wire system that is connected to earth at its origin. (ref. AS/NZS 3000:2018)
Operating Work	Operation of switching devices, links, fuses or other connections intended for ready removal or replacement, proving that electrical conductors are de-energized, earthing or short-circuiting, locking or tagging of electrical apparatus and erection of barriers or signs. (ref. AS/NZS 4836:2023)
Overcurrent	A current exceeding the rated value of electrical equipment. (ref. AS/NZS 3000:2018)
Personal Protective Equipment (PPE)	Clothing, equipment and/or substances, which when worn or correctly used, protect parts or all of the body from foreseeable risk of injury or disease at work or in the workplace. (ref. AS/NZS 4836:2023)
Person Conducting Business or Undertaking (PCBU)	Refer Section 5 of the WHS Act 2011 and Section 17 of New Zealand's Health and Safety at Work Act 2015.
Photovoltaic (PV) System	A system composed of one or more solar panels combined with an inverter and other electrical and mechanical hardware that use energy from the Sun to generate electricity .
Prescribed Electrical Work (PEW)	Applicable to New Zealand and some Australian jurisdictions and comprises the maintenance or replacement of a fitting in an existing installation; and includes relocation or extension of a conductor to facilitate replacement of a fitting; but excludes maintenance that involves the adjustment or protection or gas monitor settings of mining electrical equipment (ref. New Zealand Electrical (Safety) Regulations 2010, Electricity Safety (General) Regulations 2019 – Victoria, Australia)
Portable Electrical Equipment	A readily movable electrical appliance usually having a flexible supply cable and connected to a source of supply by means of a plug and socket outlet. This includes the equipment itself with all accessories, its flexible cable and the plug which connects it to the supply e.g., extension cords, welders, portable pumps, portable generators, power boards, portable computers, portable isolation transformers, microwave ovens etc
Prohibited Approach Boundary	An approach limit within which work is considered the same as making contact with an exposed energised electrical conductor or circuit part.
Protection, Basic	Protection against dangers that may arise from direct contact with live parts of the installation. (ref. AS/NZS 3000:2018)
Protection, Fault	Protection against dangers that may arise from direct contact with live parts of the installation. (ref. AS/NZS 3000:2018)

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Repair	The work to restore the electrical installation to safe and sound working condition after deterioration or damage has occurred. (ref. AS/NZS 3000:2018)
Rescuer/Nominated Rescuer	A worker, competent to carry out the appropriate rescue and resuscitation in constant communication with the work party and located such that no delay in carrying out a required rescue will occur. Specifically, the rescuer must be at the work site where the rescue would be required.
Residual Current Device (RCD)	A device intended to isolate supply to protected circuits, socket outlets or electrical equipment in the event of a current flow to earth which exceeds a predetermined value. (ref. AS/NZS 3000:2018)
Responsible Manager	Refers to a person who has management or control over work on or near electrical equipment including installations (i.e., the Energy Solutions Head of Deployment or Head of Asset Operations). The Responsible Manager is responsible for ensuring compliance, competency, and safety within their domain of responsibility.
Restricted Approach Boundary	An approach limit within which there is an increased risk of shock, due to electrical arc over combined with inadvertent movement, for personnel working in close proximity to an exposed energised electrical conductor or circuit part.
Ripple-free DC	For sinusoidal ripple voltage, a ripple content not exceeding 10% r.m.s. (ref. AS/NZS 3000:2018)
Safety Observer	Person who has been specifically assigned the responsibility of observing and warning against the unsafe approach to electrical equipment, exposed energized conductors or live conductive parts and other potential risks. (ref. AS/NZS 4836:2023)
Service Protection Device	A fuse or circuit breaker installed as required by the electricity distributor for interrupting the supply to an electrical installation on a consumer's premises from the supply main. (ref. AS/NZS 3000:2018)
Subcircuit, Final	A circuit originating at a switchboard and to which only consuming devices or points will be connected. (ref. AS/NZS 3000:2018)
Subcontractor	Any person engaged and controlled by the Contractor, to execute work for or in relation to the Project. This includes person(s) engaged and controlled by the Contractor but nominated by Ampol Group to execute specific items of the works.
Submains	A circuit originating at a switchboard to supply another switchboard. (ref. AS/NZS 3000:2018)
Substation	An assembly of electrical equipment at one place, including any necessary housing, for the conversion or transformation of electric energy or for connection between two or more circuits. (ref. AS/NZS 3000:2018)
Switchboard	An assembly of circuit protective devices, with or without switchgear, instruments or connecting devices, suitably arranged, and mounted

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	for distribution to, and protection of, one or more submains or final subcircuits, or a combination of both. (ref. AS/NZS 3000:2018)
Switchboard, Main	A switchboard from which the supply to the whole electrical installation can be controlled. (ref. AS/NZS 3000:2018)
Switchgear	Equipment for controlling the distribution of electrical energy or for controlling or protecting circuits, machines, transformers, or other equipment. (ref. AS/NZS 3000:2018)
Testing	Use of test instruments or test equipment by a competent person. (ref. AS/NZS 4836:2023)
Voltage	Differences of potential normally existing between conductors and between conductors and earth. (ref. AS/NZS 4836:2023)
Voltage, Extra-low (ELV)	Not exceeding 50V AC. or 120 V ripple-free DC. (ref. AS/NZS 4836:2023)
Voltage, Low (LV)	Exceeding extra-low voltage (50V AC. or 120 V ripple-free), but not exceeding 1000V AC or 1500V DC. (ref. AS/NZS 4836:2023)
Work near	performance of a function within 3 m of exposed energized conductors or live conductive parts and/or electrical equipment
Work on	performance of a function within 500 mm of exposed energized conductors or live conductive parts and/or electrical equipment

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