Pre-Assessment Manual: AM2 - all versions

January 2023

By the industry, for the industry

Contents

Introduction

The AM2 has provided an independent assessment of the occupational competence of electrical installation apprentices for more than 30 years. In recent years, the AM2S has become the updated version for learners undertaking the Apprenticeship Standard and the AM2E is for those undertaking the Electrotechnical Experienced Worker Assessment.

The assessments are compulsory for apprentices, adult trainees or upskilling workers who seek to gain industry recognised qualified status to demonstrate they have knowledge and competence 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**

This Pre-Assessment Manual is designed to help candidates prepare for their upcoming assessment. In this document you'll be able to read:

- **Details on each section of the assessment**
- **Common areas – where candidates fail and how to address this**
- **General hints and tips for success**

Are you ready for assessment?

Your first port of call should be NET's Candidate Self-Assessment Checklist. This is a compulsory document and we recommend that you use this well in advance of your assessment, 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 training provider'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 (if you're an apprentice) must also sign the checklist to confirm that you have completed everything on the list and that you are ready to complete your assessment. You won't be able to book your assessment until you have signed and submitted this document.

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.

Before you attend...

Common sense can desert the best of us when under pressure, 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.**

Get more support...

NET has a series of Top Tips videos to support candidates in preparing for their assessment - please visit www.netservices.org.uk/videos for more details.

Centre Induction process

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.

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

Tools

You are permitted to use your own **insulated side cutters, wire strippers and pliers only,** providing they are in a safe and serviceable condition (i.e. insulation undamaged). NET recommends they are insulated to the BS EN IEC 60900 standard. Your assessor may refuse personal tools if they are unsafe to use. These tools will still be available from the assessment centre for you to use, if you prefer. All other tools outside of these three items will be supplied by the centre and must be used. Any personal tools will be photographed by the assessor and added to your assessment record.

Publications and Documents

Here's a list of all the publications and documents that the Centre Assessor will provide to you at relevant times throughout the assessment: All documents supplied will be the current versions at the time of the assessment.

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

The 'Candidate 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.

When required, the following additional documents will be provided:

- **Risk Assessment**
- **BS 7671 Electrical Installation Certificate, Schedule of Circuit Details and Schedule of Test Results**
- **Fault symptom information**
- **Candidate timesheet**

Brush up on these for your theory...

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 assessment test rig getting everything right, only to end up losing points on the theory aspects.

Know your Paperwork

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 Circuit Details and Schedule of Test Results and be certain you know how to carry out all the necessary tests for these.

Follow the Specification!

A fundamental aspect of industry competence is being able to follow a specification. Even if your work is safe and meets BS7671 standard, if you have not followed the specification details, you will not pass the assessment.

Candidates regularly fail because they do not follow the written instructions in areas such as positioning, measurements, or cable types and sizes. The fact your alternative approach may have been safe or deemed acceptable in your workplace is irrelevant – the ability to follow a specification as set out is a core competence for an electrician.

In your Assessment Area:

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.

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.

Your Responsibilities:

You should bring to the attention of the assessor, any materials or equipment you consider are damaged or unsuitable so that they can be replaced.

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

Assessment sections and sequence:

The assessment contains the following sections:

- **Safe Working Practices**
- **Composite Installation**
- **Inspection, Testing and Certification**
- **Safe Isolation of Circuits**
- **Fault Diagnosis and Rectification**
- **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. You are required to complete a candidate timesheet, confirming start and finish times for each section, including all breaks.

Photographs

At various points during your assessment your assessor is required to take photographs of your work.

Safe Working Practices

Maximum Time Allowed: 45 minutes.

You will be allowed 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.**

Safe Working Practices - *Continued*

Common Errors

- **Candidates have not demonstrated the correct procedure for Safe Isolation of Supplies.**
  - Make sure you test all the combinations (10-point test).
  - Make sure you are not testing 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 re-energize the circuit you are working on.
- **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.

Composite Installation (from TP&N Distribution Board)

Maximum Time Allowed: 8 hours 30 minutes for AM2; 10 hours for AM2S/AM2E.

You will be allowed 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 Candidate Manual and diagrams.**
- **Bend and install conduit systems (AM2S/E).**

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 Candidate Manual and drawings.

Common Errors

- **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 those instructions, 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 it is not what was asked for.

- **Candidates do not install the circuits in accordance with the requirements of BS 7671.**
  - Not following the requirements of the current edition of BS 7671 will mean that the installation cannot be certified
- **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 with the correct type of cable, then it may not have the protection against external influences.
- **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 loose.
- **Candidates do not correctly identify conductors.**
  - You need to identify what conductors are being used for, this is as per Chapter 51 of BS 7671.
- **Candidates either remove too much insulation, increasing the risk of electrical contact, or not enough to make an effective electrical connection.**
  - If the terminal screw is on the insulation, when the cable gets warm it will soften and the connection can become loose and burn.
  - If excessive insulation is removed, 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.

Inspection, Testing and Certification

Maximum Time Allowed: 3 hours 30 minutes.

You will be allowed 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:

- **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 in accordance with Guidance Note 3:**
  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) Prospective fault current
  g) Check of phase sequence
  h) Additional Protection
  i) Functional testing
- **Correctly complete an Electrical Installation Certificate, Schedule of Circuit Details and Schedule of Test Results.**
- **Verify the selected results to comply with BS 7671, 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 faulty.

