

Title	Demonstrate knowledge of electric lighting systems		
Level	3	Credits	6

Purpose	<p>This unit standard covers knowledge of electric lighting for electricians and related trades.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – demonstrate knowledge of electric lighting principles; – demonstrate knowledge of incandescent lighting; – demonstrate knowledge of discharge lighting; – demonstrate knowledge of LED lighting; – demonstrate knowledge of recessed lighting; and – select light fittings for common applications.
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Classification	Electrical Engineering > Electrical Installation and Maintenance
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Available grade	Achieved
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Guidance Information

- 1 This unit standard has been developed for learning and assessment off-job.
- 2 This unit standard and unit standards 29419, 29422, 29480, and 29481 together meet the assessment requirements of ERAC EPC 41.
This unit standard and unit standards 29422, 29476, and 29481 together meet the assessment requirements of ERAC EPC 53.
- 3 Achievement of this unit standard alone does not entitle trainees to legally perform prescribed electrical work without supervision. Until registered and licensed under the Electricity Act 1992, trainees are assisting, and must work under supervision when carrying out prescribed electrical work.
- 4 Definitions
 - a.c.* – alternating current.
 - CEPC* – Critical Essential Performance Capability.
 - d.c.* – direct current.
 - EPC* – Essential Performance Capability.
 - ERAC* – Electrical Regulatory Authorities Council.
 - Industry practice* – those practices that competent practitioners within the industry recognise as current industry best practice.
 - LED* – light emitting diode.
 - Safe and sound practice* – as it relates to the installation of electrical equipment is defined in AS/NZS 3000:2007, *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*.

5 Range

- a Candidates may refer to current legislation and Standards during assessment.
- b Demonstration of safe working practices and installation in accordance with *safe and sound practice* are essential components of assessment of this unit standard.
- c All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with:
 - i legislation;
 - ii policies and procedures;
 - iii ethical codes;
 - iv Standards – may include but are not limited to those listed in Schedule 2 of the Electricity (Safety) Regulations 2010;
 - v applicable site, enterprise, and industry practice; and,
 - vi where appropriate, manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria**Outcome 1**

Demonstrate knowledge of electric lighting principles.

Performance criteria

1.1 Define lighting terms and state units where appropriate.

Range luminous intensity, luminous flux, illumination, efficacy, glare, luminaire.

1.2 Outline essential considerations for good lighting in non-mathematical terms.

Range illumination level, colour, glare, intensity, standard industry illumination values, Lux levels.

1.3 Explain light fitting classifications with the aid of diagrams.

Range direct, semi-direct, indirect, semi-indirect, general diffusing, explosive atmosphere requirements.

Outcome 2

Demonstrate knowledge of incandescent lighting.

Performance criteria

2.1 Describe lamps in terms of construction, principle of operation, colour output, efficacy, and the factors that affect life span.

Range general lighting service (GLS), tungsten halogen.

2.2 Describe Bayonet cap and Edison screw lamp cap types in terms of physical appearance, and safety precautions to be observed.

- 2.3 Describe low and extra low voltage halogen lights in terms of physical construction, voltage range, auxiliary equipment, and installation requirements.

Outcome 3

Demonstrate knowledge of discharge lighting.

Performance criteria

- 3.1 Describe three discharge lighting in terms of construction, operating principle, colour output, efficacy, life span, and typical application.
- Range may include but is not limited to – cold cathode (neon), fluorescent (low-pressure mercury vapour), mercury vapour, sodium vapour, metal halide.
- 3.2 Describe safety precautions for work on high voltage lighting.
- 3.3 Draw circuit diagrams for discharge lighting, and outline circuit operation in terms of current paths and starting sequence.
- Range fluorescent;
one of – high-pressure sodium, low-pressure sodium, high-pressure mercury, metal halide.
- 3.4 Describe stroboscopic effect and outline methods of reducing or cancelling the effect.

Outcome 4

Demonstrate knowledge of LED lighting.

Performance criteria

- 4.1 Describe LED lighting in terms of construction, operating principle, colour output, efficacy, life span, and typical application.
- 4.2 Describe safety precautions for work LED lighting.
- 4.3 Outline requirements to be observed when replacing older technology lighting with LED lighting.

Outcome 5

Demonstrate knowledge of recessed lighting.

Performance criteria

- 5.1 Describe installation requirements for recessed luminaires and auxiliary equipment in accordance with AS/NZS 3000.

- 5.2 Describe recessed luminaire classes to be used in New Zealand in according to AS/NZS 3000.

Outcome 6

Select light fittings for common applications.

Range one lighting application specific to each of – surface mount incandescent, recessed incandescent, low voltage halogen, neon, sodium vapour, mercury vapour, metal halide, fluorescent, LED.

Performance criteria

- 6.1 Identify the operating and environmental conditions of the installation.
- 6.2 State the advantages and disadvantages of each type of fitting.
- 6.3 Make simple calculations using inverse square and cosine laws to achieve the standard industry illumination level for each application.

Replacement information	This unit standard and unit standard 29481 replaced unit standard 1710.
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This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 July 2016	31 December 2027
Review	2	25 May 2023	31 December 2027

Consent and Moderation Requirements (CMR) reference	0003
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.