

Highfield Level 3 End-Point Assessment for ST0150 Electrical, Electronic Product Service and Installation Engineer

End-Point Assessment Kit



Highfield Level 3 End-Point Assessment for ST0150 Electrical, Electronic Product Service and Installation Engineer

EPA-Kit

Contents

Please click on the headings below to navigate to the associated section of the EPA kit.

<u>Introduction</u>	<u>4</u>
<u>The Highfield approach</u>	<u>8</u>
<u>Gateway</u>	<u>10</u>
<u>The electrical, electronic product service and installation engineer apprenticeship standard</u>	<u>12</u>
<u>Assessment summary</u>	<u>30</u>
<u>Assessing the multiple-choice test</u>	<u>33</u>
<u>Assessing the practical skills test</u>	<u>35</u>
<u>Assessing the professional discussion</u>	<u>40</u>

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How to Use this EPA Kit

Welcome to the Highfield End-Point Assessment Kit for the Electronic Product Service and Installation Engineer Apprenticeship Standard.

Highfield is an independent end-point assessment organisation that has been approved to offer and carry out the independent end-point assessments for the Level 3 Electrical, Electronic Product Service and Installation Engineer Apprenticeship Standard. Highfield internally quality assures all end-point assessments in accordance with its IQA process, and additionally, all end-point assessments are externally quality assured by the relevant EQA organisation.

The EPA kit is designed to outline all you need to know about the end-point assessments for this standard and will also provide an overview of the on-programme delivery requirements. In addition, advice and guidance for trainers on how to prepare apprentices for the end-point assessment are included. The approaches suggested are not the only way in which an apprentice may be prepared for their assessments, but trainers may find them helpful as a starting point.

In this kit, you will find:

- an overview of the standard and any on-programme requirements
- a section focused on delivery, where the standard and assessment criteria are presented in a suggested format that is suitable for delivery
- guidance on how to prepare the apprentice for gateway
- detailed information on which part of the standard is assessed by which assessment method
- suggestions on how to prepare the apprentice for each part of the end-point assessment
- a section focused on the end-point assessment method where the assessment criteria are presented in a format suitable for carrying out 'mock' assessments

Introduction

Standard overview

The engineer will install and service a range of domestic and/or commercial equipment from washing machines and microwave ovens in the kitchen, laundrette or restaurant to television and audio equipment in the living room. The influence of computers in controlling washing machines and providing television have brought the installation and service requirements of these products together. In the near future, the 'smart home' will give wireless control of these products and link their requirements still closer.

To meet the needs of these 'smart' products, it is essential that the engineer is I.T. literate and has an understanding of all aspects of connectivity, with the ability to make and troubleshoot I.P. connections to routers, Bluetooth and Wi-Fi connections, in both domestic and commercial situations. The engineer must also be capable in the usage of "Apps". Technology is developing at a rapid rate and the range of products requiring the engineer's skills will expand and require the engineer to maintain and update their knowledge and skills to meet these future needs. Many products will be integrated into the 'smart home' in the future and talk to each other through the "Internet of Things" giving the engineer a secure and profitable future.

As most of the work is carried out in the customer's home or business, the engineer has to be polite, well dressed and have the appropriate customer-facing skills. The work will be interesting and varied giving the opportunity to work with a wide range of people in differing environments. The engineer should have an enquiring mind and be able to follow a logical sequence of mechanical events or electrical tests. Following the Apprenticeship, the engineer will have additional training if they are working on gas appliances or working in specific commercial premises, they may also have the opportunity to take additional qualifications to further develop their skills and extend their prospects into management, training or development.

Apprentices may specialise in white goods or brown goods, and will be assessed on a white goods, brown goods or a generic pathway.

On-programme requirements

The period of learning, development and continuous assessment is managed by the employer, in most cases with the support of a training provider. The on-programme pace will be driven by individuals as well as by the breadth of experience an employer can offer.

