Title	**Demonstrate knowledge of power cable construction and preparation**		
Level	**3**	**Credits**	**4**

Purpose	People credited with this unit standard are able to: demonstrate knowledge of power cable construction; and cable voltage stress and stress control techniques; describe types of cable and cable design voltages; and demonstrate knowledge of techniques to prepare cables.

Classification	Electricity Supply > Electricity Supply - Distribution Networks

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 the current version of the Health and Safety at Work Act 2015; Electricity Act 1992; Electricity (Safety) Regulations 2010; and any subsequent amendments and replacements; Electricity supply industry codes of practice and documented enterprise procedures, including *Safety Manual – Electricity Industry* (SM-EI) (2015) Wellington: Electricity Engineers' Association available at www.eea.co.nz.

3 Definitions
Asset owner refers to a participant who owns or operates assets used for generating or conveying electricity.
HV is defined as 'high voltage' and includes voltages above 1000V AC.
Industry requirements include all asset owner requirements; manufacturers' specifications; and enterprise requirements which may include the documented workplace policies, procedures, specifications, business, and quality management requirements relevant to the workplace in which assessment is carried out.
LV is defined as 'low voltage' and includes voltages exceeding 50V AC but not exceeding 1000V AC.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of power cable construction.

Performance criteria

1.1 The types of conductor materials and configurations used in power cables are described.

Range includes but is not limited to – copper, aluminium, concentric, compressed, compacted, solid, stranded, sectored, circular.

1.2 The types and purpose of insulation materials used in power cables are described.

Range includes but is not limited to – paper (mineral insulated and mineral insulated non-draining), polyvinyl chloride (PVC), cross-linked polyethylene (XLPE), ethylene propylene rubber (EPR).

1.3 The types and purpose of insulation screens used in power cables are described.

Range semi-conducting tapes or extrusion, graphite layer, metallic screens, aluminium, wire, copper braid, plain copper wire.

1.4 The types and purposes of armour used in power cables are described.

Range steel wire, steel tape.

1.5 The types and purpose of sheathing and serving used in power cables are described.

Range includes but is not limited to – PVC, high density polyethylene (HDPE), medium density polyethylene (MDPE), lead, compound impregnated tapes.

1.6 The types and purpose of ancillary components used in power cables are described.

Range includes but is not limited to – fillers, belting, bedding.

1.7 Power cable design and construction is described.

Range stress control, capacity, single and multi-core configurations, resistance, inductance, capacitance, belted, screened, neutral screened.

Outcome 2

Demonstrate knowledge of cable voltage stress and stress control techniques.

Performance criteria

2.1 Voltage stress in LV and HV cables is described.

Range includes but is not limited to – radial, longitudinal, tangential.

2.2 Stress control techniques are described.

Range evidence is required for four different techniques.

Outcome 3

Describe types of cable and cable design voltages.

Performance criteria

3.1 Cable types are described in terms of LV and HV cables single core, multi-core, polymeric and paper insulated, voltage ratings.

3.2 Cable design voltage ratings are described in terms of LV and HV cables, single core and multi-core cables.

Outcome 4

Demonstrate knowledge of techniques to prepare cables.

Performance criteria

4.1 Cable bending techniques are described in terms of bending radii for LV, HV, single core, multi-core, polymeric and paper insulated cables.

4.2 Cable stripping techniques are described in terms of stripping of LV and HV cables, including sheaths, armour, bedding, fillers, lead, paper, screens (metallic, graphite, bonded, tape, wire), semi-conducting layers, and primary insulation.

4.3 Cable insulation preparation and reinstatement techniques are described.

4.4 Cable sheath, shield preparation and reinstatement are described.

4.5 Cable jointing methods are described.

4.6 Use of specialist tools and equipment is described in terms of knives, specialist stripping tools (semi-conducting layers), crimping tools, compression tools, spiking guns, smoothing materials, cleaning liquids, and jointing pastes.

4.7 Work site management requirements are described in terms of work site lay-out, cleanliness standards, weather conditions, joint pit design and construction, work site access.

Replacement information	This unit standard replaced unit standard 20074, unit standard 28277, and unit standard 28280.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	27 February 2020	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.