

<b>Title</b>	<b>Demonstrate knowledge of single and three-phase transformers used in the electricity supply industry</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>4</b>

<b>Purpose</b>	People credited with this unit standard are able to: describe single-phase transformers in the electricity supply industry; describe three-phase transformer theory; and demonstrate knowledge of transformer outputs and efficiencies.
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<b>Classification</b>	Electricity Supply > Electricity Supply - Core Skills
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<b>Available grade</b>	Achieved
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### 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](http://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.

*Data* refers to information of a written or numerical form. The latter may include summary statistics, information in tables and numbers displayed in a variety of graphs.

*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.

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## Outcomes and performance criteria

### Outcome 1

Describe single-phase transformers in the electricity supply industry.

Range double-wound transformer, auto-transformer.

#### Performance criteria

- 1.1 The purpose of single-phase transformers is described in terms of their use in the electricity supply industry.
- 1.2 Single-phase transformer construction is described with the aid of a sketch, and with reference to cores and windings.
- 1.3 Single-phase transformer operating principles are described with reference to mutual or self induction and regulation by tap changing.

### Outcome 2

Describe three-phase transformer theory.

#### Performance criteria

- 2.1 The purpose of three-phase transformers is described in terms of their use in the electricity supply industry.
- 2.2 Three-phase transformer construction is described with the aid of a sketch, and with reference to cores and windings.
- 2.3 Three-phase transformer operating principles are described with reference to mutual or self induction and regulation by tap changing.

### Outcome 3

Demonstrate knowledge of transformer outputs and efficiencies.

#### Performance criteria

- 3.1 The relationships between line and phase values of voltage, current, and volt-amps (VA) are stated for star and delta winding configurations.
- 3.2 Transformer values are calculated from given data for different winding configurations.  
  
Range primary and secondary voltage and current, turns ratio, VA rating; configurations – star-star, delta-delta, star-delta, delta-star.
- 3.3 The effect of load current on the secondary terminal voltage of a transformer is illustrated with the aid of calculations, and the use of tap changing to overcome this effect is described.

- 3.4 Transformer efficiencies are calculated from given data for different values of secondary load.

<b>Planned review date</b>	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 June 2002	31 December 2013
Revision	2	11 February 2004	31 December 2013
Rollover and Revision	3	26 November 2007	31 December 2013
Review	4	9 December 2010	31 December 2019
Review	5	16 March 2017	31 December 2023
Review	6	30 September 2021	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	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](mailto:qualifications@connexis.org.nz) if you wish to suggest changes to the content of this unit standard.