| | | | |
|---|---|---|---|
| **Title** | **Apply and remove portable earths in an electricity supply system** | | |
| **Level** | **4** | **Credits** | **7** |

| | |
|---|---|
| **Purpose** | People credited with this unit standard are able to: demonstrate knowledge of earthing and bonding in an electricity supply system; demonstrate knowledge of earthing requirements in the electricity supply system; demonstrate the use of a voltage detection device; apply and remove the earths from conductors, plant and equipment on the electricity supply network; and report work completed on applying and removing earths from conductors, plant and equipment. |

| | |
|---|---|
| **Classification** | Electricity Supply > Electricity Supply - Core Skills |

| | |
|---|---|
| **Available grade** | Achieved |

**Guidance Information**

1 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.

2 Legislation, regulations and/or industry standards relevant to this unit standard include but are not limited to:
- Health and Safety at Work Act 2015;
- Electricity Act 1992;
- Electricity (Safety) Regulations 2010;
- Electricity supply industry codes of practice and documented enterprise procedures, including *Safety Manual – Electricity Industry* (SM-EI) and relevant EEA guides available from www.eea.co.nz;
  and any subsequent amendments and replacements.

3 Definitions
*Asset owner* refers to a participant who owns or operates assets used for generating or conveying electricity.
*Industry requirements* include all asset owner requirements and standards; manufacturers' specifications; and enterprise requirements which cover the documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.

4 Assessment of practical skills against the outcomes in this standard requires three practical observations from three different workplace activities.

5 Earths include multi-phase and single-phase earths.

## Outcomes and performance criteria

### Outcome 1

Demonstrate knowledge of earthing and bonding in an electricity supply system.

**Performance criteria**

1.1 The Multiple Earth Neutral (MEN) system of supply in New Zealand is explained.

1.2 The concept of referencing in a MEN system to the general mass of earth is explained in terms of safety, insulation levels, and protection.

1.3 Sources that cause development of hazardous voltages in the workplace are explained.

Range may include but is not limited to – lightning strikes, fault currents.

1.4 Earth potential rises (EPR) in a worksite during a fault situation is explained.

1.5 The equipotential zone on a worksite is explained.

1.6 Methods of reducing hazardous voltage exposure during faults to workers is explained.

Range grounding, earthing and bonding.

1.7 Factors that reduce effective grounding, earthing and bonding at a worksite are explained.

Range may include but is not limited to – site layout, soil resistivity, climatic conditions, size and length of earthing and bonding conductors, placement of earthing electrodes, condition of terminations and electrodes.

1.8 Hazards of poorly implemented earthing and bonding in a worksite are explained.

Range generation of step, touch and hand to hand voltages.

### Outcome 2

Demonstrate knowledge of earthing requirements in the electricity supply system.

Range SM-EI.

**Performance criteria**

2.1 Requirements for effective earthing for safe working of protective equipment are described.

2.2 Responsibilities of employees when applying and removing portable earths are described.

2.3 Statutory and enterprise inspections and care of insulating sticks and voltage detection devices are demonstrated in terms of manufacturers' specifications and recommendations.

2.4 Requirements for isolation of protective equipment are described.

2.5 Equipotential zones in the workplace are described.

**Outcome 3**

Demonstrate the use of a voltage detection device.

**Performance criteria**

3.1 Correct voltage detection device is selected for system voltage.

3.2 Voltage detection device is inspected for compliance.

3.3 Voltage detection device is used and tested according to manufacturer's instructions.

**Outcome 4**

Apply and remove the earths from conductors, plant and equipment on the electricity supply network.

**Performance criteria**

4.1 Work control documentation is checked.

4.2 Personal protective equipment is worn and used in accordance with SM-EI.

Range includes but is not limited to – hard hats, insulating gloves and overgloves, overalls, footwear.

4.3 Conductors, plant or equipment are physically identified.

Range single line diagram, labels, line, plant, equipment numbering and equipment layout.

4.4 Earth attachment points are identified.

4.5 Procedures and requirements for portable earths are determined.

4.6 Earthing equipment is inspected for compliance.

Range compliance includes – satisfactory for use, surface condition and cleanliness;
equipment includes – clamps, leads, fittings, sticks and poles, terminations.

4.7 Earthing points are proven de-energised.

Range voltage detection device.

4.8 Earths are applied.

Range tail clamp connection to earth first, leads kept away from person, positive connection made and held in place before clamping, equipotential environment for work.

4.9 Earths are removed.

**Outcome 5**

Report work completed on applying and removing earths from electrical conductors, plant and equipment.

Range may include but is not limited to – operating order or recipient safety measure form.

**Performance criteria**

5.1 Information is recorded concisely in the required format and filed in the correct location.

| | |
|---|---|
| **Planned review date** | 31 December 2026 |

**Status information and last date for assessment for superseded versions**

| Process | Version | Date | Last Date for Assessment |
|---|---|---|---|
| Registration | 1 | 16 March 2017 | 31 December 2023 |
| Review | 2 | 30 September 2021 | N/A |

| | |
|---|---|
| **Consent and Moderation Requirements (CMR) reference** | 0120 |

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@infrastructureito.org.nz if you wish to suggest changes to the content of this unit standard.