

Title	Demonstrate knowledge of power factor, three-phase AC power, and transformer safety and performance		
Level	4	Credits	6

Purpose	People credited with this unit standard are able to demonstrate knowledge of: <ul style="list-style-type: none"> – power, power factor, and power factor improvement; – three phase AC power; and – transformer safety and performance.
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Classification	Electrical Engineering > Core Electrical
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Available grade	Achieved
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Guidance Information

- 1 Unit standard or equivalent prior knowledge and skills recommended:
 Unit 32622, *Demonstrate knowledge of the national supply grid, MEN system, and earthing*;
 Unit 32625, *Demonstrate knowledge of damp situations, SELV and PELV systems, and single-phase transformers*;
 Unit 32626, *Demonstrate knowledge of capacitors, inductors, and electronics in the electrical trade*.
- 2 Reference
 AS/NZS 3000 (version as cited in the Electricity (Safety) Regulations), *Electrical Installations (known as the Australian/New Zealand Wiring Rules)*;
 or any current subsequent amendments and replacements.
- 3 Definition
 AC – alternating current.
- 4 This unit standard can be used together with other relevant unit standards, additional learning and workplace training to meet the requirements of the Electrical Workers Registration Board (EWRB) core competencies, available at <https://www.ewrb.govt.nz>.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of power, power factor and power factor improvement.

Performance criteria

- 1.1 Explain real power, apparent power and power factor.
- 1.2 Describe the consequences of power factor issues and methods of power factor correction.
- Range too high power factor, too low power factor.
- 1.3 Perform calculations to determine real power and apparent power.

Outcome 2

Demonstrate knowledge of three-phase AC power.

Performance criteria

- 2.1 Describe the winding connections of three-phase transformers and the reasons for their use.
- Range Star/Star, Star/Delta, Delta/Star, Delta/Delta.
- 2.2 Calculate line and phase values of voltage and current.
- Range Star, Delta.
- 2.3 Perform three phase calculations.
- Range includes but is not limited to – power, energy, determination of neutral current.
- 2.4 Explain balanced and unbalanced three-phase loads and the implications for generation and distribution systems.

Outcome 3

Demonstrate knowledge of transformer safety and performance.

Performance criteria

- 3.1 Explain the performance characteristics of transformers.
- Range includes but is not limited to – percentage regulation, VA rating and effects of load power factor.
- 3.2 Describe features and applications of power transformers.
- Range includes but is not limited to – transmission transformer, local power distribution transformer, and large consumer transformer.

- 3.3 Describe general risks and safety control measures when working with transformers.

Range three risks.

Planned review date	31 December 2026
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	24 March 2022	N/A

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>.

Comments on this unit standard

Please contact Waihangā Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihanga.nz if you wish to suggest changes to the content of this unit standard.