



Pre-Assessment Manual: AM2 and AM2S

July 2019



By the industry, for the industry

Contents

Introduction	3
Safe Working Practices	5
Composite Installation (From TP&N Distribution Board)	7
Inspection, Testing and Certification of the Composite Installation	8
Fault Diagnosis	10
Assessment of Applied Knowledge	11
FAQs	12

Introduction

The AM2 has provided an independent assessment of the occupational competence of electrical installation apprentices for more than 30 years. The AM2S is the updated version for learners undertaking the Apprenticeship Standard.

Both assessments require candidates to perform a set of common occupational tasks and procedures that a fully qualified electrician might face when working in commercial or industrial premises, as well as dwellings. Candidates are assessed on installation, inspection & testing and fault finding. Their work must comply with the current British Standard (BS7671) and meet the requirements of relevant Health & Safety legislation and industry best practice.

The purpose of the assessments is to ensure all qualifying installation electricians achieve a single standard that has been agreed by the employers in the industry as meeting their expectations of newly qualified personnel. The content, structure and marking of the assessment is designed to produce evidence that a candidate has gained all the relevant safety critical competencies during their training process.

Assessment centres are not accessible for training purposes and NET licensed assessors are not involved in the training or development of candidates. Accordingly, the assessments provide a reliable and trusted independent assessment of safe, high quality standards for the electrical installation industry and are highly valued by employers, who regard them as proof of competence for an electrician.

The assessments are compulsory for apprentices, adult trainees or upskilling workers who seek to gain industry recognised qualified status; raising overall safety and skill levels and ensuring that candidates from various routes have the skills employers need in the following key areas:

- **Undertaking risk assessments for given circumstances**
- **The interpretation of specifications, and diagrams**
- **Safe isolation**
- **Planning and preparing to install, terminate and connect identified wiring systems**
- **Installing, terminating and connecting identified wiring systems**
- **The inspection, testing and certification of an electrical installation**
- **Fault diagnosis and recommend appropriate rectification**
- **Understanding and application of procedures, industry recognised working practices and the requirements of statutory and non - statutory regulations relevant to the electrotechnical industry.**

In accordance with the Installation Specification and the relevant statutory and non-statutory regulations you will be expected to install, terminate, connect, inspect, test and verify the installation that you install.

Brush up on these documents...

There's also a theory element of the assessments. You'll need to be up to speed on four different guides:

- **The Building Regulations (not just Part P, but any of the regulations that might impact on electrical installation work!)**
- **The current edition of the Wiring Regulations (BS7671)**
- **The On Site Guide**
- **The IET Guidance Note 3**

Make sure you revise these carefully - you don't want to spend three days in the AM2 test rig getting everything right, only to end up losing points on the theory aspects.

Know your paperwork

Then there's just three final pieces of paperwork left. Make sure you're confident in completing an IET Electrical Installation Certificate, and that your measured results conform to the requirements of BS7671. Also, make sure you're confident about completing a Schedule of Inspections and Schedule of Test Results and be certain you know how to carry out all the necessary tests for these.

Are you ready for assessment?

Your first port of call should be NET's Candidate Self Assessment Checklist. This is a compulsory piece of paperwork and we recommend that you use this during the last 3 months of your apprenticeship as part of an honest review of your readiness and to identify areas where further training or experience may be required.

The Checklist will show you everything you should have learned before going into the Assessment - read through it and make sure you have done it all! It's your employer's and trainer's responsibility to make sure you've covered everything on the list, so they should go through this with you and help identify any areas of concern.

Your employer and training provider must also sign the checklist to confirm that you have completed everything on the list and that you are ready to complete your assessment

Special considerations

If there are health or other circumstances which may require an application for adjustment to the assessment, please refer to the NET Special Considerations and Reasonable Adjustments Policy which is available on the NET website

On the day

Common sense can desert the best of us in exam season, so in the run up to the assessment it might be helpful to consider the following:

- **Get a good night's sleep the night before your first assessment day and during the assessment period - you need to be firing on all cylinders, so don't make big plans for the evenings!**
- **Make sure you know exactly where the test centre is and how to get there. Leave enough time to travel as well, you don't want to be late.**
- **Mobile phones, smart watches, mp3 players and all electronic devices are not allowed in the assessment area. If you have any of these with you, they will need to be handed in at the beginning of the assessment and signed out at the end of each day.**

NET is producing a range of additional resources to support candidates in preparing for AM2/AM2S - please visit www.netservices.org.uk/candidate-guidance for more details.

