

# **Designing, installing and maintaining safe electrical and gas installations and distribution systems**

**DECEMBER 2015**



# **For designers, electrical workers, gas workers and users of electrical and gas installations and distribution systems**

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## **ACKNOWLEDGEMENTS**

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# **DESIGNING, INSTALLING AND MAINTAINING SAFE ELECTRICAL AND GAS INSTALLATIONS AND DISTRIBUTION SYSTEMS KEY POINTS:**

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**The Electricity and Gas Safety Regulatory regimes are risk based and segment the requirements applying to different energy sectors, including the distribution and installation sectors. The regulations cover distributed electricity and gas, as well as bottled gas and independently generated electricity.**

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**All installations and distribution systems are required by the legislation to be constructed and maintained to be safe for users, members of the public, and their property.**

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**The safety of distribution systems is set by broad safety principles at engineering level, consistent with industry practices, with prescriptive requirements set to establish rules at the interfaces with infrastructure and the installation sector. Safety Management Systems (SMS) are mandated to address the high consequence risks to the public.**

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**The maintenance of Electrical and Gas installation safety is regulated by placing obligations for safety on owners and operators, with mandatory periodic verification requirements to cover the higher risk areas.**

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**The construction and maintenance of installations is controlled by requiring all electrical work that poses a risk (Prescribed Electrical Work - PEW) and all gasfitting to be performed by a licenced worker. This work is then categorised into three risk levels with associated increasing controls, including certification.**

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**All PEW and gasfitting on an installation is required to be certified, and high risk work (as defined in the Regulations) is required to be entered onto the Electricity and Gas High Risk Database which is a publicly accessible database.**

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**All construction work is required to comply with nominated prescriptive Standards, or a base performance-based Standard where innovative techniques are being employed.**

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**Transportable installations are included in the regulatory regime, with a warrant of fitness system applying to their connection to electricity supplies.**

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**Specific safety requirements are also established for mining operations in a separate section and schedule of the Regulations where provisions relating to the relocatable equipment and mobile machinery used in mining are specified.**

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# TABLE OF CONTENTS

---

<b>01</b>	<b>INTRODUCTION</b>	<b>4</b>
1.1	What is this guide?	5
1.2	What does Energy Safety do?	5
<b>02</b>	<b>BACKGROUND TO ENERGY SAFETY'S COMPLIANCE PROGRAMME</b>	<b>7</b>
2.1	Optimising safety	8
2.2	Energy Safety compliance strategy	8
<b>03</b>	<b>COMPLIANCE</b>	<b>9</b>
3.1	Who must comply?	10
3.2	Regulatory framework	10
3.3	Transitioning from old to new regulations	12
<b>04</b>	<b>SAFETY OF ELECTRICAL INSTALLATIONS AND WORKS</b>	<b>13</b>
4.1	Safety of electrical installation and works overview	14
4.2	Low voltage installations	17
4.3	High voltage installations	26
4.4	Works	28
4.5	Operational safety	30
<b>05</b>	<b>SAFETY OF GAS INSTALLATIONS AND GAS DISTRIBUTION SYSTEMS</b>	<b>32</b>
5.1	General safety requirements	33
5.2	General and mobile installations	34
5.3	Compressed natural gas (CNG) stations	35
5.4	Certification	35
5.5	Gas distribution systems	37

---

**06 AUDITS AND ENFORCEMENT 40**

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<b>6.1</b>	Monitoring accidents, incidents and alerts	41
<b>6.2</b>	Audits and inspections	41
<b>6.3</b>	Enforcement	42

---

**07 APPENDICES 49**

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<b>7.1</b>	Related organisations	50
<b>7.2</b>	Acronyms and glossary	50

## TABLES

---

<b>1</b>	Overview for stages of electrical work	14
<b>2</b>	Risk categories and definitions for prescribed electrical work (PEW)	15
<b>3</b>	Certification requirements	17
<b>4</b>	Overview for stages of gas work	33

## FIGURES

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<b>1</b>	How the safety, risk and work architectures combine to produce a zone for innovation	26
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# 01/

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## INTRODUCTION

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### IN THIS SECTION:

- 1.1 What is this guide?
- 1.2 What does Energy Safety do?

## 1.1 WHAT IS THIS GUIDE?

This guide is intended to apply to:

- > gas installations
- > electrical installations
- > gas distribution systems and transmission systems, to the extent they are covered by the Regulations (collectively referenced to as 'distribution systems')
- > electricity generation, transmission and distribution systems and related assets (collectively referred to as 'works').

This guide provides designers, electrical workers, gas workers, owners of installations, information that will help you:

- > comply with safety requirements
- > take the appropriate steps designing, constructing or connecting an electrical or gas installation
- > avoid enforcement action which can be costly to the person responsible, especially where someone has been harmed, property damaged, or a safety recall is required or remedial action is required.

The information in this guide tells you about:

- > compliance requirements
- > Energy Safety's audit and monitoring processes
- > enforcement action for non-compliance.

The information in this guide is current as at the date of publication and should be read and used in conjunction with the [Electricity \(Safety\) Regulations 2010](#) ('Electricity Regulations') and [Gas \(Safety and Measurement\) Regulations 2010](#) ('Gas Regulations') on the New Zealand Legislation Regulations website. Collectively these are referred to in this guide as 'the Regulations', updated as of February 2014.

No information in this guide overrides or replaces any requirement specified by the Regulations, or associated electricity and gas Gazette notices.

This guide does not address the work carried out under the exemption for domestic electrical wiring refer to the [Electrical Code of Practice 51](#) - for Homeowner/occupier's Electrical Wiring Work in Domestic Installations.

## 1.2 WHAT DOES ENERGY SAFETY DO?

Energy Safety is the government agency responsible for the operation of an effective investigative, compliance, enforcement and conformance regime for electrical and gas safety under the provisions of the Electricity Act 1992, the Gas Act 1992 and associated Regulations and Gazette notices.

We administer the technical provisions of the [Electricity \(Safety\) Regulations 2010](#) and the [Gas \(Safety and Measurement\) Regulations 2010](#) to promote, monitor and enforce safe supply and use of electrical and gas installations, works, appliances and fittings.

We do this by:

- > working with manufacturers, importers, suppliers, retailers and all traders and installers of electrical and gas products to ensure they provide safe products to New Zealand consumers
- > monitoring the New Zealand marketplace to encourage appropriate behaviour and processes that ensure the safe supply and use of electrical and gas products and installations
- > conducting compliance audits of electrical and gas installations and suppliers
- > investigating accidents and incidents

- involving electrical and gas installations
- > investigating complaints of non-compliance involving electrical and gas installations
- > providing advice to Government on energy safety issues associated with electrical and gas safety.

As of December 2013, Energy Safety is part of WorkSafe New Zealand, the stand-alone health and safety regulatory agency, and works with a number of agencies with responsibility for, or an interest in the safe supply and use of gas and electricity.

All electrical and gas installations, work, appliances and fittings in New Zealand must comply with the fundamental safety requirements and any applicable Standards, in accordance with the Electricity (Safety) Regulations 2010 and Gas (Safety and Measurement) Regulations 2010.

# 02/

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## **BACKGROUND TO ENERGY SAFETY'S COMPLIANCE PROGRAMME**

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### **IN THIS SECTION:**

- 2.1 Optimising safety**
- 2.2 Energy Safety compliance strategy**

It is important for people, organisations and businesses with ‘duties’ under the Electricity Act 1992 and the Gas Act 1992 to understand our approach to compliance and how and why we choose to respond to non-compliance.

It is also important to outline our overall approach to enforcement. This will help you develop or refine your own internal operating systems and procedures to achieve compliance.

### 2.1 OPTIMISING SAFETY

The use of electrical and gas technology in New Zealand is commonplace in almost every aspect of business and personal life. Society relies on electricity and gas and the technologies these power to improve business efficiency, maintain well-being and improve social interaction. The use of electricity and gas as energy sources brings with it risks that need to be understood and managed.

Energy Safety manages the acceptable levels of electrical and gas safety through the compliance framework that forms part of the regulatory environment. In addition, the New Zealand regulatory environment is closely aligned with international practices through the application of International Standards.

Where appropriate Mutual Recognition Arrangements (MRAs) with our trading partners modify the impact of New Zealand’s regulatory environment and support compliance through international regulatory co-operation.

#### Electricity and Gas Compliance Framework is based on:

- > Electricity (Safety) Regulations 2010
- > Gas (Safety and Measurement) Regulations 2010
- > Associated electricity and gas Gazette notices
- > Recognised International Standards

- > New Zealand Standards
- > New Zealand codes of practice.

### 2.2 ENERGY SAFETY’S COMPLIANCE STRATEGY

To support our compliance strategy, Energy Safety’s compliance and enforcement team ensures safety issues are quickly identified and consistently managed. Our strategy is to:

- > monitor the market and promote greater industry and public awareness of safety for electrical and gas installations
- > promote greater industry and public awareness of installation safety compliance requirements
- > audit electrical and gas installations and networks to ensure they comply with safety fundamentals and with legislative obligations
- > enforce compliance, including issuing Warning notices, Infringement notices and undertaking Prosecutions as appropriate.

#### Electricity and Gas compliance and enforcement Framework is based on:

- > increasing industry and public awareness of the benefits of compliance
- > undertake a proactive audit programme for electrical and gas installations and networks
- > investigate accidents and incidents involving electrical and gas installations and networks
- > investigate cases where non-compliance breaches of gas and electrical safety obligations (rules) are suspected or reported
- > carry out enforcement activities.

# 03/

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## COMPLIANCE

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### IN THIS SECTION:

- 3.1 Who must comply?
- 3.2 Regulatory framework
- 3.3 Transitioning from old to new regulations

### 3.1 WHO MUST COMPLY?

Everyone who designs or does work on works, distribution systems, installations, fittings and appliances in New Zealand must ensure they comply with New Zealand's established regulatory framework. This also applies to everyone who supervises the design or work.

Persons who do work or supervise this work must ensure that:

- > the resulting works, distribution systems, installations, fittings or appliances are safe
- > it has not affected the safety of the rest of the works, distribution systems or installation
- > people and property are protected from dangers arising from the work.

Persons who own or operate works, distribution systems, installations, fittings or appliances must not use or allow anyone to use them if they are unsafe.

The work on any gas installation or appliances, including those in caravans or boats when used for non-propulsive purposes, is considered to be gasfitting and is required to be carried out by competent persons authorised under the [Plumbers Gasfitters and Drainlayers Act 2006](#).

People who work on any electrical installation must be competent to safely do the work they do, and produce safe and compliant results. Certain work – Prescribed Electrical Work (PEW) and gasfitting – may only be done by registered workers holding a current practising licence.

The Electrical Act 1992 and the ESRs define PEW, in relation to electricity works, installations and appliances, as work that may only be undertaken by a relevant electrical worker with a current licence.

#### Electrical and gas work includes:

- > designing
- > constructing
- > manufacturing
- > assembling
- > installing
- > connecting
- > maintaining
- > testing
- > certifying
- > connecting
- > inspecting
- > using
- > managing
- > commissioning.

### 3.2 REGULATORY FRAMEWORK

New Zealand's regulatory framework requires that electrical and gas installations are designed and constructed to be safe. The principal provisions are implemented throughout the installation process. This includes the design, construction, connection as well as disconnection and reconnection. These rules apply to anyone authorised to perform electrical or gasfitting work.

The framework aligns with the following World Trade Organisation (WTO) requirements, being:

- > performance based
- > risk driven
- > aligned with international standards
- > inclusive of MRAs, including those at equivalent levels.

If you have doubt about compliance with the Regulations, Energy Safety recommends you seek advice from professional consultants who specialise in electrical and/or gas safety, such as Electrical Inspectors, Electrical Engineers and organisations such as EEA, ECANZ and the like. For Gas Certifying Gasfitters, Approved Practitioners and organisations such as Master Plumbers, Gasfitters and Drainlayer NZ Inc.

### ELECTRICAL WORKS AND INSTALLATIONS COMPLIANCE FRAMEWORK

The Electrical Installations Compliance Framework is contained in the Act, Regulations, Standards and ECPs.

- > Electricity Act - provides the framework for electrical installations and who may do the work, including the role of the Electrical Workers Registration Board (EWRB).
- > Regulations - describe the mechanism for doing work.
- > Standards and ECPs - contain the technical requirements.

The EWRB controls who can do the work through registration and licensing.

