Title	**Rewind electric machines**		
Level	**4**	**Credits**	**15**

Purpose	This unit standard is for people intending to qualify in the electrical industry in motor rewinding and repair. It is for people who have responsibility for winding, connecting, and insulating electric machine coils. People credited with this unit standard are able to in accordance with industry practice: – record winding data; – assess insulation requirements; – wind coils; – insert and connect coils; and – impregnate windings as required.

Classification	Electrical Engineering > Electrical Machines

Available grade	Achieved

Guidance information

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

2 Definitions
Company practice – those practices and procedures that have been circulated by the company for use by their employees.
Industry practice – those practices that competent practitioners within the industry recognise as current industry best practice.
Machines – electric motors, generators, regulators, transformers, and other similar equipment that have windings.

3 Assessment
a The machines chosen are left to the discretion of the assessor, but must be sufficient to assess competence in all outcomes of the unit.
b Performance in relation to the outcomes of this unit standard must comply with the Health and Safety at Work Act 2015, associated regulations, industry practice, and any applicable company safety and health procedures.

Outcomes and performance criteria

Outcome 1

Record winding data.

Performance criteria

1.1 Obtain and record necessary rewinding data for the machine under repair.

Range data may include but is not limited to – manufacturer's technical information sheets (if available), data obtained during dismantling, customers specifications.

1.2 Obtain the insulation class.

1.3 Record data in accordance with company practice.

Range may include but is not limited to – coils per slot, number of turns per coil, direction of turns; conductor size; coil shape and dimensions; insulation types, thickness and layers; connections; coil pitch, commutator pitch.

Outcome 2

Assess insulation requirements.

Performance criteria

2.1 Assess specification requirements of machine insulation from manufacturer's data or actual machine under repair.

Range may include but is not limited to – insulation class; materials – varnishes, mica and its derivatives, fibre, tape, insulation cloths; slot lining insulation;
properties – physical strengthening and filling abilities, dielectric strength, rigidity, imperviousness to moisture, dust, dirt, oil, and corrosive substances.

2.2 Confirm availability of insulation material, or seek alternatives.

Outcome 3

Wind coils.

Performance criteria

3.1 Select winding wire to meet determined specifications.

3.2 Set up winding equipment in accordance with collected data.

3.2 Wind coils in accordance with customer specifications and industry standards.

Outcome 4

Insert and connect coils.

Performance criteria

4.1 Verify coil slot insulation be in accordance with industry practice.

4.2 Wind coil end overhang in accordance with manufacture’s specifications.

4.3 Select and insert thermal protection devices into windings at specified locations in accordance with specifications.

4.4 Re-band rotor surfaces to original specifications, so that bands do not protrude above surfaces.

4.5 Sleeve and connect tails.

4.6 Test connections for open circuit, short circuit, abnormal resistance, test to earth, inductance and impedance.

Outcome 5

Impregnate windings as required.

Performance criteria

5.1 Pre-heat windings according to varnish manufacturer’s specifications.

5.2 Saturate windings with varnish in accordance with available equipment, machine type, machine size, and grade of varnish.

Range brushing, spraying, dipping, vacuum pressure impregnation; evidence of two is required.

5.3 Remove excess varnish.

Range rotor and stator surfaces, slip-rings and commutators, shaft.

5.4 Bake on varnish in accordance with the manufacturer’s specifications.

Range tables of temperatures and times.

Replacement information	This unit standard and unit standard 19469 replaced unit standard 1198.

Planned review date	31 December 2023

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 August 2002	31 December 2023
Review	2	22 August 2008	31 December 2023
Rollover and Revision	3	15 March 2012	31 December 2023
Revision	4	15 January 2014	31 December 2023
Review	5	22 August 2019	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.