Useful Resources

Be sure to take advantage of the resources NET has developed to help you prepare for this section of the assessment:

Sample Forms

You can download a blank Electrical Installation Certificate, Schedule of Circuit Details form and Schedule of Test Results form to familarise yourself with the documents used during your assessment. These can be found under the 'Section B Inspection, Testing & Certification' drop down heading at **www.netservices.org.uk/am2**

(These forms can also be found on the AM2S and AM2E sections of the NET website)

Inspection & Testing App

NET's Inspection & Testing AM2 Prep app allows you to try out some of the tests you'll encounter in the assessment. Developed in conjunction with Sparky Ninja, the app presents five key tests: Continuity of Protective Conductors, Continuity of Ring Final Circuit Conductors, Insulation Resistance, Earth Fault Loop Impedance and Prospective Fault Current.

For each test there is an instructional video with Sparky Ninja describing and carrying out the steps involved. Then via a series of interactive tasks, you can carry out the test by dragging and tapping the animated test instrument, distribution board and other equipment.

Find out more at **www.netservices.org.uk/test-app**

Inspection, Testing and Certification - *Continued*

Common Errors

- **Candidates do not prepare the instrument for use or select the correct range.**
  - Select the correct function or voltage.
  - Remember to null or zero the leads.
  - Check the meter is in date and safe to use.
- **Candidates do not carry out the test in accordance with Guidance Note 3.**
  - You have Guidance Note 3 and the On-Site Guide with you so if you are unsure, check how the test should be carried out.
  - Do not take shortcuts that 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. You may then need to repeat any other test that is dependent on the test you have just repeated.
  - To ensure you have tested the whole circuit:
    - remember on lighting circuits to operate switches.
    - on other circuits, operate isolators or contactors.
- **Candidates do not record the test results.**
  - This can happen when someone carries out testing and records results on a scrap of paper and then at the end, they cannot find the reading they require.
  - Fill in the Schedule of Test Results as you complete each test. This will also highlight anything you may have forgotten.
- **Candidates do not verify the test results obtained against the requirements of BS 7671.**
  - The results need to be compared with the expected values, to check if they are within the range allowed.
- **Candidates do not complete BS 7671 Inspection & Testing documentation correctly and accurately.**
  - The test documentation are legal documents and need 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 the work. This could damage your reputation or the reputation of the company you work for.
- **Candidates do not reinstate connections correctly.**
  - Connections may have been disconnected to carry out testing, so it is important to ensure they are secure after testing is complete. The effectiveness of your connections are assessed after you have completed testing, so make sure you re-terminate securely.

Safe Isolation of Circuits

Maximum Time Allowed: 30 minutes.

You will be allowed 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 have not demonstrated the correct procedure for Safe Isolation of Supplies.**
  - Make sure you test all the combinations (10-point test).
  - Make sure you are not testing 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 re-energize the circuit you are working on.
- **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.
- **Candidates turned off other circuits.**
  - You should only isolate the circuit you are going to work on.
- **Candidates do not check switches on the circuit.**
  - Always check - is the item isolated or just turned off? Check any switches to ensure the item is not just switched off.

Fault Diagnosis and Rectification

Maximum Time Allowed: 2 hours.

You will be allowed 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 two points and on which conductor/s).
  - 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?

Assessment of Applied Knowledge

Maximum Time Allowed: 1 hour.

You will be allowed 5 minutes to read this section and prepare for assessment.

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

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: All documents supplied will be the current versions at the time of the assessment.

- **BS 7671 Requirements for Electrical Installations**
- **IET Guidance Note 3. Inspection & Testing**
- **IET On-Site Guide**
- **IET Electrician's Guide to the Building Regulations**

You are not allowed any other documentation.

Common Errors

- **Candidates do not understand how to access information from BS 7671.**
  - Get used to finding the 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.

Results and Feedback

On completion of your assessment, you will not be given any direct feedback or indication of the result by the Assessor. The NET system will provide you with your results, five days after the assessor has completed the marking.

If you are unsuccessful, the results emailed to you will give a general feedback statement on how you did not meet the criteria for the section/s in question. It will not provide you with a specific marking detail, but the general feedback statement will give you an indication of where further training or improvement may be required before you re-sit the assessment.

NET is unable to provide specific marking detail as the assessment marking criteria must remain confidential.

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: The Candidate Readiness for Assessment Checklist must be completed, signed and submitted before you can book an assessment. The checklist will help you to prepare by outlining all areas of the assessment and what is expected from you.

We recommend that candidates are familiar with the IET On-Site Guide and BS7671 publications.

There are also Top Tips videos on the NET website to help you prepare.

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

A: Many training providers offer pre-assessment training or refresher courses. NET and its licensed centres do not support, endorse or recommend any prep courses. Providing you have been able to complete your Checklist with confidence that you have the skills and knowledge needed for each area of the assessment, the resources provided above will be sufficient for you to prepare.

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: 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 visit **www.netservices.org.uk/certification** to access our online replacement certificate form. We aim to process certificate requests within one week.

Contacting NET

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