The majority of technical rules that you need to follow are contained within AS/NZS 3000, commonly known as the 'Wiring Rules' (the principal requirements are also mirrored in the Electricity Regulations).

The requirements for certification, inspection, and testing are contained in the Regulations.

The 2010 Regulations have been rearranged:

- > most of the requirements applying to installations have been grouped together
- > most of the technical requirements have now been transferred are in - AS/NZS 3000 - the Wiring Rules

- > the majority of Companion Standards that are referred to by the Regulations and are listed in Schedule 2 which is revised as standards are updated on a regular basis.

The 2010 Regulations contain requirements for all electrical work to be carried out safely, and for the completed work to be safe.

### GAS INSTALLATION COMPLIANCE FRAMEWORK

The Gas Installations Compliance Framework is contained in Acts, Regulations and Standards.

- > Gas Act - provides the framework for gas installations.
- > Plumbers Gasfitters and Drainlayers Act - provides the framework for who may do gasfitting work, including the role of the Plumbers, Gasfitters and Drainlayers Board.
- > Regulations - describe the requirements for gas installations and certification of gasfitting.
- > Standards - provide technical performance requirements and means of compliance.

The Plumbers, Gasfitters and Drainlayers Board (PGDB) controls who may do gasfitting through registration and licensing.

The 2010 Regulations contain requirements for gas work to be carried out safely, and for the completed work to be safe. The majority of technical rules that you need to follow are contained within AS/NZS 5601 and the relevant manufactures instructions. This includes testing and commissioning. Requirements for certification are contained in the Regulations.

There is a general obligation on everyone who designs, constructs, maintains, uses or manages a distribution system to ensure the distribution system is safe. Owners and operators of major gas supply systems are required to implement and maintain a Safety Management System (SMS).

The 2010 Regulations have been rearranged so that most of the requirements applying to installations are grouped together.

### **3.3** **TRANSITIONING FROM OLD TO NEW REGULATIONS**

#### **ELECTRICAL INSTALLATIONS**

The new regime is driven by risk, accountability and cost.

- > Risk: the higher the risk, the more controls have been set up (inspection, verification, and certification).
- > Accountability: systems have been put in place to identify who is responsible and accountable at every stage of the process from design, to construction, connection and maintenance.
- > Compliance cost: compliance costs have been reduced on areas on which safety would not be compromised.

The Electricity (Safety) Regulations 2010 (Regulations 113 – 118) have provisions that allow existing works and installations and those under construction or being installed in New Zealand under the previous regulations to continue to remain covered by the previous Electricity Regulations 1997.

In addition the transitional provisions retain the validity of prohibitions, exemptions and other legislative ‘instruments’ into the new regulatory environment.

When carrying out work on an existing installation:

- > Only the actual extensions to existing installations are required to be compliant with the latest Regulations and Standards.
- > The repair or replacement, including repositioning, of faulty or damaged conductors and the replacement of any fitting, including a conductor, with a fitting of appropriate size, type and rating does not create a need for upgrading.

- > The only requirements that apply to the existing parts of an installation when maintaining, extending, or altering the installation, are to replace or upgrade any parts that are now electrically unsafe. In all cases, older wiring rules and practices remain valid.

#### **GAS INSTALLATIONS**

Transitional provisions in the [Gas \(Safety & Measurement\) Regulations 2010](#) provide that distribution systems and installations constructed under the previous Gas Regulations are compliant provided they are not now unsafe.

In addition the transitional provisions retain the validity of prohibitions, exemptions and other legislative ‘instruments’ into the new regulatory environment.

# 04/

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## **SAFETY OF ELECTRICAL INSTALLATIONS AND WORKS**

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### **IN THIS SECTION:**

- 4.1 Safety of electrical installation and works overview**
- 4.2 Low voltage installations**
- 4.3 High voltage installations**
- 4.4 Works**
- 4.5 Operational safety**

**4.1 SAFETY OF ELECTRICAL INSTALLATION AND WORKS OVERVIEW**

STAGE	LOW VOLTAGE INSTALLATIONS	HIGH VOLTAGE INSTALLATIONS	WORKS
DESIGN	<p><b>Choice of design</b> Decide whether design complies with Part 1 or Part 2 of the Wiring Rules (Reg 59) General safety requirements (Reg 14)</p>	<p><b>Must have a certified design</b> (Reg 62)</p> <p><b>General safety requirements</b> (Reg 14)</p>	<p><b>Choice of design</b> Must take into account whether installation will operate under Safety Management System (SMS). Can be constructed as low voltage installations (Reg 37) General safety requirements (Reg 14)</p>
	<p>There must be a Certified Design (Reg 58) if Part 2 is not being complied with or if it is an installation in a hazardous area or in a mine (Reg 59)</p>		
CONSTRUCTION	<p><b>General requirements and technical rules</b> Follow either rules for Part 1 (Reg 59) or Part 2 (Reg 60) of AS/NZ3000, and any certified design</p>	<p>Safety requirements relating to overhead lines, earthing systems, isolation from supply of electricity, conductors and notices (Reg 34, 41 to 46)</p>	<p><b>Construction process</b> General safety rules Reg 34, 36 and 37. Trolley bus systems of supply must be treated as Works (Reg 37A)</p> <p><b>SMS</b> Reg 47 to 55      <b>No SMS</b> Reg 41 to 46</p>
	<p><b>Test the installation</b> as per Reg 63</p>	<p><b>Testing</b> (Reg 64)</p>	<p><b>Testing</b> (Reg 38) unless constructed as low voltage installations</p>
	<p><b>Certification</b> Certify work. Certificate of Compliance (CoC) ( Reg 67) (CoC not required for low-risk PEW). Details of high-risk PEW to be entered on High-risk Database (Reg 74F)</p>	<p><b>Certification</b> Certify work (Reg 65 and 66) Certificate of Compliance (CoC) Reg 67)</p>	<p><b>Certification</b> Documentation required only if the person testing is different from person connecting Reg 38</p>
CONNECTION	<p><b>Inspection</b> Only high risk electrical installations are subject to third party inspection (Reg 70 to 72A) and a Record of Inspection and the entry of details in to the High Risk Database</p>	<p><b>Inspection</b> All work on high voltage installations is subject to testing (Reg 64) and third party inspection (Reg 70 to 72A)</p>	
	<p><b>Safety check</b> certification and inspection complete Verify and technical safety compliance of the supply (Reg 73A)</p>	<p><b>Safety check</b> (Reg 73A(2)) After connection issue ESC (Reg 74A to 74G)</p>	<p><b>Safety check</b> Check power supply as specified on Reg 38</p>

STAGE	LOW VOLTAGE INSTALLATIONS	HIGH VOLTAGE INSTALLATIONS	WORKS
PERIODIC VERIFICATION	<b>In service safety verification</b> For installations with high risk of becoming unsafe overtime (Reg 75)	<b>In service safety verification</b> Reg 40	<b>In service safety verification</b> <b>SMS</b> <b>No SMS</b> Reg 49 to 50              Reg 40 or NZS 7901
	<b>Warrant of electrical fitness</b> required for certain installations (Reg 76 to 78)		<b>Audit</b> Reg 51 and statutory declaration Reg 53 at least once every 5 years
	<b>Reconnection</b> Certificate of Verification (CoV) required if disconnection > six months (Reg 74)		

Table 1: Overview for stages of electrical work

**RISK CATEGORIES AND DEFINITIONS FOR PRESCRIBED ELECTRICAL WORK (PEW)**

PEW associated with electrical work is divided in to three risk categories (Reg 6A):

1. Low-risk
2. High-risk
3. General

TYPE OF PEW	RELEVANT REGULATION	ADDITIONAL GUIDANCE
<b>Maintenance</b>	Established in ESR 6A	In all cases this is low risk work. Maintenance is principally driven by ESR 59.
Repair	Included in the definition of maintenance (ESR 4)	In all cases this is low risk work.
<b>Replacement</b>	Established in ESR 6A. Allows relocation or extension only to replace a fitting.	In all cases this is low risk work. Replacement is principally driven by ESR 59. ESR 59(3) allows restoration to ‘Original condition’.
<i>Upgrade</i>		<i>When in accordance with manufacturer’s instructions, or AS/NZS 3000, upgrading is a replacement. Upgrading to address increased supply fault rating is also a replacement. The installation of higher capacity fittings to address increased usage of an installation is an alteration. For mains work this becomes high risk.</i>
<b>Install</b>	Definition is established in ESR 4	In most circumstances this is general PEW, except where ESR 6A defines it as high risk.
Construct	Included in the definition of Install (ESR 4)	
Alter	Included in the definition of Install (ESR 4)	Used in AS/NZS 3000 Includes overhead to underground conversions. (For mains work this becomes high risk)

TYPE OF PEW	RELEVANT REGULATION	ADDITIONAL GUIDANCE
Addition	Included as 'add' in the definition of Install (ESR 4) Used in AS/NZS 3000.	
Relocate	Included in the definition of Install (ESR 4)	Includes the extension of cables (conductors) and rerouting of existing cables.
<b>Revenue Meters</b>	Specific provisions apply to metering. See definition of 'Mains work' (ESR 4).	All metering replacements are low-risk. Installation of new meters is general risk, except that work on any meter installation that can affect the continuity of the mains neutral, or polarity of the mains, is defined as high-risk.
<b>Reconnections and restoration of power</b>	Reconnections and restoration of power following a disconnection or isolation to allow safe work to be carried out is not subject to certification and is not assigned a risk category (ESR 74).	Reconnections and restoration of power following a disconnection or isolation of more than six months require certification in accordance with AS/NZS 3019.
<b>PEW on works</b>	Not subject to certification or an assigned risk category.	An ESC is required for a connection made in works that is the final step that will allow electricity to flow in the installation on which other PEW work has been done (ESR 73A).
<b>Periodic Assessments</b>	Periodic assessments are not PEW, however most are required to be performed by a licenced inspector. They are therefore not assigned a risk category (ESR 75).	<b>Note:</b> Periodic Assessments are not an 'inspection' and therefore not restricted to a person independent from the installer or 'maintainer'.
<b>Inspection</b>	All High Risk PEW must be inspected For the purposes of ESR 70. The inspection must not rely on the certification issued by the installer, and must independently verify the safety of the completed work (ESR 71).	Installation Standards have references to 'inspection'. These references relate to the visual and similar checks that the installer must carry out as part of their installation work. They may also act as a guide to aspects of the installation an inspector should consider for inspection.

**Table 2:** Risk categories and definitions for prescribed electrical work (PEW)

Since 31 December 2013, specific provisions apply to electrical installations and equipment associated with mining and similar operations:

- > definitions, including those for low voltage, high-risk and unsafe criteria ([Regulation 24A and B](#)), have been modified
- > for additional requirements that apply to electrical installations in mines, quarries and tunnels, refer to [Regulation 61AA, Part 5A \(Regulation 78A to 78M\)](#) and Schedule 8
- > for additional requirements that apply to work on or near live conductors in mining and similar operations, refer to [Regulation 103A](#)
- > detailed guidance on mining and similar operations is outside of the scope of this compliance guide.

Overview of certification requirements:

		RISK CATEGORY		
		Low risk	High risk	General
INSTALLATION STAGE	Design and Installation	Wiring rules	Wiring rules	Wiring rules
		Suppliers' declaration of conformity	Suppliers' declaration of conformity	Suppliers' declaration of conformity
		Manufacturers' instructions	Manufacturers' instructions	Manufacturers' instructions
		Original design	Certified design	Certified design
	Verification	Suppliers' declaration of conformity	Suppliers' declaration of conformity	Suppliers' declaration of conformity
		Testing	Testing	Testing
		Optional certification (CoC)	Certification (CoC)	Certification (CoC)
			Inspection	
			Record of inspection	
		Database		
	Completion	Connection or completion	Connection (including verification)	Connection (including verification)
		Electrical safety certification (ESC) - safe to use	Electrical safety certification (ESC) - safe to use	Electrical safety certification (ESC) - safe to use

- Existing requirements continue
- New requirements from 1 July 2013
- Terms or descriptions that change from 1 July 2013

Table 3: Overview for certification requirements

## 4.2 LOW VOLTAGE INSTALLATIONS

### INTRODUCTION

Low voltage installations are installations with voltage of 50 to 1,000 volts AC, or 120 to 1,500 volts DC. During the installation, and at its completion, the installation work is tested and certified.

