

<b>DOMAIN</b>	Core Electrical				
<b>STANDARD</b>	750	v9	Demonstrate knowledge of electrical test instruments and take measurements	Level 2	2 Credits
<b>ENTRY</b>	There are no pre-requisite unit standards.				

LEARNER TO COMPLETE					
Name			Company		
NSI No.			Email / phone		
<b>Pre-assessment confirmation</b>					
I, the <b>learner</b> , <ul style="list-style-type: none"> <li>Understand the assessment process and assessment requirements for this unit.</li> <li>Understand the appeals and resubmission processes.</li> <li>Believe I have the skills and knowledge to successfully complete the assessment requirements.</li> </ul>					
Assessment Submission: (Tick ✓ appropriate circle)	<input type="radio"/>	1st Submission	<input type="radio"/>	1st Resubmission	<input type="radio"/> Final Resubmission

ASSESSOR TO COMPLETE	
Name	Company
Email / phone	
<b>Pre-assessment confirmation</b>	
I, the assessor, can confirm the learner has achieved any pre-requisite requirements. <input type="radio"/>	

ASSESSMENT JUDGEMENT & RESULT	
I, the <b>assessor</b> , have reviewed the learner's evidence for Unit Standard 750 v1 and judge that it is sufficient and authentic.	<b>YES / NO</b>
I, the <b>assessor</b> , confirm the learner has achieved this unit standard.	<b>YES / NO</b>
Signature	Date

<b>POST ASSESSMENT FEEDBACK</b>
<b>RESUBMISSION DETAILS (IF REQUIRED)</b>

# LEARNER INSTRUCTIONS:

## YOU WILL NEED TO BE ABLE TO:

- Demonstrate knowledge of electrical test instruments.
- Select and use four electrical test instruments.

## IMPORTANT INFORMATION

- Carefully read through this Assessment Guide so you know exactly what is expected.
- All evidence you provide for this assessment must be your own work.
- You can attach additional material which shows you have the required skills and knowledge, e.g. job sheets, checklists, work samples, photos, screenshots, videos.
- Clearly name and label all attached evidence.
- Your assessor may choose a verifier from your workplace to observe and/or verify your work.

What you need to do		Tick when complete
Question Set 1	Answer questions about electrical test instruments	<input type="radio"/>
Practical worksheet 1	Select and use electrical test instruments	<input type="radio"/>

## RESUBMISSIONS:

Under Apprentice Training New Zealand (ATNZ) policy you have a maximum of **two** resubmission opportunities for this assessment. In total you will have three opportunities to meet the unit standard requirements. Information about the ATNZ resubmission process can be found in the Learner Regulations.

## APPEALS:

Your Assessor, Observer or Verifier will discuss with you ATNZ's Assessment Appeals process before carrying out this assessment. Information about the Assessment Appeals process can be found in the Learner Regulations.

# Question Set 1 – Demonstrate knowledge of electrical test instruments.

Answer the following questions about electrical test instruments.

- Use your own words.
- You can answer the questions in writing or give your answers verbally to your assessor who will write down what you say. *You may need to arrange this in advance.*
- Your assessor may ask you additional questions to check your knowledge and understanding.

<b>Your name</b>		
<b>Workplace</b>		
<b>Answers written by:</b>	<b>Learner</b> ○	<b>Assessor</b> ○ <i>When using verbal questioning, record key points from the learner's responses as accurately and fully as possible.</i>

## QUESTION SET 1

1. Identify the **TWO (2)** criteria used for classifying test instruments in Aotearoa?

PC 1.1

Tick to select correct answer(s)	Options	Tick
<input type="checkbox"/>	The country in which they are produced	○
<input type="checkbox"/>	Their measurement capabilities	
<input type="checkbox"/>	The environments in which they are used	
<input type="checkbox"/>	Their ability to be used outdoors	

2. Draw a line to **match** the Class Category with its correct description.

PC 1.1

Class Category	Description	Tick
<b>Cat I</b>	For measurements at the source of the low-voltage installation, such as electricity meters and primary overcurrent protection devices.	○
<b>Cat II</b>	For measurements on circuits not directly connected to the mains, such as electronics and protected secondary circuits.	
<b>Cat III</b>	For measurements on circuits directly connected to the low-voltage installation, such as household appliances and portable tools.	




<b>Cat IV</b>	For measurements on fixed installations, such as distribution boards, circuit breakers, and industrial equipment.	
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3. The Electrical Workers Registration Board (EWRB) states that “Best practice when carrying out testing on low voltage installations, is to use instruments with a minimum class category rating of \_\_\_\_\_?” PC 1.1

Select the correct **Class Category** from the list.