The assessment contains the following sections:

- **Safe Working Practices**
- **Composite Installation**
- **Inspection, Testing and Certification**
- **Safe Isolation**
- **Fault Diagnosis and Recommend Appropriate Rectification**
- **Assessment of Applied Knowledge**

Before starting the assessment, the Centre Assessor will brief you on the Assessment Centre's Health and Safety policies and procedures including those for First Aid, emergencies and evacuation of the premises.

You must ensure that you understand the Assessment Centre's emergency procedures. You must ensure that you know the location of equipment, tools, materials and first aid facilities.

Note: Candidates are NOT permitted to use their own tools, only those provided by the centre MUST be used

The Centre Assessor will also brief you on the procedures and requirements of all sections of the assessment.

The 'Candidate Guidance Manual' is for your reference throughout the assessment but **must remain in the assessment area**. Non-compliance with this procedure will result in you being disqualified from the assessment.

All relevant publications and documentation to complete the assessment will be made available by the Centre Assessor.

Relevant Publications and Documents:

- BS 7671 Requirements for Electrical Installations
- IET Guidance Note 3. Inspection and Testing
- IET On-Site Guide
- The Short Guide to the Building Regulations
- Candidate Guidance Manual

When required the following additional documentation will be provided:

- Risk Assessment
- BS 7671 Electrical Installation Certificate, Schedule of Inspections and Schedule of Test Results
- Fault symptom information

Further Information

1. The following documents are displayed in your assessment area:

- a) Health and safety information and fire procedures.
- b) Risk Assessment Information
- c) Schematic and Wiring Diagrams for the Electrical Installation
- d) Functional operation flowcharts.

Note: After carrying out inspection and testing the Centre Assessor will supervise you in the functional testing of all the final circuits and their connected components and equipment

2. You should:

- Carefully read all assessment instructions.
- Study the diagrams and information provided.
- Use the information throughout the assessment

If you do not understand any of the instructions, the Centre Assessor can provide further explanation if required.

3. You should bring to the attention of the assessor, any materials or equipment you consider are damaged or unsuitable.

4. You are responsible for your own safety, and the safety of others who may be affected by your work.

Sequence of assessment

To ensure a standard assessment at all centres the sections will be normally carried out in the following sequence:

1. Safe working practices
2. Composite installation
3. Inspection and Testing
4. Safe Isolation, Fault Diagnosis and Rectification
5. Assessment of applied knowledge

When you have finished a section, you cannot return to that section and any time left will not be available for other sections.

Section A1 - Safe Working Practices

Maximum Time Allowed: 45 Mins

You will be allowed a minimum of 10 minutes to read this section and prepare for assessment

To demonstrate occupational competence, you will be required to carry out the correct sequence for safe isolation of the assessment unit distribution board to allow you to safely complete the composite installation. This will be fully observed by the assessor as this is the only way that they can see what you are doing. This can seem intimidating at first and can be off putting so try and practice with a colleague watching you carry out some tasks on-site.

Safe isolation procedure

This is very important as if this is not done correctly on site it could result in someone getting an electric shock and in the worst-case death.

1. Identify your point of isolation
2. Inform the customer that you will be isolating the supply
3. Operate the isolator and lock off and fit warning notice
4. Select approved test equipment and prove that it is working
5. Test on outgoing side of isolator all combinations
 - L1 and L2
 - L1 and L3
 - L1 and Neutral
 - L1 and Earth
 - L2 and L3
 - L2 and Neutral
 - L2 and Earth
 - L3 and Neutral
 - L3 and Earth
 - Neutral and Earth
6. Re-prove your test equipment is working.

You will also need to carry out a review of safe working practices and undertake a risk assessment in accordance with organisational requirements and procedures prior to commencing the 'composite installation'. Record the findings on the relevant documentation.

Risk Assessment

This is a careful examination of the risks associated with both working practices and candidate and centre staff activities.

- A hazard is anything that may cause harm.
- A risk is a chance, great or small, that someone will be harmed by a hazard.