For those installations or part of installations recognised as having higher risk of harm or damage to property by reason of their particular characteristics, eg high voltage, hazardous areas, electrical medical, mains work, etc, an independent inspection is required, together with a record of that inspection and an entry of details in to the High Risk Database by the inspector.

The installation work can be permanently connected to a supply after the certification, testing, and safety verifications have been completed.

The Regulations contain specific provisions relating to the use of electricity in mining operations. These provisions are contained in Part 5A of the Regulations and the Rules contained in Schedule 8 of the Regulations. These provisions are not covered in this guide.

## **DESIGN**

Compliance with the Electricity (Safety) Regulations 2010; regulations 14 and 58.

A certified design is part of the risk management architecture that enables the responsibilities, liabilities and accountabilities of all parties that influence safety of completed work to be identified.

A certified design may be relied on for installation work ([Regulation 58](#)), and must be used for Part 1 and high voltage installations work.

[Regulation 14](#) makes it an offence to complete a design which, if constructed, would not be electrically safe.

There are some installations where the use of Part 2 is mandatory, eg low and extra low voltage domestic installations ([Regulation 59](#)) or an installation in a hazardous area and certain medical areas ([Regulation 60](#)). There is formal recognition in Regulation of certified designs and manufacturer's instructions. This is to clarify the accountability of everyone involved in the safety of completed work.

### **CERTIFIED DESIGNS**

It is anticipated that most work will be done in accordance with prescriptive means of compliance in AS/NZS 3000 – the Wiring Rules.

If installation PEW is subject to a certified design, the designer must certify the design is compliant and safe. The electrical practitioner who installs, tests or connects the resulting installation is entitled, if acting in good faith, to rely on the certified design. There is no

obligation to accept a certified design if the installer does not have confidence that it will achieve compliance and safety.

The recognition of certified designs in regulation means that someone other than the certifier of the installation work takes responsibility and liability that the design is compliant and will achieve safe outcomes.

For a design to be recognised as a certified design when it is being relied on to install, test, inspect and connect installations it must demonstrate compliance with legislation and electrical safety. The design must also include the following:

- > the designer is required to be clearly identifiable on the design, with their signature and date signed
- > the location, or proposed location, is required on the design
- > it should identify any standard with which the installation complies or is intended to comply with on the design.

The as-built drawing provided by third parties such as installers are not the designs required to be declared by the designer or installer in the Regulations. They are simply drawings that document what was done for the clients.

### **DESIGN CHANGES**

A person responsible for any changes or additions to a design must:

- > go back to the designer for careful consideration that any changes to the original design will not affect the electrical safety of the installation, and
- > after this consideration the designer will make the changes to the design, date and sign, and
- > the installer will document these changes on the CoC.

This means the responsibility for all design changes are accounted for and designer still remains responsible for the overall design, including the aspects of the design that have not been changed.

## CONSTRUCTION

### GENERAL REQUIREMENTS

Installations complying with Part 2 of AS/NZS 3000 are subject to the Technical Requirements of Part 2, and must be certified, tested, and inspected as detailed in the Regulations. Although technically a Part 2 installation meets the fundamental safety principles of Part 1 none of the Regulatory requirements applying specifically to a Part 1 design apply if Part 2 has been chosen.

### TECHNICAL RULES

#### Rules for Part 1 of AS/NZS 3000

When Part 1 is being used, a number of additional technical and documentation requirements are required. These are set because work on installations in accordance with Part 1 that follow methods other than those in Part 2 is considered to be a higher risk.

Installations designed to Part 1 must comply with the technical, testing, certification and inspection requirements of **both** the Regulations and Part 1 of the Wiring Rules.

The use of Sections of Part 2 to achieve compliance with Part 1 is only recognised where explicitly detailed in the Wiring Rules.

The new Regulations retain flexibility to depart from the listed Standards by applying Part 1 of the Wiring Rules. This flexibility is restricted to those circumstances where higher risks do not exist.

There are limitations as to when Part 1 can be applied. Part 1 cannot be applied for:

- > Domestic installations with maximum demand up to 80A single phase or 50A Multi-phase. These installations **MUST** comply with Part 2 ([Regulation 60\(1\)](#)).
- > Specific high-risk installations (medical, mobile medical, connectable, shows and carnivals, hazardous areas, marinas). These installations **MUST** comply with AS/NZS 3000 Part 2 and the relevant Companion Standard. ([Regulation 60\(2\)](#)).

AS/NZS 3000 has been written to allow its use in different regulatory systems. However, in New Zealand, Part 1 or Part 2 are applied as two distinct and separate options, and any cross references between Part 1 and Part 2 have no relevance when Part 2 is being applied.

Compliance with Part 1 requires a certified design ([Regulation 61](#)), and the design must be followed by the installer ([Regulation 58](#)). The installations design **MUST** be fully documented to show how compliance has been achieved and **MUST** be independently audited ([Regulation 6A](#)) High Risk Requiring Inspection.

When designing or installing to Part 1, it is also important to consider the Preliminary provisions ([Regulation 5](#)) and General Safety Requirements (Part 2) of the Electricity (Safety) Regulations 2010, in particular, [Regulations 20, 22, 24](#) and [Regulation 8](#) of Part 1.

There are specific safety requirements applying when Part 1 is being used ([Regulation 61](#)):

- > Switches and circuit breakers in unearthed 2 and 4-wire systems must operate in all conductors.

- > Switches, fuses and circuit breakers must not be installed into an earthing conductor.
- > The installation must be designed so that the voltage drop is not more than 5% under maximum load conditions between the point of supply and any socket-outlet or the supply terminals of fixed appliances operating at standard low voltage.

**Rules for Part 2**

Installations complying with Part 2 are subject to the technical requirements of Part 2, and are certified, tested, and inspected as detailed in the Regulations.

For most installations, AS/NZS 3000 Part 2 will be suitable and so the installation work would be carried out in accordance with that Standard.

AS/NZS 3000 is supported by a number of Companion Standards that set special requirements for particular types of installation.

Where an installation is being constructed to comply with Part 2, any part of the installation containing electrical installations listed below must comply with Part 2 and with the relevant companion standard indicated (Regulation 60(2)):

- > refrigeration system (but not a refrigeration appliance: AS/NZS 1677.2)
- > animal stunning or meat conditioning system: NZS 6116
- > stand-alone power system: AS/NZS 4509.1
- > photovoltaic array: AS/NZS 5033
- > emergency power supply in a hospital: AS/NZS 3009
- > low voltage mains parallel generation system that is connected to the national grid: AS/NZS 3010 and AS 4777.1.

Although technically a Part 2 installation meets the fundamental safety principles of Part 1, none of the Regulatory requirements applying to a Part 1 design apply if Part 2 has been chosen.

Electrical installations or part installation listed below must comply with Part 2 and with the relevant standard indicated (Regulation 60(1)):

- > installation for use with electrical medical devices: AS/NZS 3003
- > installation in a hazardous area: AS/NZS 60079.14
- > connectable installation in a mobile medical facility: NZS 6115
- > installation in a marina: AS/NZS 3004.1
- > connectable installation in a pleasure vessel: AS/NZS 3004.2
- > all other connectable installations: AS/NZS 3001
- > installation in a show or carnival: AS/NZS 3002
- > installation intended to supply connectable installations in a mobile medical facility: NZS 6115
- > installation intended for supply to any other connectable installation: AS/NZS 3001
- > installations located in open-cast mines and quarries: AS/NZS 3007.

**Final Subcircuit**

AS/NZS 3000 sets requirements for the number of final subcircuits that can be connected to an RCD.

In New Zealand, within a switchboard a final subcircuit is considered to start at the terminals of the protective device for that circuit and extend along all cables supplied from that protective device, irrespective of any branching that might be taking place, including branching directly from the terminals of the protective device.

In effect this means that an RCD feeding three subcircuits would be one supplying three circuit breakers, although, one of these circuit breakers may also have multiple circuits branching from it.

In all cases, departures from the cited Standards are considered to be a departure from Part 2 and the rules applying to a Part 1 solution would apply.

## TESTING

The Regulations implement three levels of testing and verification, depending on the elements of safety that are involved, in recognition of the principles of risk management.

At the first level most work may be self-certified and connected. The Regulations are prescriptive on the various tests and checks necessary to verify the safety of the work carried out. Self-checks would include polarity testing, continuity testing and other testing.

An electrical installation may be connected to a supply for the purposes of testing. This is provided for in [Section 82\(4\)](#) of the Electricity Act.

At the second level, recognising that safety is more critical. Certain work requires additional independent checks and hence the requirement of an inspector. This requirement is for the likes of mains work, medical electrical locations, hazardous areas of work where the work is classified as high risk PEW.

At the third level a small amount of work where safety is vital requires the testing to be carried out a third time, in many cases by another person. This requirement is applicable for the connection of any Mains Work.

The Multiple Earthed Neutral (MEN) system in New Zealand is safe only if the polarities of both the supply system and the installation are correct and the connections of the neutral are reliable.

This is why polarity testing and earthing verification are absolutely critical and are repeated as requirements for the installer, an independent inspector, and the person making a connection to an electricity supply.

The safety requirements of mains and the MEN switchboard are so critical that failure to comply with these requirements is very likely to result in the most serious sanctions being sought in any enforcement action.

All testing required by the Regulations must be certified, and if not carried out by the installer may need to be certified on a separate certificate.

### ***Test in accordance with AS/NZS 3000***

All low voltage installations must be tested in accordance with AS/NZS 3000 ([Regulation 63](#)), unless the person is acting under the exemption for domestic electrical wiring ([Regulation 57](#)).

### ***Special situations***

Where the work has been carried out in accordance with a Companion Standard, that work must also be tested in accordance with the Companion Standard.

Low voltage AC railway signalling equipment must be tested in accordance with Electrical Code of Practice (ECP) 60, and not in accordance with AS/NZS 3000.

### **Certification**

All installation wiring work (for example the placing, replacing, or repositioning conductors or fittings attached to conductors) must be certified.

The modified certification regime introduced in July 2013 is aimed at providing flexibility to improve business effectiveness and efficiency in certification.

The new regime also explicitly recognises both the work and the product of the work, ie the resulting installation, and is expected to lead

to safer outcomes for consumers.

The changes also clarify the roles and accountabilities for designs and manufacturer’s instructions.

**CERTIFICATE OF COMPLIANCE (CoC)**

The purpose of the Certificate of Compliance (CoC) is to certify the compliance of work prior to connection. Installation PEW is not considered complete until a CoC is issued.

The CoC, or CoCs if more than one practitioner is involved, provides technical information and confirms that work is compliant and lawful.

For low-risk work the CoC is optional.

The CoC is issued by the person who did the work or supervised the work, and who is authorised to certify that category of PEW.

Practitioners and businesses can design their own certificates or use a format from an industry organisation. The CoC and Electrical Safety Certificate (ESC) can be incorporated together or with other business documents, such as invoices.

The Electricity (Safety) Regulations 2010 (Regulation 66 and 67) specify the details the CoC must contain.

**Note:** A checklist and sample forms for developing your own CoC, ESC and Rol are available on our website [www.energysafety.govt.nz](http://www.energysafety.govt.nz).

**The Authentication Mark**



The Authentication Mark must be displayed on CoCs, ESCs and Rol.

**INSPECTION**

Electrical installation work considered to be classed as a high-risk (Regulation 6A(2)) is subject to third party inspection (Regulation 70). Such installations include:

- > those carried out in accordance with Part 1 of AS/NZ 3000
- > installations that operate at high voltage
- > mains work
- > work on mains parallel generation
- > work on hazardous areas
- > installations intended for use with electrical medical devices
- > work on animal stunning appliances or meat conditioning appliances
- > a photovoltaic system (this is the DC part of the installation up to and including connections to storage batteries and/or inverters)
- > specified installations in mining operations.

The inspection, which is a third-party verification, must be carried out to ensure that the installation will be safe when connected to a supply and has been done in accordance with the Act and Regulations. (Regulation 71).

Inspections may only be carried out by a person who is authorised by their registration and current practising licence to carry out inspection work. They must also have not carried out that work, supervised that work or certified that work (Regulation 71).

**Inspection and Testing**

Regulation 70 applies to an inspector, particularly 70(3), where the inspector must carry out testing etc. This must be done within the limitations of Regulation 71(2) noting that any testing required by the Regulations is PEW (Schedule 1).

Inspectors are required to carry out any tests necessary to satisfy themselves of compliance and safety. The words carry out and the wording of Regulation 71(2) make it very clear that they may not rely on the installers testing.