Class Category	Tick
Cat I	○
Cat II	
Cat III	
Cat IV	

4. Identify each of the FOUR (4) electrical test instruments. PC 1.2

Test instrument	Tick to identify the test instrument	Tick
	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○
	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○
	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○

	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	<input type="radio"/>
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5. For each of the FOUR (4) electrical test instruments, **select the description** that best explains what it measures (principle of operation). PC 1.2

Test instrument	Principles of operation - What is measured with this instrument.	Tick
<b>Multimeter</b>	<input type="checkbox"/> Combines several measurement functions in one unit. <input type="checkbox"/> Measures the resistance of electrical insulation. <input type="checkbox"/> Measures the impedance of the earth fault loop. <input type="checkbox"/> Measures current without needing to make direct contact with the conductor.	<input type="radio"/>
<b>Clip-on ammeter (Clamp meter)</b>	<input type="checkbox"/> Combines several measurement functions in one unit. <input type="checkbox"/> Measures the resistance of electrical insulation. <input type="checkbox"/> Measures the impedance of the earth fault loop. <input type="checkbox"/> Measures current without needing to make direct contact with the conductor.	<input type="radio"/>
<b>Insulation tester</b>	<input type="checkbox"/> Combines several measurement functions in one unit. <input type="checkbox"/> Measures the resistance of electrical insulation. <input type="checkbox"/> Measures the impedance of the earth fault loop. <input type="checkbox"/> Measures current without needing to make direct contact with the conductor.	<input type="radio"/>
<b>Earth loop impedance tester</b>	<input type="checkbox"/> Combines several measurement functions in one unit. <input type="checkbox"/> Measures the resistance of electrical insulation. <input type="checkbox"/> Measures the impedance of the earth fault loop. <input type="checkbox"/> Measures current without needing to make direct contact with the conductor.	<input type="radio"/>

6. **Match** each of the **FOUR (4)** electrical test instruments to the correct description of when its used (application). PC 1.2

Application – when the tool is used	Test instrument	Tick
Used for measuring current in live circuits, especially in situations where it is impractical or unsafe to disconnect the circuit.	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○
Used to verify that the protective devices (like circuit breakers and fuses) will operate correctly in the event of an earth fault.	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○
Used to troubleshoot electrical problems such as checking circuit continuity, measuring battery voltage, and diagnosing electrical faults.	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○
Used to ensure the safety and reliability of electrical installations by checking the insulation resistance of cables, transformers, and other electrical equipment.	<input type="checkbox"/> Multimeter <input type="checkbox"/> Clip-on ammeter <input type="checkbox"/> Insulation tester <input type="checkbox"/> Earth loop impedance tester	○

7. Using a digital thermometer correctly is essential for accurate temperature measurements. Put the steps into the right order to show how you would use this instrument. PC 1.3

Order	Process step	Tick
	Record the reading	○
	Take a reading	
	Ensure meter is reading correctly	
	Select the correct type of thermocouple for the job and ensure it is compatible with thermometer	
	Check reading meets system parameters.	

8. Thermal test instruments can be used to identify and diagnose issues in electrical systems. In which of the following instances would you consider using a thermal test instrument? PC 1.3

Answer	When would you use?	Tick
<input type="checkbox"/>	Commissioning new installations	<input type="radio"/>
<input type="checkbox"/>	During routine maintenance to check for excessive heat in switchgear, circuit boards and plant	
<input type="checkbox"/>	De-commissioning old installations	
<input type="checkbox"/>	Locating faults on new and existing plant	

9. Using test instruments incorrectly can lead to a range of issues. **Identify FOUR (4)** consequences that could occur when **incorrectly using** test instrument use from the list below. PC 1.4

Answer	Options	Tick
<input type="checkbox"/>	Correct measurements	<input type="radio"/>
<input type="checkbox"/>	Polarity Reversed	
<input type="checkbox"/>	Incorrect Connection to the Circuit	
<input type="checkbox"/>	Safe operation	
<input type="checkbox"/>	Incorrect Range or Function Selection	
<input type="checkbox"/>	Proper diagnosis	
<input type="checkbox"/>	Open circuit fuse in fused lead	



# Practical worksheet 1 – Selection and use of electrical test instruments.

<b>Your name</b>		
<b>Workplace</b>		
<b>Evidence provided by:</b>	<b>Learner</b> ○	<b>Assessor</b> ○ <i>When using verbal questioning, record key points from the learner's responses as accurately and fully as possible.</i>
<b>Verifier Name</b>		
<b>Verifier Signature</b>		<b>Date:</b>

ASSESSMENT JUDGEMENT & RESULT	
I the <b>assessor</b> , have reviewed the learner's evidence for the <b>Practical Worksheet</b> for Unit Standard 750 v1 and judge that it is sufficient and authentic.	<b>YES / NO</b>
I the <b>assessor</b> , confirm that <b>FOUR (4)</b> tests have been completed using <b>at least FOUR (4)</b> different test instruments.	<b>YES / NO</b>
Signature	Date

## NOTES TO THE LEARNER

You must be observed using electrical testing equipment on **FOUR (4)** separate occasions.

- You must complete **FOUR (4)** tests
- Using at least **FOUR (4)** different test instruments from the list below:
  - multimeter,
  - clip-on ammeter,
  - insulation tester,
  - earth loop impedance tester,
  - RCD tester,
  - appliance tester**OR**
  - other appropriate electrical testing tool commonly used in your job.

