

Title	Demonstrate knowledge of earthing in high voltage electricity network installations and works		
Level	3	Credits	2

Purpose	People credited with this unit standard are able to demonstrate knowledge of: earthing regulatory requirements; bonding; and earthing installations and testing.
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Classification	Electricity Supply > Electricity Supply - Core Skills
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Available grade	Achieved
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Guidance Information

- Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable legislative and industry requirements.
- Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to the current version of the Health and Safety at Work Act 2015; Electricity Act 1992; Electricity (Safety) Regulations 2010; and any subsequent amendments and replacements; Electricity supply industry codes of practice and documented enterprise procedures, including *Safety Manual – Electricity Industry (SM-EI)* (2015) available at www.eea.co.nz.
- Definitions
Asset owner refers to a participant who owns or operates assets used for generating or conveying electricity.
HV is defined as high voltage and includes voltages greater than 1000 volts AC.
Industry requirements include all asset owner requirements; manufacturers' specifications; and enterprise requirements which may include the documented workplace policies, procedures, specifications, and business and quality management requirements relevant to the workplace in which assessment is carried out.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of earthing regulatory requirements.

Performance criteria

1.1 Earthing terms are described.

Range earthed, earthing system, earth electrode, earth impedance, earthing conductor, main earthing conductor, equipotential earthing.

1.2 Reasons for the requirement of low resistance for an earthing system are explained.

1.3 Metalwork that must be earthed is described.

Range may include but is not limited to – metalwork forming parts of works, metalwork in painted structures, electrical installations, electrical components, accessories.

1.4 Metalwork that must not or need not be earthed is stated.

1.5 Specific requirements for earthing and bonding of HV equipment and substations are described.

Range New Zealand Electrical Code of Practice for Power Systems Earthing (NZECP 35:1993), power network earthing and bonding standards.

Outcome 2

Demonstrate knowledge of bonding.

Performance criteria

2.1 Bonding terms are described.

Range may include but is not limited to – electrical bonding, earth bonding, equipotential bonding; evidence of three terms is required.

2.2 The need for bonding metalwork is explained in terms of the elimination of the risk of electric shock, equipotential earthing, and for prevention of arcing.

2.3 Situations requiring bonding are described.

Range may include but is not limited to – conductive equipment, uninsulated metalwork, metal support structures, oil tanks, earth grids and mats, reinforced concrete pads, surge arresters, security fences, mobile equipment in the work zone; evidence of three items is required.

2.4 Bonding methods and the equipotential zone are described.

Outcome 3

Demonstrate knowledge of earthing installations and testing.

Range may include but is not limited to – substations, transmission structures, switchgear;
evidence of two installations is required.

Performance criteria

3.1 Essential components of an earthing system are described according to current regulations and standards.

3.2 Requirements for earthing and bonding of conductors are described.

3.3 Diagram of earthing system is drawn showing all components and interconnections, and cable sizes are indicated.

Range may include but is not limited to – HV installation, Works (Substation), Works (Lines).

3.4 The methods for testing earthing connections, earth electrodes, and loading are described.

Range may include but is not limited to – earth resistance test, loop impedance test, soil resistivity test, continuity (bonding) test within an installation;
evidence of one method is required.

Planned review date	31 December 2025
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 April 2001	31 December 2012
Revision	2	13 September 2004	31 December 2012
Rollover and Revision	3	20 June 2008	31 December 2012
Review	4	21 July 2011	31 December 2013
Revision	5	22 June 2012	31 December 2018
Review	6	20 August 2015	31 December 2022
Review	7	25 March 2021	N/A

Consent and Moderation Requirements (CMR) reference	0120
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Connexis - Infrastructure Industry Training Organisation qualifications@connexis.org.nz if you wish to suggest changes to the content of this unit standard.