Title	**Demonstrate knowledge of direct current (d.c.) power supplies**		
Level	**3**	**Credits**	**3**

Purpose	This unit standard covers the theory and measurement of d.c. power supplies, and is intended for people in the electrical and related trades. People credited with this unit standard are able to: – demonstrate knowledge of d.c. power supply principles; – demonstrate knowledge of d.c. power supply filters; – demonstrate knowledge of voltage regulators; – demonstrate knowledge of a variable d.c. power supply; and – take measurements on a regulated d.c. power supply and compare with expected values.

Classification	Electrical Engineering > Core Electrical

Available grade	Achieved

Guidance Information

1 This unit standard has been developed for learning and assessment off-job.

2 For assessment purposes
- a Candidates shall be supplied with formulae involving more than three quantities.
- b Use of a calculator during assessment is permitted.
- c Candidates are expected to express calculated values in the relevant Système International (SI) units, including multiples and sub-multiples (pico, nano, micro, milli, kilo, mega, etc) and be able to convert between them.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of d.c. power supply principles.

Performance criteria

1.1 D.c. power supply terms are defined in accordance with industry practice.

Range regulation, rectification, centre-tapped transformer, reservoir capacitor, three-pin regulator, half-wave, full-wave.

1.2 Power supply operation is described with the aid of a labelled block diagram.

Range block diagram shows – input, transformer, rectifier, filter, voltage regulator, output.

1.3 Possible causes of power supply failure are described with the aid of a circuit diagram, and methods of avoiding them are briefly outlined.

Range causes – over voltage, over current, transient voltages.

Outcome 2

Demonstrate knowledge of d.c. power supply filters.

Performance criteria

2.1 Filters are described in terms of their function, and principles of operation, with the aid of circuit diagrams.

Range single-capacitor, single inductor, inductor-capacitor, resistor-capacitor.

2.2 One typical application for each type of filter is stated.

Outcome 3

Demonstrate knowledge of voltage regulators.

Performance criteria

3.1 Voltage regulators are described in terms of their function and principle of operation, with the aid of a circuit diagram.

Range voltage regulators – resistance voltage divider, zener diode, series pass, fixed and variable three-terminal integrated circuit (IC).

3.2 One typical application for each type of regulator is stated.

Outcome 4

Demonstrate knowledge of a variable d.c. power supply.

Performance criteria

4.1 A fully labelled circuit diagram is drawn for a practical variable d.c. power supply.

Range circuit diagram shows – input supply, transformer, rectifier, variable regulator, filter, means of adjustment, output polarity.

4.2 The operation of the circuit is described, with reference to the function of each component and the method of varying the output voltage.

4.3 Current and power ratings are calculated for each component.

Outcome 5

Take measurements on a regulated d.c. power supply and compare with expected values.

Performance criteria

5.1 Voltage and current values are measured using an oscilloscope and compared with expected values in terms of wave shape and magnitude.

Range measuring points – supply input, transformer output, rectifier output, filter output, supply output.

5.2 Regulation is measured and compared with expected value in terms of operational data performance parameters.

Replacement information	This unit standard replaced unit standard 1210.

Planned review date	31 December 2022

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	10 February 1999	31 December 2013
Revision	2	3 April 2001	31 December 2013
Review	3	26 May 2005	N/A
Rollover and Revision	4	15 March 2012	N/A
Revision	5	15 January 2014	N/A
Rollover and Revision	6	28 January 2021	N/A

Consent and Moderation Requirements (CMR) reference	0003

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact The Skills Organisation reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.