

## PERFORM TESTING OF ELECTRICAL INSTALLATION

UNIT CODE: ENG/OS/EI/CR/04/6

### UNIT DESCRIPTION

This unit covers the competencies required to carry out inspection and testing of an electrical installation. The inspection and testing work covers; identification of types of test, preparation of test equipment, verifying installed fittings, conducting performance tests, recording testing results, generation of reports and issuance of certificates.

### ELEMENTS AND PERFORMANCE CRITERIA

<b>ELEMENT</b> These describe the key outcomes which make up workplace function.	<b>PERFORMANCE CRITERIA</b> These are assessable statements which specify the required level of performance for each of the elements <i>(Bold and italicised terms are elaborated in the Range)</i>
1. Conduct physical inspection	1.1 <b>Visual inspection</b> is carried out 1.2 <b>Fitting points</b> and equipment are identified 1.3 Physical condition of all fittings is verified for safety appropriateness
2. Identify the test to be carried out	2.1 The <b>installation</b> to be tested is identified 2.2 Test points are identified 2.3 Relevant standards for testing are applied
3. Prepare test equipment	3.1 Appropriate <b>Test equipment</b> are identified 3.2 Test equipment are checked for appropriate specifications and functionality 3.3 Test equipment are prepared and stored for safe and easy access in accordance with established procedure
4. Perform the test	4.1 <b>Test parameters</b> are identified 4.2 Test equipment are assembled 4.3 Test sequence procedure is decided based on the test standards 4.4 Safety precautions are adhered to 4.5 Additional precaution is observed on the installation in hazardous environment as per EHS standard 4.6 <b>Tests</b> are carried out in line with the IEE regulations 4.7 Functionality of all devices including protective devices is checked as per the set standards 4.8 Test results are recorded as per agreed format

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	4.9 Test results are compared with permissible data parameters in data sheets and standards 4.10 Test report is compiled and shared with relevant parties
5. Issue certificates	5.1 Test certificate is issued to the relevant parties 5.2 Wiring certificate is issued to the relevant parties

## RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance

<b>Variable</b>	<b>Range</b> <i>May include but is not limited to:</i>
1. Installation	1.1 Domestic 1.2 Industrial 1.3 Commercial 1.4 Agriculture/ horticulture 1.5 Water heater
2. Test equipment	2.1 Multimeter/AVO meter 2.2 Wattmeter 2.3 Insulation resistance tester 2.4 Loop impedance tester 2.5 Earth resistance tester 2.6 Clamp meter 2.7 Power quality analyser 2.8 Infrared camera 2.9 Phase sequence meter 2.10 Frequency meter 2.11 Synchroscope 2.12 Tachometer 2.13 Tacho generator 2.14 Laser meter 2.15 Lux meter

<b>Variable</b>	<b>Range</b> <i>May include but is not limited to:</i>
3. Visual inspection	Check for: 3.1 Firmness of accessories/equipment 3.2 Loose connections 3.3 Damaged equipment/component if any 3.4 Colour coding
4. Fitting points	4.1 Switches 4.2 Cables 4.3 Socket outlets 4.4 Light fittings 4.5 Conduits and cable trays 4.6 Trunking 4.7 Motors 4.8 Power generators 4.9 Pumps
5. Test parameters	5.1 Potential difference between circuits 5.2 Power 5.3 Resistance 5.4 Voltage 5.5 Current 5.6 Inductance/capacitance 5.7 Frequency 5.8 Q- factor 5.9 Power factor 5.10 Harmonics 5.11 Speed of rotary equipment
6. Tests	6.1 Continuity 6.2 Insulation resistance 6.3 Polarity 6.4 Earth electrode resistance 6.5 Earth fault loop impedance 6.6 Phase sequence 6.7 Speed

## REQUIRED KNOWLEDGE AND UNDERSTANDING

*The individual needs to demonstrate knowledge and understanding of:*

<b>1. Organisational and legislative requirements including:</b>	
1.1	The manufacturer's warranty requirements relating to inspection and testing activities for the electrical installations and related components.
1.2	The legal and statutory requirements relating to the electrical installation and components.
1.3	Legislation and workplace procedures relevant to: 1.3.1 Health and safety; 1.3.2 The environment (including waste disposal); 1.3.3 Appropriate personal protection equipment (PPE).
1.4	Workplace procedures for: 1.4.1. Using test tools and instruments 1.4.2. Work place communication; 1.4.3. Time management 1.4.4 Tools and equipment management
1.5	The importance of documentation and keeping records
1.7	The relationship between time and costs.
<b>2. The use of technical information including:</b>	
2.2	The importance of using the correct sources of technical information.
3.	Performing tests including:
3.1	3.1.1 Connection of testing equipment 3.1.2 Operation of testing equipment 3.1.3 Recording and interpretation of test results 3.1.4 Making recommendations based on test results 3.1.5 Compiling test report

## FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:	
<ul style="list-style-type: none"> <li>• Communications (verbal and written);</li> <li>• Proficient in using test equipment;</li> <li>• Time management;</li> <li>• Analytical;</li> <li>• Faults troubleshooting;</li> </ul>	<ul style="list-style-type: none"> <li>• Decision making;</li> <li>• First aid;</li> <li>• Report writing;</li> </ul>

<ul style="list-style-type: none"> <li>• Problem solving;</li> <li>• Planning;</li> </ul>	
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## EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

1. Critical Aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> <li>1.1 Applied and adhered to safety procedures</li> <li>1.2 Applied the procedures of testing according to the standard</li> <li>1.3 Identified the types of tests to be carried out</li> <li>1.4 IEE regulations were observed during testing</li> <li>1.5 Test equipment were identified according to the type of tests that were to be carried out</li> <li>1.6 Obtained and recorded test values accurately</li> <li>1.7 Interpreted the recorded test results</li> </ol>
2. Resource Implications	<p>Resources the same as that of workplace are advised to be applied including</p> <ol style="list-style-type: none"> <li>2.1 Electrical installation tool kit</li> <li>2.2 Multimeter/AVO meter</li> <li>2.3 Wattmeter</li> <li>2.4 Insulation resistance tester</li> <li>2.5 Clamp meter</li> <li>2.6 Phase sequence meter</li> <li>2.7 Frequency meter</li> <li>2.8 Tacho meter</li> </ol>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ol style="list-style-type: none"> <li>3.1 Observation</li> <li>3.2 Oral questioning</li> <li>3.3 Practical test in conducting test</li> <li>3.4 Demonstration of interpretation of test results</li> </ol>
4. Context of Assessment	<p>Competency may be assessed individually</p> <ol style="list-style-type: none"> <li>4.1 In the actual workplace</li> <li>4.2 Simulated environment of the work place</li> </ol>
5. Guidance information for assessment	<p>Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.</p>