Regulation 73A applies to the person doing the connection. This is not related to the

rules for inspecting, although it might be done by the same person as the inspection. The regulations do not link inspection and connecting.

**Note:** The person doing the connection must verify that the testing was done, both by the installer, and by the inspector if any high risk work is involved. If a person connects work where the inspector has not done any testing, the person making the connection may be committing an offence.

However, the testing an inspector carries out might be the same, or different, or only duplicate a part of the testing completed by the installer. This testing need not necessarily duplicate the testing of the installer. For example, an inspector might carry out different testing that gives both technical and personal independence.

References to 'Inspections' within AS/NZS 3000 do not imply that that 'inspection' is work required to be performed by an 'Inspector' unless the Regulations specifically require these aspects of the work to be inspected by a person authorised (registered and licensed) to perform inspection. For example, when the installation work is in a hazardous area.

The inspection must be carried out in accordance with the requirements of the applicable installation standards.

Work done on an installation that complies with Part 1 of AS/NZS 3000 must be inspected in accordance with that standard and in accordance with the certified design.

A Record of Inspection (RoI) must be completed for each inspection, and this record must specify whether the installation is safe to connect or otherwise.

Details of high-risk prescribed electrical work must be lodged on electricity and gas high risk database reference 74F.

## RoI

A person who carries out an inspection of high-risk PEW must prepare a written record of inspection. The Electricity (Safety) Regulations 2010 ([Regulation 72](#)) specify the details the RoI must contain

The person who issues an RoI must retain the RoI and make it available when requested ([Regulations 72A](#)).

The requirements applying to the inspection of each of the specific kinds of installations are set in the Regulations ([Regulation 70](#)). The 'Inspector' must work in accordance with AS/NZS 3000 and the standard indicated for:

- > mains parallel generation systems: AS 4771.1 and AS/NZS 3010
- > installations in hazardous areas: AS/NZS 600079.17
- > installations for use with electrical medical devices situated in mobile medical facilities: NZS 6115
- > installations intended for use with electrical medical devices situated in other medical location: AS/NZS 3003
- > work on animal stunning appliances or meat conditioning appliances: NZS 6116.
  - a photovoltaic system AS/NZS 5033
  - special requirements apply to the inspection of work carried out in mines.

## Inspection of Switchboards

The definition of 'Mains work' makes reference to a 'MEN switchboard', which in turn clarifies the particular aspects of the switchboard that are relevant. In this way the two definitions point to the features of the switchboard that would make the work subject to inspection.

Therefore, unless the work carried out on the MEN switchboard relates to the 'connection to an earth electrode via an earthing conductor, and a connection between earth and neutral made by a removable link, for the purposes of creating a MEN system', the work is not considered to comprise of 'Mains work' and therefore not subject to inspection.

### **CONNECTION**

The next stage of the work is its permanent connection to a supply. Connection is defined as the prescribed electrical work that is the final step that will allow electricity to flow in the installation or part installation on which other prescribed electrical work has been done (regulation 73A (5)). For example, turning on the main switch is not connecting.

Temporary connection for the purposes of testing may have already taken place.

The Regulations use the action of connecting completed work to a supply - which is Prescribed Electrical Work - as the keystone of the safety regime by requiring those making the connection responsible for verifying the safety or certification of the work being connected. The Regulations also use the expanded certification requirements to ensure safety is achieved.

Before any low voltage installation work can be connected to a supply, the person intending to make the connection must:

- > verify that the work has been certified or
- > have certified that work.

The certification is required to cover the requirements of [Regulations 67\(1\) and 67\(2\)](#)

### **AND**

- > verify that any necessary inspection has been carried out and certified or
- > inspect and certify the work ([Regulations 70 to 72](#))

### **AND**

The person doing the connection must:

- > ensure that the polarity and phase rotation of the supply is correct
- > ensure that the protection of the supply is correctly rated
- > verify, by testing, checking, or sighting a declaration as to safety, the safety of revenue meters and associated load control fittings of mains
- > ensure that the installation is compatible with the supply system
- > if the supply system is from a MEN system, verify that there is a main earthing system
- > if PEW has been done on the installation, either certify, or sight a certificate, for the work given by another person.

If the meter installation is not the last piece of PEW, the connection may be made by:

- > the meter installer
- > an inspector
- > the electrical worker certifying the installation or
- > a line mechanic making the network connection.

The connection is subject to the verification provisions of [Regulations 74\(A\)](#), and an ESC must be issued after the connections are carried out.

### **Electrical Safety Certificate (ESC)**

The purpose of the ESC where PEW has been carried out on an installation, or part installation or any fitting that supplies an installation or a part installation with electricity is to ensure it is safe to use.

After the connection has been made in an installation, or part installation or any fitting that supplies an installation or a part installation with electricity the person who carried out the connection must issue an ESC if that person is satisfied that:

- > the installation or part installation is safe to use, on the grounds that is electrically safe complies with these regulations; and
- > where the prescribed electricity work comprised the maintenance or alteration of, or the addition to, the installation or part installation, the work has not adversely affected any other part of the installation.

The Electricity (Safety) Regulations 2010 ([Regulation 74A](#)) specify the details the ESC must contain.

### Metering

A risk-based certification requirement applies to the replacement and installation of meters and load control equipment as follows:

- > if you are replacing a meter or metering system (which includes load control equipment), only an Electrical Safety Certificate (ESC) need be issued on completion of the work. All replacements, irrespective of the neutral wiring arrangement, are low-risk work. (**Note:** adjustments to tails is clarified to be a part of replacement).
- > if you are installing a meter, as a part of the construction of an installation, the work is subject to certification on a Certificate of Compliance (CoC). This CoC could be either for the whole of the installation or for a part of an installation – metering only.
- > if the work on the meter can affect the Neutral or Polarity, it is high-risk by virtue of it being mains work. For that reason, it also requires inspection by a person other than the person who installed and certified the meter. This requires a RoI and an entry in the online Electricity and Gas High-risk Database.

If the installation of the meter is the connection of the installation, then the connection is subject to the verification provisions of [Regulations 73A](#), and an ESC must also be issued after the connections are carried out.

### PERIODIC VERIFICATION

A person who owns or operates works, installations, fittings, or appliances must not use, and must not allow anyone to use, the works, installations, fittings, or appliances if they are electrically unsafe.

### IN SERVICE SAFETY VERIFICATION

Certain installations present a higher risk of becoming unsafe over time and therefore, they must be inspected and tested on a periodic basis.

The following low voltage installations must be verified by authorised persons ([Regulation 75 \(1\)\(a\)\(b\)\(c\)](#)):

- > caravan parks
- > boat marinas
- > demolition and construction sites.

The following low voltage installations must be verified by competent persons ([Regulation 75 \(1\)\(d\)\(e\)\(f\)](#)):

- > carnivals and fair grounds
- > hazardous areas
- > medical facilities.

### Warrant of electrical fitness

A warrant of electrical fitness, issued by an authorised person, is required prior to connecting or using electrical installation ([Regulations 76, to 78](#)) in a:

- > vehicle
- > relocatable building
- > pleasure vessel.

### RECONNECTION

If the installation has been disconnected for more than six months and no General or High-risk work is done, the person doing the connection must give or sight a Certificate of Verification (CoV) issued in accordance with Section 3 of AS/NZS 3019 that:

- > was issued no earlier than six months before the date of reconnection

- > verifies the installations are suitable for continued use, and
- > is given by a person authorised to certify mains work.

**PRIVATE DISTRIBUTION SYSTEMS**

The Regulations allow AS/NZS 3000 to be used for private works or distribution systems, for example low voltage wiring of a shopping centre that would otherwise be classified as ‘works’ (Regulation 37). The same principles as those described under the low voltage installations section of this guide apply.

**Note:** The Regulations in defining ‘safe’ and ‘unsafe’ express the principle that there is a zone between what is defined as being safe and what is defined as being unsafe. This zone provides scope for innovation between recognised safe practices and practices that are deemed to be unsafe.

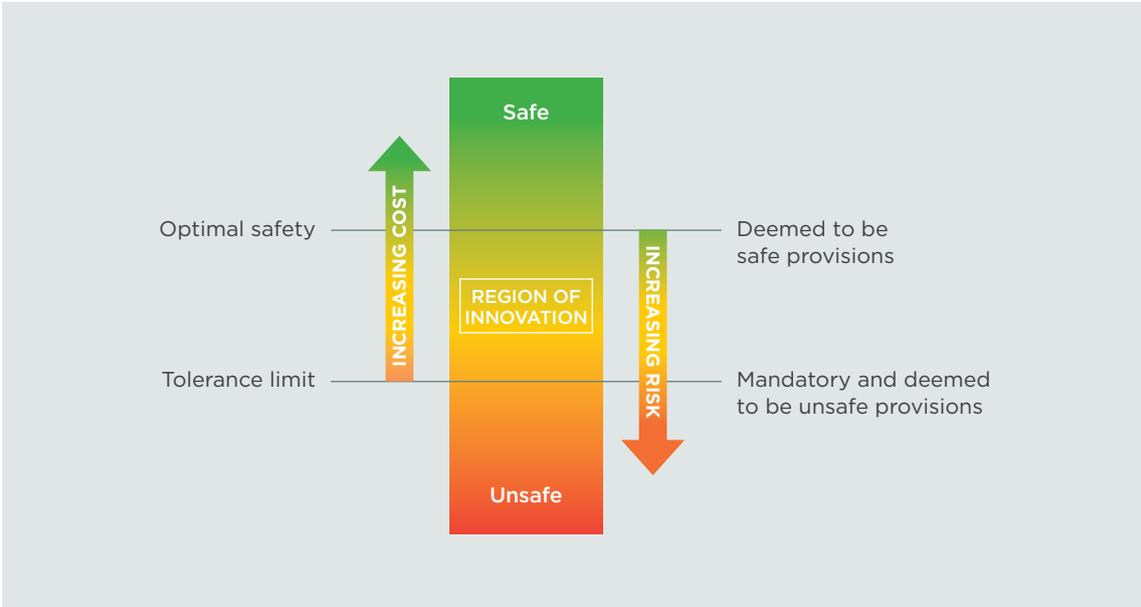


Figure 1: How the safety, risk and work architectures combine to produce a zone for innovation

**4.3 HIGH VOLTAGE INSTALLATIONS**

**GENERAL**

Unlike a low voltage installation, which is generally designed and constructed in accordance with technically prescriptive requirements, most high voltage installations are unique to their application and are designed according to electrical engineering safety principles. As a result, the Regulations set fundamental safety requirements only.

In addition, high voltage installations require planned ongoing maintenance and are often designed as a part of, or closely interact with, the electricity distribution system supplying them. As a result, the Regulations explicitly implement a number of measures that apply the same principles and practices across the supply systems/installations interface.

Reflecting the engineered installation philosophy, the Regulations achieve control through identifying the factors that need to be addressed during design and construction and by defining characteristics that are considered to be unsafe.

Installers of installations are responsible for ensuring the risks of injury to persons or damage to properties are minimised ([Regulation 62](#)).

This requirement applies to:

- > design
- > construction
- > maintenance.

### **DESIGN**

Anybody who designs, or supervises the design of, high voltage installations must ensure that the finished design would be electrically safe when it has been constructed, installed or manufactured.

- > A High Voltage installation must have a Certified Design ([Regulation 62](#)).
- > A certified design for installation PEW must:
  - identify the location of the installation
  - identify the Standards (if any) with which the installation PEW will comply
  - be signed and dated by the person who completed the design.

[Regulation 14](#) makes it an offence to complete a design – including supervision of the design – which, if constructed, would not be electrically safe.

In addition, measures must be put in place to do at least one of the following:

- > prevent accidental contact with exposed parts
- > provide automatic disconnection of power if a fault that would cause injury arises
- > prevent or limit electric current passing through the body of a person coming

into contact with any part of works or installations. The limits are set in the International Electrotechnical Commission (IEC) shock current standards ([Regulation 8](#)).

### **CONSTRUCTION**

Overhead lines and structures supporting them must be capable of withstanding, without damage, the likely static and dynamic loading; and must not become unsafe or dangerous to the public or to persons likely to work on them. If overhead line structures fail to meet these requirements they must be marked and repaired or replaced within 12 months (or three months if there is a risk of injury or damage to property) ([Regulation 41](#)).

High voltage conductors of overhead electric lines must be protected by earth fault protection fittings ([Regulation 44](#)).