The aim is to make sure that no one becomes ill or gets hurt at the facility. There are three steps to achieve this:

1. Identify the Hazards

Look at what may cause harm to candidates, centre staff, or other people because of a work activity.

2. Decide Who Might be Harmed and How

Look at who may be affected by the work activity, how they may be affected; this may include other candidates and centre staff.

3. Evaluate the Risks and Decide on Precautions

If you find a hazard, there may be a risk to other people; you need to decide what steps must be taken to eliminate or reduce those risks as far as is reasonably practical:

- What needs to be done depends on whether the hazard is low risk or high risk
- You can determine this by looking at what type of injury may occur and how often it may happen
- It may be possible to remove the hazard altogether or to take steps to reduce this risk to an acceptable level
- If there is no risk present, then you do not need to take any action
- Record 'No action required' on the Risk Assessment document

Section A1 - Safe Working Practices - *Continued*

Common Errors section

- **Candidates have not demonstrated the correct procedure for Safe Isolation of Supplies**
 - Did not test all the combinations (10-point test)
 - Tested at the wrong position on the switch
- **Candidates do not prove test equipment before and after Safe Isolation**
 - If you do not prove the test equipment before and after you have used it how do you know that it is working correctly?
- **Candidates do not locate the key in a secure place**
 - If the key is not secure someone else could take it and reenergize the circuit, you are working upon.
- **Candidates do not fit warning notices**
 - Fitting a notice and informing people around you that the circuit will be isolated avoids issues with shutting down IT equipment and people trying to switch equipment back on.

Section A - Composite Installation (From TP&N Distribution Board)

Maximum Time Allowed: 8 Hours 30 Minutes for AM2 and 10 hours for AM2S

You will be allowed a minimum of 15 minutes to read this section and prepare for assessment

To demonstrate occupational competence, you will be required to:

- Apply industry working practices and procedures in keeping with relevant statutory and non- statutory regulations.
- Interpret the drawings and diagrams
- Prepare, install, connect and terminate conductors and cables to industry standards
- Terminate and connect at a TP&N Distribution Board and the identified equipment outlets as detailed in the candidates' handbook and diagrams
- Install and bend conduit systems (AM2S)

To complete this section of the assessment you must demonstrate occupational competence in accordance with statutory and non-statutory regulations and approved industry working practices.

You will need to make sure that you follow all of the instructions given in the candidates' handbook and drawings.

Common Errors

- **Candidates do not install the circuits in accordance with the requirements of BS 7671**
 - Not following the requirements of BS 7671 will mean that the installation will not be able to be certified and therefore not able to use.
- **Candidates do not install the circuits in accordance with the installation specification**
 - Not following the specification does not mean that the work you have completed is unsafe. However, if the customer has specified that the work is carried out a certain way and you do not follow that they would not have to pay and the work could have to be taken out and replaced. An example of this would be if the customer specified white conduit and you fitted black. The circuit would be electrically safe but not what was asked for.
- **Candidates do not select the correct type of protective device**
 - This could make the circuit unsafe or trip with no faults.
- **Candidates do not select the correct size and type of circuit conductors**
 - If the cable fitted is too small, then it will cause danger under load or fault conditions
 - If the circuit is not wired in the correct type of cable, then it may not have the protection against external influences required
- **Candidates do not sufficiently tighten glands or clamps**
 - These are checked and if they can be undone by hand they would not be deemed to be tight
- **Candidates do not sufficiently secure conductors in terminals**
 - If a conductor can be pulled out of a connection between finger and thumb it would be deemed as being loose
- **Candidates do not correctly identify conductors and cables**
 - Conductors need to be identified for what they are being used for, this as per chapter 51 of BS 7671
- **Candidates remove too much or too little insulation to make an effective electrical connection or increase the risk of electrical contact**
 - If the terminal screw is onto the insulation, then when the cable gets warm it will soften and the connection become loose and burn
 - If excessive insulation is removed, then contact could be made with live conductors.
 - When viewing a connection at 90 degrees you should not see any copper
- **Circuits are not connected in a way as to ensure effective functional operation**
 - If the circuit does not work, then the customer would not pay.
- **Candidates do not ensure effective segregation of extra low voltage and low voltage cables**
 - ELV cables must be in a different compartment of trunking to LV cables.