The training programme leading to end-point assessment should cover the breadth and depth of the standard using suggested on-programme assessment methods that integrate the knowledge, skills and behaviour components, and which ensure that the apprentice is sufficiently prepared to undertake the end-point assessment. Training, development and ongoing review activities should include:

- achievement of level 2 English and maths. If the apprentice began their apprenticeship training before their 19th birthday, they will still be subject to the mandatory requirement to study towards and achieve English and maths. The requirements for English and maths are optional for apprentices aged 19+ at the start of their apprenticeship training.
- completion of a portfolio through which the apprentice gathers evidence of their progress.
- study days and training courses.
- mentoring/buddy support.
- regular performance reviews undertaken by the employer.
- structured one-to-one reviews of their progress with their employer and/or training provider.

To drive quality and consistency through on-programme learning employers may wish to consider the following:

- use of their normal performance management processes to monitor the progress of the apprentice, provide feedback and guide development.
- provide support, ensuring the requirements of the apprenticeship standard are reflected in the above processes, and by filling any gaps through their work with apprentices.
- carry out joint reviews of progress at regular intervals, involving apprentices, line managers and others with a direct relationship, e.g. mentors, workplace coaches, etc. They should agree on how any issues are to be resolved together.

Portfolio

During the time on programme, the apprentice must develop a portfolio that demonstrates progress and competency throughout the standard. The portfolio will not be assessed however it may be used to support the apprentice during the professional discussion.

The portfolio should include:

- a briefing document of approximately 1500 words (minimum 1350 and maximum of 1650) that summarises research completed by the apprentice into the latest development in health & safety and environmental legislation.
- photo and video evidence alongside job completion reports that highlight the apprentice undertaking and completing fault diagnosis and fitting parts for any jobs they have taken part in.
- documents that contribute to building a picture around the apprentice's behaviours throughout the duration of the apprenticeship. This should consist of attendance records from the employer and training provider (one from each is acceptable).

The portfolio must be accompanied by a portfolio matrix. This can be downloaded from our website. The portfolio matrix must be fully completed, including a declaration by the employer and the apprentice to confirm that the portfolio is valid and attributable to the apprentice.

The portfolio of evidence must be submitted to Highfield at gateway. It is not directly assessed but underpins the professional discussion.

Use of Artificial Intelligence (AI) in the EPA

Where AI has been used as part of the apprentice's day-to-day work and forms part of a project report, presentation, or artefact, it should be referenced as such within the work. AI must not be used to produce the report or portfolio.

Where AI has been used as part of a portfolio that underpins an interview or professional discussion or any other assessment method, it should be fully referenced within the portfolio.

Readiness for end-point assessment

For an apprentice to be ready for the end-point assessments:

- the apprentice must have achieved level 2 English and maths. The requirements for English and maths are mandatory for all apprentices aged between 16-18 at the start of their apprenticeship training. The requirements for English and maths are optional for apprentices aged 19+ at the start of their apprenticeship training.
- they must have compiled a portfolio containing evidence of work carried out under supervision with their employer that demonstrates their knowledge, skills and behaviours.
- they must have completed a 1500-word briefing document relating to health and safety, and environmental legislation.

- their line manager (employer) must be confident that the apprentice has developed all the knowledge, skills and behaviours defined in the apprenticeship standard and that the apprentice is competent in performing their role. To ensure this, the apprentice must attend a formal meeting with their employer to complete the gateway readiness report.
- the employer/training provider needs to submit a completed Practical Skills Test Plan to indicate the piece(s) of equipment to be used during the practical skills tests.
- the apprentice and the employer should then engage with Highfield to agree on a plan and schedule for each assessment activity to ensure all components can be completed within the end-assessment window. The assessment plan does not specify an assessment window for this standard. Highfield suggests a 3-month assessment window that starts from the attempt of the first assessment component.

If you have any queries regarding the gateway requirements, please contact your EPA Customer Engagement Manager at Highfield Assessment.

Order of end-point assessments

The assessment plan states that the practical skills tests must be completed before the professional discussion. The multiple-choice test can take place at any time.

[Click here to return to contents](#)

The Highfield Approach

This section describes the approach Highfield has adopted in the development of this end-point assessment in terms of its interpretation of the requirements of the end-point assessment plan and other relevant documents.