Works and high voltage installations must be protected by an earthing system. Compliance with [ECP 35](#) or, in the case of a railway electrification system, IEC 62128-1 and BSEN 50122-1 ([Regulation 42](#)) is deemed to be acceptable.

Works and high voltage installation must be capable of being isolated from its supply of electricity. If the installation comprises separate parts, each part must have an isolation fitting to disconnect that part from its supply of electricity ([Regulation 43](#)).

Visible and durable notices reading ‘Danger Live Wires’ or equivalent warnings must be installed on all poles or supports carrying uninsulated conductors ([Regulation 45](#)).

The owner must keep records and plans of the installations ([Regulation 46](#)).

Certification must be carried out on high voltage installations ([Regulation 64](#)) using a Certificate of Compliance (CoC) ([Regulation 66](#)).

The installer on completion is required to provide a CoC ([Regulation 65](#)) for the work carried out as per the design and indicating this as required on the CoC.

**CONNECTION**

**INSPECTION**

Electrical work on installations that operate at high voltage must be inspected ([Regulation 70](#)).

Inspection, a third-party verification, must be carried out to ensure that the installation will be safe when connected to a supply and has been done in accordance with the Act and Regulations ([Regulation 71](#)).

Inspections can only be carried out by a person who is authorised by their registration and practising licence to carry out inspection work and who has not carried out, supervised or certified that work ([Regulation 71](#)).

The inspection may be carried out in accordance with the certified design and the applicable installation standards listed on the design.

The inspection of work done on a high voltage installation must verify that the installation complies with [ECP 34](#) and also with [Regulation 34](#), and [Regulations 41\(1\)](#), [42\(1\)](#), [43\(1\)](#) and [44\(1\)](#), as if references in those Regulations to works were references to high voltage installations.

On completion of an inspection the person who carries out the inspection must prepare a written RoI ([Regulations 72](#)).

Before any high voltage installation work can be connected to a supply, the person intending to make the connection must:

- > verify the completion of certification
- > have an electrical safety certificate (ESC), as this must be issued after the connections are carried out ([Regulation 74A](#)). When you have connected it and are satisfied that the tests, such as polarity,

are correct and it will be safe for use, sign off the ESC

**AND**

- > ensure that when connecting the power supply, it is subject to provisions of amendment [Regulation 73A \(2\)](#) of [Regulation 38 \(2\)](#)
- > be satisfied that tests have been carried out to ensure the electrical safety, the compatibility with the supply system, and the correct polarity, phase rotation and protection of the supply

**AND**

- > verify technical safety compliance of the supply ([Regulations 27 to 33](#)).

**PERIODIC VERIFICATION**

There is a requirement to implement a safety checking system ([Regulation 40](#)) that must:

- > verify compliance with all the requirements
- > occur periodically at reasonable intervals
- > ensure records of results are being kept.

**4.4 WORKS**

**GENERAL SAFETY OBLIGATIONS**

There is a general obligation on everyone who designs, constructs, maintains, uses or manages a distribution system to ensure the distribution system is safe.

Some general safety rules apply to all works, whether they are covered by a Safety Management System (SMS) or not:

- > The owner of works must ensure the works and fittings have adequate electrical protection against short circuits and earth faults ([Regulation 34](#)).
- > A person must not interfere with, move or attempt to move the works ([Regulation 35](#)).
- > Electricity generation facilities and substations of works and installations must be secured against access by unauthorised persons ([Regulation 36](#)).

- > Before any works on which Prescribed Electrical Work has been done are connected to a power supply, the person who does the connection must ensure that tests have been carried out to ensure the electrical safety, the compatibility with the supply system, and the correct polarity, phase rotation and protection of the supply ([Regulation 38](#)).

### REQUIREMENTS FOR THE SAFE SUPPLY OF ELECTRICITY

Distribution companies have a requirement within [Part 3 of the Electricity \(Safety\) Regulations 2010](#) to ensure electrical characteristics are not altered in a way that may cause danger to persons or property, and also with regard to:

- > voltage supply to installations ([Regulation 28](#))
- > frequency of electricity supplied ([Regulation 29](#)) requirements relating to safety of electricity supplied ([Regulation 30](#))
- > requirements relating to quality of supply ([Regulation 31](#))
- > protection against fault currents ([Regulation 32](#))
- > requirements relating to construction of, or work in vicinity of, telecommunications equipment ([Regulation 33](#)).

### SAFETY MANAGEMENT SYSTEMS (SMS)

Safety Management Systems (SMS) create an environment where all aspects of the design, construction and operation of a electricity supply system are subject to third party audit and certification. This allows the owner or operator of the electricity supply system to fulfil their legal obligations for safety in a rigorous manner while at the same time allowing a certain amount of flexibility in their implementation.

Electricity generators and electricity distributors that own or operate an electricity supply system must implement and maintain safety management systems. Owners or operators of other works may opt in to having a SMS in order to meet their obligations to ensure safety.

SMSs must either comply with NZS 7901 or [Regulations 49 and 50](#).

Electrical Supply Systems must have a Safety Management System (SMS) implemented and maintained by a safety management system operator. The SMS ensures that all practicable steps are taken to prevent the electricity supply system (Electricity Act 1992 – Section 61A) or works from presenting a significant risk of:

- > serious harm to a person
- > significant damage to property.

Each SMS must be fully documented and provide for:

- > the systematic identification of hazards
- > the assessment of hazards
- > the steps to be taken to eliminate, isolate, or minimise hazards and to mitigate risks from those hazards
- > the assessment of the effectiveness of this risk management
- > the investigation of accidents
- > the enhancement of safety performance throughout the system including performance measurement
- > an audit programme.

Every SMS must be regularly audited by an accredited auditor to confirm it is being implemented and maintained in compliance with these requirements ([Regulation 51](#)).

The requirement for an SMS to have been audited came into force on the 1 April 2012.

Operators of SMS are required to provide WorkSafe with a statutory declaration at least once every five years to confirm the operator has a current audit certificate ([Regulation 53](#)).

The first such statutory declaration must be made and sent to WorkSafe within six months of the first audit of the SMS.

Auditors must not issue an audit certificate without being satisfied that the conditions are being met. They are required to cancel the audit certificate for an SMS if the requirements for an SMS are not met, or if WorkSafe directs cancellation on the grounds that the SMS is not being implemented ([Regulation 54](#)).

#### WORKS NOT COVERED BY SMS

Works that are not covered by an SMS must meet the requirements of [Regulations 40 to 46](#). These Regulations require owners and operators to ensure the safety of their works by ensuring:

- > adequate records and plans are kept up to date
- > these works are designed, constructed, maintained and operated in a manner that achieves continuity of supply and safety of the distribution systems
- > overhead electric lines are constructed to support structural design loads with no risk of failure or injury to persons
- > the works are protected by an earthing system
- > the works are capable of being isolated from its supply of electricity
- > high voltage conductors of overhead electric lines are protected by earth fault protection fittings that interrupt fault currents to earth in five seconds or less
- > notices reading 'Danger Live Wires' are affixed, and maintained on all poles that carry uninsulated conductors.

## 4.5 OPERATIONAL SAFETY

[Regulation 5](#) defines the meaning of electrically safe and unsafe.

If overhead line structures are damaged or unsafe, the owner must repair or replace them within the maximum timeframe set by [Regulation 41](#) depending on their condition.

#### DEFINING UNSAFE WORKS AND INSTALLATIONS

[Regulation 20](#) defines electrically unsafe works and installations.

Works and installations are unsafe if:

- (a) the characteristics of any fittings used in the works or installations are impaired; or
- (b) conductors are inadequately identified; or
- (c) where colour is used to identify conductors in a standard low voltage domestic installation that is being installed (other than in light fittings, connections to appliances, and wiring within a fitting),—
  - (i) the neutral conductor is identified by any colour except black; and
  - (ii) black is used to identify a conductor other than the neutral conductor; or
- (d) connections between conductors, and between conductors and other fittings, are not secure and reliable; or
- (e) fittings are installed in such a way that any designed cooling conditions are impaired; or
- (f) fittings that cause or are subject to high temperatures or electric arcs are placed in such a position, or are unguarded, so as to create a risk of ignition of flammable or explosive materials or of injury to persons or damage to property; or

- (fa) any refrigerant used in the works or installation, or used in any fittings or appliances in the works or installation, is substituted with a refrigerant other than a refrigerant with which the works, installation, or fitting—
  - (i) is designed to operate (including one of higher toxicity or lammability); or
  - (ii) has been adapted to operate safely; or
- (fb) the works or installation, or any fitting or appliance in the works or installation, is retrofitted with a refrigerant other than one with which it has been designed to be retrofitted; or
- (fc) in the case of a domestic installation, any safety or security function of the installation that needs electricity to operate has no manual override in the event of an interruption in the supply of electricity; or
- (g) cables (including underground cables) are inadequately protected against the risk of damage by the nature of their covering or their method of installation; or
- (h) cables are bent beyond their design criteria; or
- (i) there is insufficient space, access, and lighting to operate, maintain, repair, test, and inspect all fittings of the works and installations (other than cables and buried parts of earthing systems) in a safe manner.

In addition, measures must be put in place to do at least one of the following:

- > prevent contact with exposed parts (Regulation 16 and 17)
- > provide automatic disconnection of power if a fault that would cause injury arises
- > prevent or limit (International Electrotechnical Commission shock current Standards) electric current passing through the body of a person on contact of any part of the works or installations.

### SAFETY SIGNAGE IS REQUIRED WHEN CARRYING OUT PRESCRIBED ELECTRICAL WORK

#### SAFETY SIGNAGE



If there is a danger from electricity during the installation work, signage is required ([Regulation 18A](#)).

The purpose of this sign is to identify to the public that the environment they are entering is not the normal environment they may be used to and that they should take extra care. For example parents should supervise their children more closely.

The signage does not remove the obligation for safety applying to the person who has control of the installation under [Regulation 16](#) or the electrical workers under [Regulation 13](#).

#### SAFETY CHECK

A person who owns or operates works, installations, fittings, or appliances must not use, and must not allow anyone to use, the works, installations, fittings, or appliances if they are electrically unsafe ([Regulation 15](#)). This includes rental, fire and leasing situations.

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## **SAFETY OF GAS INSTALLATIONS AND GAS DISTRIBUTION SYSTEMS**

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### **IN THIS SECTION:**

- 5.1 General safety requirements**
- 5.2 General and mobile installations**
- 5.3 Compressed natural gas (CNG) stations**
- 5.4 Certification**
- 5.5 Gas distribution systems**

## 5.1 GENERAL SAFETY REQUIREMENTS

There is a general obligation on every person who commissions, imports, installs or tests a gas installation or gas distribution system to ensure that the gas installation or gas distribution system is safe. There is a general obligation on everyone who designs, constructs, maintains, uses or manages a distribution system to ensure the distribution system is safe. Owners and operators of gas supply systems are required to implement and maintain a Safety Management System (SMS).

The majority of technical rules for installations are contained within AS/NZS 5601 the manufacturer's instructions. This includes testing and commissioning. Requirements for certification are contained in the Regulations.

STAGE	INSTALLATION	DISTRIBUTION
DESIGN	Decide whether the design complies with means of compliance in installation Standard ( <a href="#">Reg 44</a> ) General Safety requirements ( <a href="#">Reg 9</a> ) A certified design ( <a href="#">Reg 43</a> ) is required if it relies on other means of compliance than those in the installation Standard (5601.1 and 5601.2)	<b>General Safety requirements</b> ( <a href="#">Reg 9</a> ) Must take into account whether installation will operate under Safety Management System (SMS)
	Performance requirements modified for installations with design capacity more than 60,000 MJ/h General requirements and technical rules follow either means of compliance or essential requirements, and any Certified Design	
CONSTRUCTION	Testing: Test the installation as per <a href="#">Reg 45</a> <b>Certification</b> Certify work ( <a href="#">Reg 46 to 50</a> ) CoC not required for low-risk gasfitting Details of CoC for high-risk gasfitting to be entered on database ( <a href="#">Reg 52H</a> )	With SMS <a href="#">Reg 29 to Reg 40</a> Without SMS <a href="#">Reg 25 to Reg 28</a>
CONNECTION	<b>Safety check</b> Verify installation is safe to connect and relevant testing and checking done ( <a href="#">Reg 51</a> ) Reconnection if disconnected for more than six months ( <a href="#">Reg 52A</a> ) Issue Gas safety Certificate (GSC) after connection ( <a href="#">Reg 52B to 52E</a> )	Operation (Supply) General requirements for odourisation and quality ( <a href="#">Reg 16-19</a> and <a href="#">41-42</a> )

**Table 4:** Overview for stages of gas work

## 5.2 GENERAL AND MOBILE INSTALLATIONS

### DEFINITION

Installations include domestic and commercial installations such as offices, shops, gymnasiums and sports complexes, as well as smaller industrial installations.