Section B - Inspection, Testing and Certification of the Composite Installation

Maximum Time Allowed: 3 Hours 30 Minutes

You will be allowed a minimum of 20 minutes to read this section and prepare for assessment

This section will be observed by the Centre Assessor.

You will be provided with the following documentation for use throughout the section:

- BS 7671 Requirements for Electrical Installations
- IET Guidance Note 3. Inspection & Testing
- IET On-Site Guide

To demonstrate occupational competence, you will be required to:

- Carry out a visual inspection of the installation.
- Complete the following tests on the installation:
 - a) Continuity of protective conductors, including main and supplementary bonding
 - b) Continuity of ring final circuit conductors
 - c) Insulation resistance
 - d) Polarity
 - e) Earth fault loop impedance
 - f) Additional protection (effectiveness of RCDs)
 - g) Prospective fault current
 - h) Check of phase sequence
 - i) Functional testing
- Correctly complete an Electrical Installation Certificate, Schedule of Inspections and Schedule of Test Results using the documentation provided.

You will be expected to follow practices and procedures that consider the presence of voltage sensitive equipment.

All testing procedures will be undertaken under the direct supervision of the Centre Assessor.

Faults/Alterations

During and within the time allowed for this section, you may correct any part of your installation that you decide is incorrect or not complete.

Section B - Inspection, Testing and Certification of the Composite Installation - *Continued*

Common Errors

- **Candidates do not prepare the instrument for use and set it on the correct range**
 - Selection the correct function or voltage
 - Remembering to null or zero leads
 - Check the meter is in date and safe to use
- **Candidates do not carry out the test in accordance with BS 7671**
 - You have the On-site guide with you so if unsure check how the test should be carried out.
 - Do not take shortcuts you have been shown on-site these may not be correct follow the way you have been shown in college
 - If you remember something and need to go back and repeat a test that is fine if you repeat any other tests that rely on that test being carried out.
 - Remember on lighting circuits to operate switches when required and parts of circuits after isolators or contactors.
- **Candidates do not record the test results**
 - This is normally when someone carries out testing and records results on a scrap of paper and then at the end cannot find reading they require.
 - Fill in the schedule of test results as you complete each test it will also highlight anything you may have forgotten.
- **Candidates do not verify test results obtained against the requirements of BS 7671**
 - The results need to be compared with the maximum values to check if they are within range allowed.
 - You may know the maximum values but to prove this they need to be documented on the schedule of test results.
- **Candidates do not complete BS 7671 Inspection 7 Testing documentation correctly and accurately**
 - The test documentation is a legal document and needs to be completed correctly.
 - There are templates in the On-site guide and Guidance note 3 showing you how to complete these documents if you are unsure.
 - You may test correctly but if the documentation is not correct the testing would not be proven as correct.
- **Candidates do not verify that the installed circuits and equipment function as intended**
 - Checking that the installation works as required before handing it over is important. If the installation did not function this would require revisits by someone to correct and you and your company reputation could be damaged.
- **Candidates do not reinstate connections correctly**
 - While testing, connections have been disconnected to carry out testing. It is important that connections are secure after testing. They are tested after the installation has been tested so you may cause an issue to a connection that was OK before testing if you do not re-terminate securely.

Section C1 (C AM2S) - Safe Working Practice

Maximum Time Allowed: 30 minutes

You will be allowed a minimum of 5 minutes to read this section and prepare for assessment

The safe isolation procedure will be fully observed by the Centre Assessor

To demonstrate occupational competence, you will be required to:

- Carry out safe isolation in the correct sequence to allow for the following tasks to be carried out.

Note: for tasks 1 & 2 all other circuits must remain energised.

Task 1, To replace a single-phase piece of equipment

Task 2, To replace a three-phase piece of equipment

Task 3, To isolate the distribution board in your fault diagnosis bay.

Common Errors

- Candidates do not carry out Safe isolation procedures correctly
 - This would be as in section A1
 - Only turn off the circuit you are going to work on
 - Is the item isolated or just turned off, check any switches to see if item is just switched off?

