

1. Module details**Module name****Cable Jointing 3 - Paper/Lead****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 54 – 60 hours.

Module code

NUE219

Discipline code

0703130

2. Module purpose

This module is designed to supply the knowledge and skills required by electricity supply industry workers to joint paper/lead type cables.

The experience gained is in the correct procedures and practices involved in preparing for and carrying out installation and maintenance of de-energised high and low voltage paper/lead cables.

Low voltage paper/lead cables straight joint and termination.

High voltage paper/lead straight and tee joint with stress control and a paper lead to XLPE cable transition. Pole top and sub station/switchgear termination and conduct HV testing procedure.

All procedures and practices comply in accordance with electricity supply industry standards, enterprise regulations, relevant Australian standards and OH&S regulations.

3. Prerequisites

NE162 Electrical Principles 3.

NUE207 Powerline Safety Practices.

NE175 Workshop Practice.

4. Relationship to competency standards

This module addresses Unit 3.7 of the E.S.I. National Competency Standards for Overhead Line Work and Cable Jointing and Unit 5.7 of the Electrical Contracting Industry Award Standard (Volume 8).

5. Content**Cable types and construction****Safety aspects relating to lead covered paper insulated cables (PLY)****Tools and equipment relating to joining paper lead cables****Plumbing techniques****Low voltage joints (PLY)**

jointing instructions

straight through joint

	<p>Low voltage terminations (PLY) pole top terminations substation terminations distribution pillar/cubicle terminations</p> <p>High voltage joints (PLY) straight through tee joint stress control PLY to XLPE transition</p> <p>High voltage terminations (PLY) pole top terminations substation/switchgear terminations</p> <p>Repairs to cables types of damage repairs to sheath repairs to cores</p> <p>HV test procedures phase identification HV insulation resistance test</p>
6. Assessment strategy	
Assessment methods	Short answer questions (written, oral or graphic or computer based). Suitable practical exercises which assess the skills required of each learning outcome.
Conditions of assessment	Theory room for written tests together with practical field observation.
7. Learning outcome details	
Learning outcome 1	Identify low voltage and high voltage lead covered, paper insulated cables and describe the construction of the cables.
Assessment criteria	1.1 List and identify the various common low and high voltage lead covered, paper insulated cables. 1.2 Describe the structure of low and high voltage PLY cables. 1.3 Describe and identify the materials used, and characteristics of, each layer in the structure of low voltage PLY cables.

Learning outcome 2

Demonstrate lead wiping procedure.

Assessment criteria

- 2.1 List steps taken to prepare and tin lead sheath/sleeve.
- 2.2 List tools and equipment required for plumbing metal application and wiping.
- 2.3 List steps for applying, compacting, shaping and finishing.
- 2.4 Prepare lead sheath for application of plumbing metal.
- 2.5 Applying plumbing metal, complete shaping and finish joint.

Learning outcome 3

Prepare and joint de-energised low voltage lead sheathed, paper insulated cables.

Assessment criteria

- 3.1 Identify and interpret all technical drawings required to joint de-energised low voltage lead sheathed, paper insulated cables.
- 3.2 State the importance of supporting and training cables into position.
- 3.3 List steps taken to prepare, join and complete low voltage cable joint.
- 3.4 Install low voltage straight joint, insulate and seal sleeve.
- 3.5 Inspect and repair minor damage to outer sheath of lead sheathed low voltage cable.

Learning outcome 4

Terminate low voltage lead sheathed, paper insulated cables.

Assessment criteria

- 4.1 Identify and interpret all technical drawings required to joint de-energised low voltage lead sheathed, paper insulated cables.
- 4.2 Prepare tools, equipment and cable for termination.
- 4.3 Terminate low voltage lead sheathed, paper insulated cables.

Learning outcome 5

Prepare and joint high voltage lead sheathed, paper insulated cables.

Assessment criteria

- 5.1 Identify and interpret all technical drawings required to joint high voltage lead sheathed, paper insulated cables.

	5.2 Identify methods of jointing high voltage lead sheathed, paper insulated cables.
	5.3 Prepare tools, equipment and cable for jointing.
	5.4 Joint high voltage lead sheathed, paper insulated cables.
Learning outcome 6	Prepare and install a transition joint between XLPE and lead sheathed, paper insulated cables.
Assessment criteria	6.1 Identify and interpret all technical drawings required to install a transition joint between XLPE and lead sheathed, paper insulated cables.
	6.2 Identify method of install a transition joint between XLPE and lead sheathed, paper insulated cables.
	6.3 Prepare tools, equipment and cable for jointing.
	6.4 Install a transition joint between XLPE and lead sheathed, paper insulated cables.
Learning outcome 7	Conduct high voltage lead sheathed paper insulated cable test procedures.
Assessment criteria	7.1 Test instruments prepared for cable test.
	7.2 Test high voltage under ground cables upon completion of joint/termination/fault repair.
8. Delivery of the module	
Delivery strategy	Delivery strategies must be suitable for both theoretical and/or practical learning and module purpose. It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning sequence other than indicated in the body of this module descriptor.
Resource requirements	Enterprise construction manuals Relevant Australian standards Enterprise work manuals and standing instructions Relevant manufacturers' equipment manuals
Occupational health and safety requirements	Students should be made aware of Occupational Health and Safety issues in all situations and be expected to demonstrate safe working practices at all times. Electrical safety must be emphasised.