### DESIGN AND CONSTRUCTION

#### PERFORMANCE REQUIREMENTS

Anyone who designs, commissions, installs, tests or imports a gas installation must ensure it complies with AS/NZS 5601.1 Section 2 or AS/NZS 5601.2 Section 2, (whichever is the applicable standard). This applies to the full installation, and any part, extension, addition or replacement of an installation.

The performance or essential requirements in Section 2 of the respective standards express the safety objectives that are to be achieved for gas installations. They cover materials and components, design and construction for the completion of gas installations, including appliances and flueing requirements.

Anyone who designs, constructs, maintains, uses, or manages a distribution system or gas installation must ensure that it will be safe to use – [Regulation 9](#).

#### MEANS OF COMPLIANCE

AS/NZS 5601.1, sections 3 to 6, and AS/NZS 5601.2, sections 3 to 9, give means of compliance with the essential requirements for general gas installations and for caravans and boats respectively. It can also provide guidance for simple installations of higher gas consumption.

The means of compliance result in installations that meet the essential requirements or safety objectives of Section 2.

Topics covered in the means of compliance include materials and components, installing pipe work, installing gas equipment and appliances, ventilation and flueing, and testing and commissioning.

Any person who designs, installs, commissions or tests a gas installation or part of an installation that is not in a caravan or boat, must do so in accordance with AS/NZS 5601.1.

Section 2 states that anyone who deviates from the standard's means of compliance sections must still meet the levels of safety, convenience and efficiency set out in the standard and they must document the design and keep a record for seven years. The GSMRs require a certified design where an alternative to the means of compliance is applied.

Alternative means of compliance may be used. A certified design ([Regulation 43](#)) is required and must contain the signature of the person who did the design, the date of the design and Standards to which the installation will comply.

The ability to use alternative means of compliance allows flexibility in the selection of relevant Standards or industry Codes to suit each particular application and ensure that the performance requirements are met. This includes:

- > materials and components
- > installing pipe work
- > installing gas equipment and appliances
- > ventilation and flueing
- > testing and commissioning.

When using alternative means of compliance, practitioners must ensure that the means of compliance used fully address the performance requirements.

### SAFETY OF INSTALLATIONS

There is a general obligation on everyone who owns, supplies, sells or operates a gas installation to not use or allow another person to use the gas installation if it is unsafe ([Regulation 9](#)).

### REPAIRS TO APPLIANCES

Every person who repairs, modifies, or makes adjustments to an appliance must ensure that it is safe in all reasonably foreseeable circumstances and meets the technical requirements of NZS 5266 before returning it to service. [Regulation 11](#), [13](#) and [Regulation 74\(2\)](#) indicates circumstances in which an appliance can be considered unsafe [Regulation 74](#).

## 5.3 COMPRESSED NATURAL GAS (CNG) STATIONS

### DEFINITION

Compressed Natural Gas (CNG) is methane-based gas compressed for storage or use outside a gas transmission or distribution system. CNG is used as a vehicle fuel. CNG stations are gas installations subject to Part 7 of the Gas Regulations. Such CNG installations are subject to additional inspection, training and records requirements as described at the end of this section.

### DESIGN AND CONSTRUCTION

CNG stations must be designed and constructed to be safe and NZS 5425 provides means of compliance.

### SAFETY OF CNG STATIONS

There is a general obligation on everyone who owns, supplies, sells or operates a gas installation, that they must not use or allow another person to use the gas installation if it is unsafe ([Regulation 9](#)).

[Regulation 80](#) detail specific requirements to maintain CNG stations in a safe condition and ensure they are operated safely. [Gas Code of Practice \(GCP\) 2](#) is deemed compliance with this Regulation.

### OPERATION AND PERIODIC INSPECTION

#### OPERATOR TRAINING

Operators of CNG stations must ensure that vehicles are refuelled at the station by or in the presence of a person who has received training in safety requirements specified in [Schedule 3](#) of the Gas Regulations.

#### IN SERVICE SAFETY INSPECTION

Because CNG installations represent a higher risk, they must be inspected on a periodic basis.

Inspections must be carried out:

- > at least once every two years
- > by a competent organisation
- > in accordance with [GCP 2](#).

A CNG Station CoC in the form specified in [Schedule 4](#) of the Regulations must be issued.

#### RECORDS

The Gas Regulations detail specific requirements for operators of CNG stations to maintain records in relation to measurement systems, pressure limiting devices and staff training.

## 5.4 CERTIFICATION

Licensed certifying gasfitters are responsible for certifying their own work and the work of those under their supervision.

#### WHAT MUST BE CERTIFIED?

All gasfitting work must be certified.

There are three categories of gasfitting work: low-risk, high-risk and general gasfitting ([Regulation 5A](#)).

The certification required depends on the risk category. General and high-risk gasfitting requires a Certificate of Compliance (CoC). A CoC may also be issued for low-risk gasfitting, but is not required ([Regulation 46](#)).

#### CERTIFICATES OF COMPLIANCE (CoC)

The CoC identifies the work that has been completed and who is responsible for that work.

It confirms that the gasfitting has been done lawfully and safely ([Regulation 47](#)) and must contain the information specified in [Regulation 48](#).

A CoC is issued by the relevant person identified in [Regulation 49](#).

Gasfitting work is not considered complete until a CoC is issued for it.

#### TESTING AND CONNECTION

‘Connection’ is defined in the Gas Regulations as gasfitting that provides a gas supply to an installation or gasfitting that would lead to gas being supplied to an installation by another activity. Connecting an installation’s pipework to a gas meter or providing a pigtail on an LPG installation (to allow another person to connect the cylinder) would be ‘connection’.

The Gas Regulations place obligations on those responsible for connecting a gas installation (including a CNG station) to a gas supply. In most cases, the person doing the connection must:

- > be satisfied the installation or part installation is safe to connect
- > be satisfied the connection is safe
- > ensure the required testing has been done
- > once connected, ensure the installation is operating in a safe manner
- > be satisfied the installation is compatible with the gas supply and
- > ensure that safety devices associated with the supply are correctly rated and are operational.

Where gasfitting that requires certification has been done, the person connecting must either:

- > certify the work or
- > sight a relevant CoC no older than six months before the date of connection.

Where the installation is an imported installation, ensure the installation complies with Section 2 of AS/NZS 5601.1 or AS/NZS 5601.2 (whichever is applicable).

#### RECONNECTION WHERE NO GASFITTING HAS OCCURRED

If the installation was last disconnected less than six months previously and no gasfitting has occurred, then the connection requirements outlined above do not apply. The gas installation may be reconnected provided the installation will operate safely once reconnected to the gas supply.

If the period since the last connection or isolation is more than six months, the person proposing to reconnect or restore supply must issue or sight a certificate issued in accordance with NZS 5255 that certifies the installation is suitable for continued use ([Regulation 52A](#)).

In these cases, the person doing the reconnection may rely on written confirmation from the owner of the installation that no gasfitting has been done since it was last disconnected.

#### GAS SAFETY CERTIFICATE (GSC)

A Gas Safety Certificate (GSC) is required for all gasfitting once completed and connected to gas supply ([Regulation 52B](#)).

The GSC states the gas installation or part installation is safe to use and complies with the regulations. Where the gasfitting comprises maintenance to, alteration of or addition to a gas installation or part installation the person must be satisfied that the work has not adversely affected the safety of the installation. The contents of the GSC are specified in [Regulation 52B](#).

**Time for issue of GSC**

Gas Safety Certificates must be issued as soon as practicable after connection and, in any case, within 20 days ([Regulation 52E](#)).

**What happens to Certificates**

CoCs and GSCs must be:

- > given to the person who contracted for the work to be done
- > retained for a minimum of seven years
- > must be supplied on request
- > See [Regulation 52B](#) and [52I](#)

Details of CoCs for the high-risk gasfitting must be lodged on the high-risk database by the person who issued the CoC within 20 days ([Regulation 52H](#)).

**CESSATION OF SUPPLY**

If a gas supplier (wholesaler or retailer) becomes aware that a gas installation is unsafe, that supplier may cease supply of gas to the installation.

If a person is proposing to certify an installation as being suitable for reconnection ([Regulation 52A](#)) or a person is proposing to issue a GSC for the work they have carried out ([Regulation 52B](#)) and they are not satisfied that the installation is safe then that person must immediately disconnect the gas supply from the installation or part installation.

A certifier may not withhold certification.

If a homeowner requests the GSC the certifier must provide the certification within seven working days otherwise he commits an offence.

**5.5 GAS DISTRIBUTION SYSTEMS****DEFINITION**

Natural gas transmission systems transport natural gas that must meet NZS5442 ([Regulation 41](#)) from a production facility to distribution systems and end users.

Natural gas distribution systems take gas from

the point at which the transmission system delivers gas to the 'city gate' station to various consumer points of supply. Transmission systems and distribution systems are generally constructed of either metal or plastic to specific standards. Transmission systems are operated at pressures upwards of 2000 kPa. Distribution systems can be operated at various pressures that are typically up to about 400 kPa.

Liquefied Petroleum Gas (LPG) is supplied by bulk tanker or in cylinders to supply depots and consumer installations. When stored and supplied in bulk, LPG is in liquid form. It is vaporised by withdrawal from the tank or cylinder.

While most LPG supplied in New Zealand is delivered in bulk form or in cylinders, there are some small LPG reticulation systems in the South Island. LPG must meet *NZS 5435 Specification for Liquefied Petroleum Gas (LPG)* ([Regulation 41](#)).

**SUPPLY PRESSURE, GAS QUALITY AND ODOUR**

The gas pressure available to each installation must be sufficient for the safe supply and use of gas at that installation ([Regulation 42](#)). Gas suppliers are responsible for ensuring consumers have sufficient supply pressure. In practice, suppliers will indicate the supply pressure available.

In order to ensure that the gas supplied is suitable for appliances available in New Zealand, the gas supplied must meet the relevant specification. For natural gas, this specification is *NZS 5442 Specification for reticulated natural gas*.

Gas supplied into distribution systems must have a distinctive and unpleasant odour so that the presence of gas in the atmosphere is readily detectable ([Regulation 16 to 19](#)). This requirement is fundamental to the way safety for gas supply and use is achieved.

## GAS MEASUREMENT

The Regulations specify limits for accuracy of measurement of gas for revenue purposes. The requirements of NZS 5259 Gas measurement must be met unless there is written agreement between the seller and the purchaser (Regulations 21 to 23).

## DESIGN, CONSTRUCTION AND OPERATION

### SAFETY OF DISTRIBUTION SYSTEMS

There is a general obligation on everyone who designs, constructs, maintains, uses or manages a distribution system to ensure the distribution system is safe (Regulation 9).

### SAFETY MANAGEMENT SYSTEMS (SMS)

A gas supply system is the distribution system plus any related installations, appliances and fittings that form part of a system for conveying gas to consumers (Section 46A of the Gas Act).

Owners and operators of gas supply systems that supply or are intended to supply annual consumption greater than 10 TJ of gas per year are required to implement and maintain an audited Safety Management System (SMS).

SMSs create an environment where all aspects of the design, construction and operation of a gas supply system are subject to third party audit and certification. This allows the owner or operator of a gas supply system to fulfil their legal obligations for safety in a rigorous manner while at the same time allowing a certain amount of flexibility in their implementation.

A safety management system (SMS) is implemented and maintained by a safety management system operator. The SMS ensures that all practicable steps are taken to prevent the gas supply system from presenting a significant risk of:

- > serious harm to a person
- > significant damage to property.

Owners or operators of other distribution systems that are not gas supply systems may opt in to having an SMS in order to meet their obligations to ensure safety.

The requirements for a SMS are stated in Regulations 32 to 40.

SMSs must either comply with NZS 7901 or Regulations 33 and 34.

### **Each SMS must be fully documented and provide for:**

- > the systematic identification of hazards
- > the assessment of hazards
- > the steps to be taken to eliminate, isolate, or minimise hazards and to mitigate risks from those hazards
- > the assessment of the effectiveness of this risk management
- > the investigation of accidents
- > the enhancement of safety performance throughout the system including performance measurement
- > an audit programme.

