
NUE 505A

Electrical Systems Safety

Assessment Guide





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Purpose of this guide

This guide is to assist Registered Training Organisations to develop and to manage assessment events that satisfy the criteria specified in module NUE 505A Electrical Systems Safety. The Guide covers:

- The scope of the assessment events.
- How the module is intended to be used.
- Assessment design and development including a sample specification of knowledge and practical assessments items.
- Managing assessment
- Suggested set-ups for the practical assessments.

The Appendices provide sample assessment instruments, an assessment specification template and an example set-up for practical assessment.

How Module NUE 505A Electrical Systems Safety is intended to be used

During the training of apprentices/trainees undertaking Certificate III Electrotechnology Systems Electrician evidence of competency is sourced from two areas. These are:

- Formal assessments events in an off-job program covering underpinning knowledge (and associated skills), specified for each Unit of Competency, and
- Work performance, primarily from on-job experience, covering the range of work and performance standards specified for each Unit of Competency

Because of the hazardous nature of electricity the Electrotechnology Industry has deemed that a third source of evidence is necessary to ensure that a learner has acquired the knowledge and skills critical to safety. These are summarised as:

- Working safely with electricity.
- Ensuring electrical installations are safe and comply with standards.
- Selecting equipment that complies with standards.
- Ensuring electrical protection systems operate in compliance with standards.

Module NUE 505A Electrical Systems Safety specifies the criteria for gathering this evidence through formal knowledge and practical assessment events. These assessment events should be undertaken only after evidence shows that a candidate has acquired the underpinning knowledge (and associated skills) and work performance standards as outline above.

Scope of the assessment

At the outset it is important to understand that this assessment in itself is not intended or suitable as a trade test for recognising competence as an electrical tradesperson. The evidence on which competency is deemed comprises results of assessments undertaken in a formal off-job program, the range of work and performance gathered from the workplace and the results of the assessment outlined in this guide.

The assessment outcomes specified in Module 505A focus on the higher knowledge and skills applicable to safety of electrical tradespersons themselves, their co-workers, industry and the community. To assist in conducting and managing the assessment it is recommended that it be divided into the following three tests:

- Test 1— Knowledge of performance standards to ensure electrical installations are safe
- Test 2 — Knowledge and skills in applying requirements to planning/designing and altering/repairing electrical installations to ensure they are safe.
- Test 3 — Skills and knowledge applied to arrangement of earthing and protective devices and to testing and identifying non-compliance of electrical installations.

A duration of the assessment is expected to be around 6 hours

To pass this module candidates shall achieve:

- a pass in Test 1 and Test 2, and
- a satisfactory result in Test 3.

Assessment design and development

A most useful tool for designing tests is to arrange the content / topics, item types and weightings into a table called a table of specifications. The first step in developing a table of specifications is to determine what is to be assessed. Normally this would require reading through the elements, underpinning knowledge and critical aspects of evidence listed in each of the Units of competency and extracting the relevant information. This is how the assessment outcomes and criteria described in the Module descriptor NUE 505A were derived and therefore provide topic / content information for the table of specifications.

The next step is to, identify the topic / content items that are best assessed in a knowledge test and those that are best demonstrated in a practical test.

Next, decide on the most appropriate item format and types to use in the knowledge tests. In considering the advantages and limitation of the various item types this guide recommends the following:

- Selected-response format using multiple choice items only.
- Constructed-response format using short answer questions, calculations, identification questions and completion (of diagrams) questions.
- Practical tasks that may include either written or oral constructed-response items directly related to the task.

Finally a weighting is applied to each topic / content depending on its significance in relation to the other topics / content. The weighting for each topic is distributed across item type to be used. This process usually involves review and iteration. Appendix A shows the Table of Specifications for the sample tests in Appendices B to D

Clearly the allocation of marks is the most effect way of assessing performance in the written tests. In this case Tests 1 and 2. This raises the thorny old question of the “pass mark”. A pass mark is an attribute of each test that is set against the same assessment criteria: how difficult is each item?; are difficult items weighted higher than easy items? and so on. So to be fair (and this is an AQTF requirement) a pass mark is not dictated in this guide. The pass mark specified for the sample tests in Appendices B and C is an attribute of these particular tests only.

Practical tasks are best assessed by components being given essential or critical status with the overall performance being the main consideration in judging whether performance is satisfactory or unsatisfactory. An assessment criteria check sheet for sample Test 3 (Appendix D) is given in Appendix E

Note: For more information on test items refer to *Designing Tests*, 2000. VETASSESS / Western Australian Department of Training and Employment

Managing assessment

As with all assessment activities for nationally recognised qualifications they are to follow the requirements of the Australian Quality Training Framework (AQTF). The following advice is intended to support this endeavour.

