Title	Demonstrate knowledge of three-phase theory in the electricity supply industry		
Level	**4**	**Credits**	**5**

Purpose	People credited with this unit standard are able to demonstrate knowledge of single and three-phase load connections in the distribution network and neutral current in three-phase loads.

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.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of single and three-phase load connections in the distribution network.

Performance criteria

1.1 Single-phase and three-phase terms are defined and explained with the aid of sketches.

Range line, phase, balanced, unbalanced, star, delta, phase sequence.

1.2 Relationship between line and phase voltages, and between line and phase currents are explained for star and delta connected loads.

1.3 Values of line and phase voltages and currents are calculated from given data for star and delta connected loads.

1.4 The relationship between apparent power, reactive power, power, line currents and power factor in star and delta is determined and conclusions are drawn.

1.5 The requirements for correct phase rotation in network and to consumer installations are explained.

Outcome 2

Demonstrate knowledge of neutral current in three-phase loads.

Performance criteria

2.1 The effects of balanced and unbalanced loads on the neutral current are explained in terms of the instantaneous sum of the three-phase currents.

2.2 The advantages of balanced loads are described in terms of low or no neutral current and improved efficiency for generation and distribution companies.

2.3 The need for a neutral conductor on an unbalanced star connected load is explained.

2.4 The effects power harmonics have on the value of the neutral current are explained.

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