Every SMS must be regularly audited to confirm it is being implemented and maintained in compliance with these requirements.

Operators of SMSs are required to provide WorkSafe with a statutory declaration at least once every five years to confirm the operator has a current audit certificate.

The first such statutory declaration must be made and sent to WorkSafe within six months of the first audit of the SMS.

Auditors are required to cancel the audit certificate for an SMS if the requirements for an SMS are not met, or if WorkSafe directs cancellation on the grounds that the SMS is not being implemented.

#### DISTRIBUTION SYSTEMS NOT COVERED BY SMS

Distribution systems that are not covered by an SMS must meet the requirements of [Regulations 25 to 28](#). These Regulations require owners and operators of distribution systems to ensure the safety of their systems by ensuring:

- > adequate records and plans are kept up to date
- > these systems are designed, constructed, maintained and operated in a manner that achieves continuity of supply and safety of the distribution systems
- > competence of all persons who carry out work on the system and
- > regular inspections of the systems.

Compliance with New Zealand Standard NZS 5258 *Gas distribution networks* or Australian New Zealand Standard AS/NZS 4645 *Gas distribution networks* is cited by the Regulations as providing technical detail that is intended to ensure the safety of the distribution system.

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## **AUDITS AND ENFORCEMENT**

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### **IN THIS SECTION:**

- 6.1 Monitoring accidents, incidents and alerts**
- 6.2 Audits and inspections**
- 6.3 Enforcement**

## 6.1 MONITORING ACCIDENTS, INCIDENTS AND ALERTS

Regular monitoring of electrical and gas installations and networks through audits and inspections is Energy Safety's proactive approach to maintaining the compliance framework and promoting the appropriate steps to compliance. This minimises the likelihood of unsafe installations and networks operating in New Zealand, as well as the costs associated with compliance action.

Our approach to market monitoring is to:

- > ensure that electrical and gas installations and works and distribution systems comply with the Regulations
- > strengthen relationships with the electrical and gas designers, installers and operators through education
- > strengthen relationships with electrical and gas network owners and operators
- > improve Energy Safety's understanding of the marketplace
- > maintain the value of a safe electrical and gas installation safety environment in New Zealand
- > maintain the integrity of the installations and networks safety regime
- > provide a level playing field for operators
- > target non-compliance.

## 6.2 AUDITS AND INSPECTIONS

### WHO CAN BE AUDITED BY ENERGY SAFETY?

Anyone who designs, installs and/or operates electrical or gas installations and imports or sells appliances in New Zealand can be audited.

Energy Safety works with installers, owners and operators throughout the audit and investigation process to initiate proactive education strategies and audit programmes that enhance our effectiveness as a safety regulator.

### WHAT ARE THE SELECTION CRITERIA?

The selection criteria 'for audits' undertaken by Energy Safety are based on:

- > operator risk assessment
- > installation or network risk assessment
- > complaints, incidents and accidents
- > advice from other regulatory agencies
- > type of operator
- > regional spread.

If you have concerns about any electrical or gas installation, please complete our online [Installation Fault Notice Form](#), or call our free phone number 0800 030 040.

### ACCIDENTS AND INCIDENTS

Where an accident or incident involving an installation or network occurs that is considered significant, or where installation compliance is drawn into question, Energy Safety may at the time of investigation:

- > require the designer, installer or operator to provide information relating to installation safety or compliance
- > require the designer, installer or operator to undertake specific remedial action
- > require the network to cease supply of electricity and gas.

Any subsequent action will follow Energy Safety's compliance and enforcement procedures.

### ALERTS

Energy Safety maintains a number of co-operation arrangements with other regulatory agencies where information on safety compliance is exchanged and surveillance activities are carried out co-operatively.

Based on information exchanged, investigations may be carried out or direct enforcement action implemented.

In some cases, information from industry participants is brought to the attention of Energy Safety for assessment and follow-up action.

### THE AUDIT PROCESS

If you are selected for a planned electrical or gas installations audit, Energy Safety will give you reasonable notice. Spot audits may also occur without advanced notice during business hours. When Energy Safety visits, you will need to provide:

- > details of the appropriate contact person authorised to respond on behalf of the business
- > details of your business eg registered company, partnership
- > documentation about design and construction of the installation, works or distribution systems
- > evidence of testing and other requirements prior to connection (such as Certificate of Compliance, Warrant of Electrical Fitness)
- > documentation about maintenance (Safety Management Systems (if required) and record of periodic inspection)
- > evidence of general safety requirements.

### OUTCOME OF AUDITS

Energy Safety will advise the outcome when all elements of the audit have been considered. At the time of an audit, a verbal explanation will be given which may include advice to cease operation.

If the audit has been deemed unsatisfactory, Energy Safety will advise of the problem(s) requiring remedy and compliance action may include issuing an Infringement notice or Prosecution.

## 6.3 ENFORCEMENT

### ASSESSMENT PROCESS

Enforcement of electrical and gas installations, networks and works safety is based on Energy Safety's observations and assessment of the market. Energy Safety operates in a fair and consistent manner when dealing with non-compliance.

Non-compliance is based on evidence and circumstance to determine the appropriate action required. The action may be a Warning, Infringement notice, Prosecution, and/or Prohibition or Urgent Instruction. A variety of factors are considered for their impact on public safety and care, including:

- > severity of the offence
- > impact of the offence
- > co-operation, attitude and behaviour
- > operational implications
- > risk to consumers and members of the public.

If the impact from the assessment indicates that non-compliance is sufficiently serious, or there is a previous history of non-compliance, Energy Safety may issue an Infringement notice directly after the investigation or audit.

Energy Safety will also consider what action(s) may be necessary to correct the non-compliance. This may include issuing an Urgent Instruction. Failure to comply with the Urgent Instruction may result in Prosecution.

### WARNINGS AND ADVISORIES

A Warning notice will outline:

- > the offence observed
- > the remedial action to take.

The Warning notice may be accompanied by advice to cease use and remedy.

A follow-up audit may be made to monitor compliance with the Regulations and any remedial action required.

If remedial action is not taken within the specified timeframe, Energy Safety may escalate the enforcement to ensure protection of the public and property.

### Warnings

While an Infringement notice may follow from an unresolved Warning notice, there is no requirement to give a Warning notice first.

### INFRINGEMENT NOTICES

Regulations 10, 11 and 12 of the Electricity (Safety) Regulations and Regulations 6, 7 and 8 of the Gas (Safety and Measurement)

Regulations define Level 2 and 1 offences, strict liability offences and infringement offences.

There are two levels of offences, and many of the offences are strict liability offences where the Crown does not have to prove an intent to fail to comply, but merely show that the situation discovered clearly demonstrates non-compliance.

The Regulations provide significant penalties, including 'instant fines', for those who fail to comply with their requirements.

An infringement fee is an instant fine of:

- > For an individual
  - \$1,000 for a Level 2 offence.
  - \$500 for a Level 1 offence.
- > For a body corporate\*
  - \$3,000 for a Level 2 offence.
  - \$1,000 for a Level 1 offence.

An Infringement notice will be issued in the form specified in Schedules of the Regulations, and will outline:

- > the relevant infringement offence
- > your rights and obligations
- > the amount of the Infringement fee and
- > the address for payment of the Infringement fee.

Paying an Infringement fee will not exempt you from having to carry out any remedial action. Continuing to commit an offence may result in further notices or prosecution.

If the impact assessment made by Energy Safety indicates that the effect of non-compliance is sufficiently serious, or a previous history of non-compliance exists, an Infringement notice may be issued directly following an investigation or audit. For example, a serious breach would be to connect an installation without first verifying its safety.

Notices include an explanation of the recipient's responsibilities and rights so should be read carefully and advice should be sought if necessary.

Infringement notices and other enforcement notices do not require a preliminary warning. Infringement notices are issued where the effect of the non-compliant situation is sufficiently serious, or a previous history of non-compliance exists.

### OFFENCES AND PROSECUTIONS

Energy Safety may take Prosecution action rather than issue an Infringement notice. This will usually happen when this is considered necessary for deterrent effect or when an Infringement notice has not achieved correction of a non-compliance situation. This will be considered on a case by case basis.

Every individual or body corporate who commits an offence shall be liable on summary conviction to a fine not exceeding:

Level 1 penalty:

- > \$2,000 in the case of individuals
- > \$10,000 in the case of a company or body corporate.

Level 2 penalty:

- > \$10,000 in the case of an individual

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\* A body corporate includes (but is not limited to) organisations such as companies, incorporated societies and charitable trust boards.

- > \$50,000 in the case of a company or other body corporate.

Offences under the Electricity Act and Gas Act may attract other penalties.

**PROHIBITIONS AND URGENT INSTRUCTIONS**

If it is determined that a serious safety risk is occurring or could occur, then a Prohibition or an Urgent Instruction may be issued.

A Prohibition or Urgent Instruction may:

- > require operation of the installation to cease
- > alert the public of safety risks
- > specify that an instruction be carried out within a stipulated way.

Failing to comply with a Prohibition or Urgent Instruction, may result in a Prosecution and is a Level 2 offence.

The person to whom the instruction is issued is responsible for the costs of complying with an Urgent Instruction.

**DEFINITION OF SAFE AND UNSAFE**

In respect of enforcement, it is important to understand that the defined terms of ‘safe’ and ‘unsafe’ are not opposites, but are better understood as defined points on a spectrum of risk of harm or damage to property. Non-compliance with a recognised specification does not immediately imply that safety is compromised. However, it is critical that workers familiarise themselves with the contents of the Regulations that specifically describe what is deemed to be unsafe, as these are the most likely drivers of enforcement.

- > **for electricity**, Regulations 5 and 20 to 26 explain what is meant by ‘electrically safe’ and ‘electrically unsafe’.
- > **for gas**, Regulations 4 and 11 to 14 explain what is meant by ‘safe’ and ‘unsafe’.

Regulation 20 of the Electricity Regulations defines electrically unsafe works and installations. Works and installations are unsafe if:

- > the characteristics of any fittings are impaired
- > the conductors are inadequately identified (eg the neutral conductor must be black/black and must not be used for any other conductor)
- > the connections are not secure and reliable
- > cooling conditions are impaired
- > there is a risk of ignition (eg fittings subject to high temperature unguarded)
- > cables are not protected against the risk of damage or are bent beyond their design criteria
- > there is insufficient space to work on the installations safely.

The Regulations also define:

- > unsafe low voltage fittings – Regulation 22
- > unsafe appliances – Regulation 23
- > unsafe RCDs – Regulation 24.

Regulation 11 of the Gas Regulations define unsafe distribution systems or gas installations. Works and installations are unsafe if:

- > Measures are not in place to ensure:
  - a release of gas is detectable or ignition of release is prevented
  - gas is not released in an uncontrolled manner
  - that any oxygen and gas is prevented from mixing in a pipe
  - persons are not exposed to harmful products of combustion of gas
  - persons and property are not exposed to excessive forces
  - the failure of any control or safety device does not expose the downstream equipment to excessive pressure above the rated pressure of any distribution system and equipment downstream of that control or safety device

- the effective isolation and shut-off of the gas supply, including during an emergency.
  - > the safety-related characteristics of any fittings are impaired.
  - > the pipes, fittings and joints are inadequate and unreliable
  - > the fittings are leaking or are hazardous when operated in a manner that is hazardous when the fittings are exposed to any reasonably foreseeable torques, pressures, or chemical or physical conditions
  - > the fittings are exposed to a pressure exceeding their maximum rated pressure
  - > a pipe or fitting is inadequately protected against the risk of damage or corrosion; or subject to forces beyond its design criteria; or there is insufficient space, access, lighting, ventilation, or facilities to operate, maintain, test, and inspect any fittings required to be operated, maintained, tested, or inspected; or
  - > fittings subject to high temperatures can create a risk of ignition of flammable materials or a risk of injury to persons or damage to property.
- (ii) the defendant's conduct was reasonable in the circumstances; and
  - (iii) the effects of the action or event were adequately mitigated or remedied by the defendant after it occurred; or
- (b) that the action or event to which the prosecution relates was due to an event beyond the control of the defendant (such as natural disaster, mechanical failure, or sabotage) and
    - (i) the action or event could not reasonably have been foreseen or been provided against by the defendant; and
    - (ii) the effects of the action or event were adequately mitigated or remedied.