You will need to:

- Complete the **BLUE** sections of each of the **Four (4)** observation checklists.
- An assessor or verifier will need to complete the **ORANGE** sections.
- Follow workplace safety procedures.
- Attach any required evidence.
- You may be asked additional questions to check your knowledge and understanding and may need to demonstrate your skills and/or carry out tasks more than once.

## NOTES TO THE ASSESSOR OR VERIFIER

- Complete the **ORANGE section** of each observation checklist. By completing the checklists, you are confirming that you have seen the learner complete the tasks and/or demonstrate the skills.
- All tasks must be carried out in accordance with accepted industry practice.
- Check the learner has completed all **BLUE sections** and has attached additional evidence (if required).

# Observation Checklist – Test 1

**Learner** to complete **BLUE** sections. **Verifier/Assessor** to complete **ORANGE** sections

Tasks to be completed		Learner to complete		Verifier to confirm	
1	What test instrument you have selected?			Correct instrument selected for type of test	○
2	What test are you conducting?				
3	Inspect instrument <b>visually</b> for safety prior to testing	Were there any issues? <b>Yes / No</b>	If yes – what?	Instrument inspected correctly	○
4	Demonstrate the <b>prove-test-prove</b> method according to industry practice	Were there any issues? <b>Yes / No</b>	If yes – what?	Demonstrated correctly	○
5	Take measurements and write results in the table	Results:		Measured and compared correctly	○
6	Compare your results with expected readings (based on equipment)	Do they match expected reading? <b>Yes / No</b>			
7	What is the approximate tolerance you expect to see for each measurement?	List tolerances	Within tolerance? <b>Yes / No</b>	Verified within tolerance	○
Date completed:				Evidence attached?	Yes/No

## FEEDBACK ON TEST 1

## RESUBMISSION DETAILS (IF REQUIRED)

# Observation Checklist – Test 2

**Learner** to complete **BLUE** sections. **Verifier/Assessor** to complete **ORANGE** sections

Tasks to be completed		Learner to complete		Verifier to confirm	
1	What test instrument you have selected?			Correct instrument selected for type of test	○
2	What test are you conducting?				
3	Inspect instrument <b>visually</b> for safety prior to testing	Were there any issues? <b>Yes / No</b>	If yes – what?	Instrument inspected correctly	○
4	Demonstrate the <b>prove-test-prove</b> method according to industry practice	Were there any issues? <b>Yes / No</b>	If yes – what?	Demonstrated correctly	○
5	Take measurements and write results in the table	Results:		Measured and compared correctly	○
6	Compare your results with expected readings (based on equipment)	Do they match expected reading? <b>Yes / No</b>			
7	What is the approximate tolerance you expect to see for each measurement?	List tolerances	Within tolerance? <b>Yes / No</b>	Verified within tolerance	○
Date completed:				Evidence attached?	Yes/No

## FEEDBACK ON TEST 2

## RESUBMISSION DETAILS (IF REQUIRED)

# Observation Checklist – Test 3

**Learner** to complete **BLUE** sections. **Verifier/Assessor** to complete **ORANGE** sections

Tasks to be completed		Learner to complete		Verifier to confirm	
1	What test instrument you have selected?			Correct instrument selected for type of test	○
2	What test are you conducting?				
3	Inspect instrument <b>visually</b> for safety prior to testing	Were there any issues? <b>Yes / No</b>	If yes – what?	Instrument inspected correctly	○
4	Demonstrate the <b>prove-test-prove</b> method according to industry practice	Were there any issues? <b>Yes / No</b>	If yes – what?	Demonstrated correctly	○
5	Take measurements and write results in the table	Results:		Measured and compared correctly	○
6	Compare your results with expected readings (based on equipment)	Do they match expected reading? <b>Yes / No</b>			
7	What is the approximate tolerance you expect to see for each measurement?	List tolerances	Within tolerance? <b>Yes / No</b>	Verified within tolerance	○
Date completed:				Evidence attached?	Yes/No

## FEEDBACK ON TEST 3

## RESUBMISSION DETAILS (IF REQUIRED)

# Observation Checklist – Test 4

**Learner** to complete **BLUE** sections. **Verifier/Assessor** to complete **ORANGE** sections

Tasks to be completed		Learner to complete		Verifier to confirm	
1	What test instrument you have selected?			Correct instrument selected for type of test	○
2	What test are you conducting?				
3	Inspect instrument <b>visually</b> for safety prior to testing	Were there any issues? <b>Yes / No</b>	If yes – what?	Instrument inspected correctly	○
4	Demonstrate the <b>prove-test-prove</b> method according to industry practice	Were there any issues? <b>Yes / No</b>	If yes – what?	Demonstrated correctly	○
5	Take measurements and write results in the table	Results:		Measured and compared correctly	○
6	Compare your results with expected readings (based on equipment)	Do they match expected reading? <b>Yes / No</b>			
7	What is the approximate tolerance you expect to see for each measurement?	List tolerances	Within tolerance? <b>Yes / No</b>	Verified within tolerance	○
Date completed:				Evidence attached?	Yes/No

## FEEDBACK ON TEST 4

## RESUBMISSION DETAILS (IF REQUIRED)