Reporting assessment results

The following report criteria is recommended:

- Results shall be reported against the criteria listed in the report sheet (Appendix F)
- A copy of his/her assessment reports should be given to the candidate.
- Where a candidate has been unsuccessful the report should advise of the assessment criteria against which sufficient knowledge and/or skill has not been shown.

Reassessment

An unsuccessful candidate shall;

- be provided with advice on preparing for the reassessment;
- not be reassessed within one month of his/her previous assessment attempt; and
- be required to undertake a different version of the complete Test in which they were unsuccessful.

Guide to resources for practical tasks.

The resources needed to assess the practical tasks in this module are an adaptation of the resources needed for other modules in the training program for Certificate III Electrotechnology Systems Electrician. It is recognised that these resources have been arranged in a number of different ways across different training/assessment providers. And it does not preclude using facilities in the workplace provided that the standard for assessment outlined in the guide are maintained.

Resources for the installation component of the assessment are expected to be generally consistent across training/assessment providers. For example, installation of an MEN earthing system in the case of the sample Test 3 (Appendix D) requires a main switchboard; consumer mains; an earth electrode; and an exposed conductive part e.g. metallic water pipe.

Although the resources for the installation testing and fault finding component of the assessment comprise a simulated installation their arrangement will vary somewhat. Some training/assessment providers use simulated installations with permanent faults built-in. Others used switches to create faults in various parts of the simulated installation. An extension of this is a combinations of switches to create faults providing greater assessment security. Any of these arrangements is acceptable as long as the facilities they provide are sufficient to meet the assessment requirements. An example of a simulated installation with the minimum facilities expected for assessing installation testing and fault finding is shown in Appendix F.

Appendices

- A Sample test Table of specifications.
- B Test 1 Knowledge.
- C Test 2 Installation planning.
- D Test 3 Practical.
- E Sample Test marks allocation, practical, assessment criteria and reporting.
- G Example simulated electrical installation for testing and fault finding.

Appendix A

Sample test Table of specifications

Appendix B

Sample Test 1 Knowledge

Appendix C

Sample Test 2 Installation Planning

Appendix D

Sample Test 3 Practical

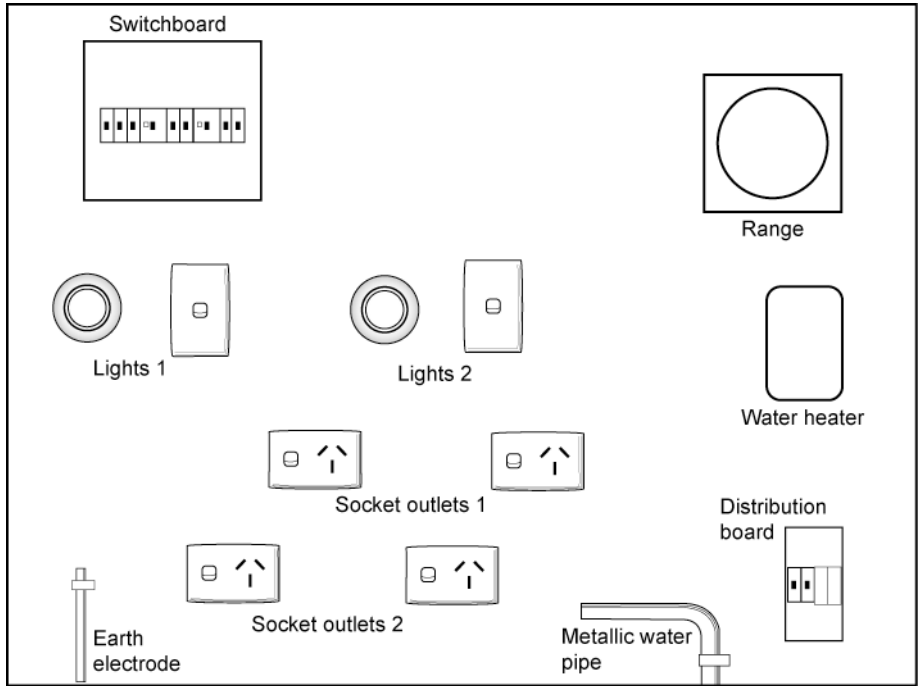
Appendix E

Sample Test marks allocation, practical, assessment criteria and reporting

Appendix F

Example simulated electrical installation for Testing and fault finding

Simulated installation:



Equipment is mounted on a 1200mm x 900mm ply board. Room has been allowed to incorporate fault switches.