Section C2 (D AM2S) - Fault Diagnosis and Rectification

Maximum Time Allowed: 2 hours

You will be allowed a minimum of 5 minutes to read this section and prepare for assessment

To demonstrate occupational competence, you will be required to:

- Identify the fault in each circuit from the information provided by the Centre Assessor.
- State and record for the faults;
 - The type of each fault (Short or open circuit, High resistance or mis-connection)
 - The specific location of each fault (between what 2 points or on what piece of equipment)
 - How each fault could be rectified, and any additional works required to prove fault has been rectified

Common Errors

- Candidates do not correctly identify the faults
 - Location of the fault should be specific i.e. between point 1 and point 2. If you were sent to repair a circuit would you just replace the damaged piece of cable or rewire the whole circuit. Therefore, you need to identify the exact location of the fault.
 - The type of fault should be described as if you were talking to another electrician.
- Candidates do not record a correct method for rectifying the faults
 - What would you do to repair the fault
 - Also, how would you check that your repair was successful.

Section D (E AM2S) - Assessment of Applied Knowledge

Maximum Time Allowed: 1 Hour

You will be allowed a minimum of 5 minutes to read this section and prepare for assessment

You will be required to undertake an on-line assessment consisting of 30 multiple-choice questions.

You require 21 correct answers to pass the assessment (70%)

You will be assessed on your application of knowledge associated with the following:

- Health and Safety
- BS 7671 Requirements for Electrical Installations
- Building Regulations

You will be provided with the following publications:

- BS 7671 Requirements for Electrical Installations
- IET Guidance Note 3. Inspection & Testing
- IET On-Site Guide
- A Short Guide to the Building Regulations

You are not allowed any other documentation.

You must complete the on-line feedback section at the end of the on-line examination.

Common Errors

- **Candidates do not understand how to access information from BS 7671**
 - Get used to finding information there are practice exams available online for BS 7671
- **Candidates do not understand the requirements of the Building Regulations**
 - Practice finding items from the Building Regulations.

FAQs

Q: Who can I speak to if I have a query about my assessment or booking an assessment?

A: All assessment enquiries must be made directly to the centre of your choice from the list of NET licenced Centres.

Q: If the centre I contact has a waiting time for assessment availability, can I go to another centre?

A: Yes - candidates are free to book with any assessment centre. Please bear in mind that selecting an alternative centre located further away may incur additional travel or accommodation costs.

Q: How can I book an assessment re-sit?

A: You can re-sit your assessment at the centre where you sat it initially - or any other centre of your choice. Please contact the centre directly to arrange.

Q: Is there any preparation I can do prior to taking my assessment?

A: Unless otherwise specified, before registering for an assessment the Candidate Self-Assessment Checklist must be completed and signed by you as the candidate, your employer and your training provider (unless you are an independent candidate). You must take this with you on the first day of your assessment to be permitted entry.

Candidates are advised to read and understand all information documents before booking an assessment. We also recommend that candidates are familiar with the IET On-Site Guide and BS7671 publications.

Q: Can I do a pre-assessment training course?

A: Many centres offer pre-assessment training or refresher courses. To enquire, contact your preferred centre directly.

Q: I have not received my results. Where can I enquire?

A: Please note that NET cannot provide candidate results over the phone. To enquire about assessment results, please contact your chosen assessment centre. Most issues surrounding the non-receipt of results arise because of incorrect email addresses being provided at the point of booking.

If your centre experiences technical problems during the assessment process, they must raise a query with NET's IT support and will contact you with an update once the matter has been resolved.

Q: I've received my results and wish to query the marks I've been given. How do I go about this?

A: Please contact your chosen assessment centre directly. If you are not satisfied with the assessment outcome and believe that you have grounds for an appeal, please see the NET appeals policy.

Q: How much does an assessment or re-sit cost?

A: Please contact your assessment centre directly to enquire about their fees.

Q: How do I obtain a replacement or duplicate certificate?

A: To request a replacement certificate, please download our replacement certificate form This must be completed and returned (including payment) to the address given on the form. We aim to process certificate requests within one week

Contacting NET

National Electrotechnical Training

NET, CAN Mezzanine, 49-51 East Road, London N1 6AH

T: 020 7250 8511 **E:** info@netservices.org.uk **www.netservices.org.uk**

NET is a registered charity. Registered Charity No: 1068863