### SPECIAL CIRCUMSTANCES

The Regulations recognise circumstances in which non-compliance could be accepted.

Both [Regulation 11\(3\)](#) of the Electricity Regulations and [Regulation 7\(3\)](#) of the Gas Regulations state:

It is a defence to a prosecution for an offence to which this subclause applies if the defendant proves—

- (a) that—
  - (i) the action or event to which the prosecution relates was necessary for the purpose of avoiding serious harm to any person, or preventing significant damage to property; and

### EXAMPLES OF ELECTRICITY OFFENCES

#### OFFENCES RELATING TO DESIGN AND INSTALLATION

- > Completing a design - including supervision - which if constructed would be unsafe ([Regulation 14](#)).
- > Installing a low voltage installation without a valid DoC ([Regulation 57](#)).
- > When installing a low voltage installation, failing to comply with either Part 1 ([Regulation 59](#)) or Part 2 ([Regulation 60](#)) of the Wiring Rules.

#### OFFENCES RELATING TO CONNECTION

- > Failing to verify safety before connection ([Regulation 73](#)) or reconnection ([Regulation 74](#)) of an installation.
- > Connecting an installation to an inadequate system of supply of electricity ([Regulation 27](#)).
- > Supplying electricity with incorrect voltage ([Regulation 28](#)) or incorrect frequency ([Regulation 29](#)).
- > Failing to take reasonable steps to limit levels of fault currents ([Regulation 30](#)).

- > Failing to install fittings to protect against fault currents ([Regulation 32](#)).
- > Not verifying electrical safety after constructing, manufacturing, assembling, installing, connecting, maintaining, testing, certifying, or inspecting an installation or part of it ([Regulation 13](#)).
- > Using – or letting anyone use – installations known to be unsafe ([Regulation 15](#)).
- > Failing to:
  - minimise risk of contact with live conductive parts ([Regulation 16](#))
  - maintain safe distances in accordance with ECP 34 ([Regulation 17](#)).
- > Signing a declaration of conformity which is incorrect ([Regulation 58](#)).
- > Failing to use the correct socket outlets ([Regulation 61A](#)).

**OFFENCE RELATING TO WORKS**

- > Failing to ensure that the works:
  - are designed, constructed, and maintained to minimise the risk of injury to persons or damage to property from the expected structural loading ([Regulation 41](#))
  - are protected by an earthing system ([Regulation 42](#))
  - are capable of being isolated from its supply of electricity ([Regulation 43](#)).
- > Failing to carry out tests to verify electrical safety of works before connecting to supply ([Regulation 38](#)).
- > Failing to ensure that the works have adequate electrical protection against short circuits and earth faults ([Regulation 34](#)).
- > Failing to implement a safety checking system for regularly checking the compliance of the works ([Regulation 40](#)).
- > Failing to ensure that:
  - high voltage conductors of overhead electric lines are protected ([Regulation 44](#))

- Durable notices reading ‘Danger Live Wires’ or equivalent are affixed ([Regulation 45](#)).

**OFFENCES RELATING TO PERFORMING ELECTRICAL WORK**

- > Failing to ensure that people and property are protected from dangers arising from electrical work ([Regulation 13](#)).
- > Failing to follow safety responsibilities when carrying out work ([Regulation 14](#)).
- > Failing to notify owner or occupier and WorkSafe of danger if electrical worker has reasonable grounds to believe there is an immediate risk of danger to life or property ([Regulation 19](#)).

**OFFENCE RELATING TO INSPECTION**

- > For an accredited auditor to:
  - issue an audit certificate for a SMS without being satisfied of compliance with [Regulation 51\(1\)\(a\)](#)
  - failing to cancel an audit certificate if not satisfied of compliance
  - failing to issue a notice of cancellation, or give a copy of the notice ([Regulation 56](#)).
- > Inspecting an installation without being authorised or competent to do so ([Regulation 75](#)).

**OTHER OFFENCES**

- > Failing to comply with urgent instructions, orders, or requirements ([Regulation 110](#)).

**Examples of Level 1 offences:**

**OFFENCES RELATING TO NOTICES, SIGNS AND RECORDS**

- > Failing to maintain notices where high voltages used, generated, or transmitted ([Regulation 18](#)).
- > Failing to keep record and plans of works ([Regulation 46](#)).
- > Failing to erect signs when carrying out work on installations ([Regulation 63](#)).

## OFFENCES RELATING TO CERTIFICATION AND PERIODIC ASSESSMENTS

- > Once prescribed electrical work has been done:
  - failing to test the installation ([Regulation 65](#))
  - failing to certify or arrange certification of the work ([Regulation 66](#))
  - arranging certification, inspecting, issuing and keeping a certificate of compliance if not satisfied that the work is electrically safe and that the work was done in accordance with the Electricity Act and associated Regulations. ([Regulation 67](#)) and ([Regulation 68](#)) and ([Regulation 71](#)) and ([Regulation 72](#)).
- > Failing to arrange periodic assessments of certain installations ([Regulation 75](#)).

## OFFENCES RELATING TO ELECTRICAL WARRANTS OF FITNESS

- > Supplying electricity without warrant of electrical fitness ([Regulation 76](#)).
- > Hiring out a vehicle, relocatable building, or pleasure vessel that contains a connectable installation if this does not have a current warrant of electrical fitness ([Regulation 77](#)).
- > Issuing of warrant of electrical fitness if the installation is unsafe or without being authorised to do so ([Regulation 78](#)).

## OFFENCE RELATING TO WORKS

- > Interfering with, moving or attempting to move works ([Regulation 35](#)).
- > Failing to secure access to generating facilities by unauthorised persons ([Regulation 36](#)).

## OTHER OFFENCES

- > Using of fittings and appliances that interfere with the satisfactory supply of electricity or impair its safety ([Regulation 31](#)).

## EXAMPLES OF GAS OFFENCES

## OFFENCES RELATING TO DESIGN AND INSTALLATION

- > Designs, constructs, maintains, uses or manages a distribution system or gas installation in an unsafe manner ([Regulation 9](#)).
- > Design installs, commissions, or tests a gas installation or a part of a gas installation, or an extension, addition, or replacement not in accordance with AS/NZS 5601 ([Regulation 44](#)).
- > Failing to verify safety before connection ([Regulation 50](#)).

## OFFENCES RELATING TO OPERATION OF DISTRIBUTION SYSTEMS

- > Failing to ensure continuity of supply and safety of the distribution system ([Regulation 26](#)).
- > Failing to ensure competency of persons working on systems ([Regulation 27](#)).
- > Failing to arrange regular safety inspections and keeping record of these inspections ([Regulation 28](#)).
- > Issuing an audit certificate without being satisfied of the audit or failing to cancel the audit or to issue the notice of cancellation if not satisfied with the audit ([Regulation 40](#)).

## OFFENCES RELATING TO CERTIFICATION

- > Fails to issue a Certificate of Compliance ([Regulation 50](#)).
- > Fails to issue a Gas Safety Certificate ([Regulation 52F](#)).
- > Fails to record High Risk work on the database ([Regulation 52J](#)).

## OFFENCES RELATING TO SUPPLYING GAS

- > Failing to odorise gas as required by ([Regulations 16 and 17](#)).

- > Sells gas in a manner that does not comply with the Regulations ([Regulation 21](#) or [Regulation 76](#) for CNG).
- > Supplying gas for use in gas installations and gas appliances, or for use as an automotive fuel, that is not suitable and safe for those uses ([Regulation 41](#)).
- > Supplying gas to consumers that is not at a pressure that ensures the safe supply, passage, and use of the gas ([Regulation 42](#)).
- > Not keeping records of tests of gas measurement systems ([Regulation 23](#)).
- > Failing to keep records and plans of distribution systems ([Regulation 25](#)).
- > Failing to supply the WorkSafe copies of seals for the competent organisation prior to carrying out work ([Regulation 88](#)).
- > For competent organisations, failing to keep records ([Regulation 89](#)).

#### OFFENCES RELATING TO CNG

##### OFFENCES RELATING TO CNG

- > Failing to follow specific requirements regarding measurement of CNG station ([Regulation 76](#)).
- > Failing to test CNG gas measurement systems and failing to keep records ([Regulation 77](#)).
- > Failing to ensure pressurelimiting device and metering unit of a CNG station is sealed ([Regulation 79](#)).
- > Failing to ensure that a CNG station is maintained in a safe condition and operated safely ([Regulation 80](#)).
- > Operating a CNG dispenser above maximum fill pressure ([Regulation 81](#)).
- > Providing a certificate of compliance for unsafe CNG stations ([Regulation 83](#)).

##### OTHER OFFENCES

- > Failing to comply with urgent instructions ([Regulation 86](#)).
- > Failing to notify owner or occupier and WorkSafe when believing an installation is immediately dangerous ([Regulation 10](#)).

#### **Examples of Level 1 offences:**

##### OFFENCES RELATING TO DOCUMENTATION AND RECORDS

- > Not having relevant documentation regarding gas odourisation ([Regulation 19](#)).

##### OFFENCES RELATING TO CNG

- > Installing a CNG station in an unsafe manner ([Regulation 78](#)).
- > Failing to ensure pressure-limiting device and metering unit of a CNG station is sealed ([Regulation 79](#)).
- > Failing to ensure that personnel filling or being present for the filling of vehicles with CNG have been trained adequately ([Regulation 82](#)).
- > Failing to have CNG stations certified ([Regulation 83](#)).
- > Failing to maintain records for CNG stations ([Regulation 84](#)).

##### OTHER OFFENCES

- > Damaging, interfering with, moving or attempting to move fittings or a distribution system of gas measurement system ([Regulation 15](#)).
- > Using odorants likely to damage the integrity of distribution system ([Regulation 18](#)).
- > Not having gas measurement systems tested by a competent organisation ([Regulation 22](#)).

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## APPENDICES

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### IN THIS SECTION:

- 7.1 Related organisations
- 7.2 Acronyms and glossary

## 7.1 RELATED ORGANISATIONS

Registration, licensing and competency of electrical workers	Electrical Workers Registration Board (EWRB) <a href="http://www.ewrb.govt.nz">www.ewrb.govt.nz</a>
Competency and licensing of plumbers, gasfitters and drainlayers	Plumbers, Gasfitters and Drainlayers Board (PGDB) <a href="http://www.pgdb.co.nz">www.pgdb.co.nz</a>
Incident or accident to a gas or electrical worker, or any other worker	WorkSafe New Zealand <a href="http://worksafe.govt.nz">worksafe.govt.nz</a>

## 7.2 ACRONYMS AND GLOSSARY

TERM	DEFINITION
<b>Audit</b>	A term used by Energy Safety to refer to a range of activities undertaken to assess the compliance and safety of products and systems under the Electricity (Safety) Regulations 2010 and the Gas (Safety and Measurement) Regulations 2010
<b>Authorised person</b>	A person registered and licensed to carry out a particular type of work
<b>CNG</b>	Compressed Natural Gas
<b>CoC</b>	Certificate of Compliance
<b>CoV</b>	Certificate of Verification
<b>kPa</b>	Kilopascal - a unit of pressure
<b>PEW</b>	Prescribed Electrical Work
<b>Electricity Act</b>	Electricity Act 1992
<b>Gas Act</b>	Gas Act 1992
<b>Electricity Regulations</b>	Electricity (Safety) Regulations 2010
<b>Gas Regulations</b>	Gas (Safety and Measurement) Regulations 2010
<b>MRA</b>	Mutual Recognition Arrangement
<b>JAS-ANZ</b>	Joint Accreditation System of Australia and New Zealand
<b>IANZ</b>	International Accreditation New Zealand
<b>LPG</b>	Liquefied Petroleum Gas
<b>SMS</b>	Safety Management System
<b>RCD</b>	Residual Current Device
<b>DoC</b>	Declaration of Conformity
<b>ECP</b>	Electrical Code of Practice
<b>GCP</b>	Gas Code of Practice
<b>MEN</b>	Multiple Earthed Neutral

<b>TERM</b>	<b>DEFINITION</b>
<b>MJ/h</b>	Megajoules per hour
<b>TJ</b>	Terajoule
<b>ESC</b>	Electrical Safety Certificate
<b>PGDB</b>	Plumbers, Gasfitters and Drainlayers Board
<b>MBIE</b>	Ministry of Business, Innovation and Employment
<b>GSC</b>	Gas Safety Certificate
<b>RoI</b>	Record of Inspection



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