Documents used in developing this end-point assessment

Standard (2017)

<https://skillsengland.education.gov.uk/apprenticeships/st0150-v1-0>

End-point assessment plan (2017 ST0150/AP01)

<https://skillsengland.education.gov.uk/media/1456/electrical-electronic-product-service-and-installation-engineer-assessment-plan.pdf>

Specific considerations

The assessment criteria for the multiple-choice test have been written by Highfield and are based on the content of the standard. The areas of the standard to be assessed by multiple-choice test has been based on the content of the assessment plan.

The assessment plan states that for an apprentice to pass the test they must achieve 65% and to achieve a merit, 75%. The test is made up of 50 multiple-choice questions and so it is impossible for these percentages to be achieved exactly. Therefore, Highfield has assigned a pass mark of 66% (33 out of 50) and 76% (38 out of 50) to achieve a merit. The apprentice must achieve 90% (45 out of 50) to achieve distinction.

The knowledge, skills and behaviours (KSBs) for the practical skills test have been written by Highfield and are based on the content of the standard. The assessment criteria for the practical skills test are directly lifted from the assessment plan, alongside the mark allocation.

The assessment criteria for the professional discussion have been written by Highfield and are based on the content of the standard. The areas of the standard to be assessed by professional discussion has been based on the content of the assessment plan. The mark allocation for each assessment criteria is based on the total of the criteria being worth 100%.

The assessment plan states that the grade to be awarded for both the professional discussion and the practical skills test should be based on a percentage achievement, alongside grading descriptors. However, to apply a standardised approach across all apprentices, Highfield has used the number of marks the learner has achieved across the assessment criteria to determine the grade for each of these components, in line with the

stated percentage achievement scores. These numbers can therefore then be used in the calculation for the overall grade of the apprenticeship.

[Click here to return to contents](#)

Gateway

How to prepare for gateway

After apprentices have completed their on-programme learning, they should be ready to pass through 'gateway' to their end-point assessment.

Gateway is a meeting that should be arranged between the apprentice, their employer and training provider to determine that the apprentice is ready to undertake their end-point assessment.

As part of their time on programme, the apprentice must have completed a portfolio of evidence that demonstrates the knowledge, skills and behaviours set out in this standard.

The portfolio will be reviewed in the professional discussion.

In advance of gateway, apprentices will need to have completed the following. The requirements for English and maths listed below are mandatory for all apprentices aged between 16-18 at the start of their apprenticeship training. The requirements for English and maths listed below are optional for apprentices aged 19+ at the start of their apprenticeship training.

- Achieved level 2 English and maths

Apprentices should be advised by employers and providers to gather the required evidence and undertake these qualifications during their on-programme training.

Apprentices will also need to have:

- collated a portfolio of evidence.
- completed a 1500-word briefing document relating to health and safety, and environmental legislation.

It is recommended that employers and providers complete regular checks and reviews of this evidence to ensure the apprentice is progressing and achieving the standards before the formal gateway meeting is arranged.

Employers or training providers will also need to submit to Highfield:

- a Practical Skills Test Plan indicating the pieces of equipment to be used during the practical skills tests. This will be available as a separate download from the Highfield Assessment website.

The gateway meeting

The gateway meeting should last around an hour and must be completed on or after the apprenticeship on-programme end date. It should be attended by the apprentice and the relevant people who have worked with the apprentice on-programme, such as the line manager/employer or mentor, the on-programme trainer/training provider and/or a senior manager (as appropriate to the business).

During the meeting, the apprentice, employer and training provider will discuss the apprentice's progress to date and confirm if the apprentice has met the full criteria of the apprenticeship standard during their on-programme training. The **Gateway Readiness Report** should be used to log the outcomes of the meeting and agreed by all 3 parties. This report is available to download from the Highfield Assessment website.

The report should then be submitted to Highfield to initiate the end-point assessment process. If you require any support completing the Gateway Readiness Report, please contact your Employer Engagement Manager at Highfield Assessment.

Please note: a copy of the standard should be available to all attendees during the gateway meeting.

Reasonable adjustments and special considerations

Highfield Assessment has measures in place for apprentices who require additional support. Please refer to the Highfield Assessment Reasonable Adjustments Policy for further information/guidance.

ID requirements

Highfield Assessment will need to ensure that the person undertaking an assessment is indeed the person they are claiming to be. All employers are therefore required to ensure that each apprentice has their identification with them on the day of the assessment so the end-point assessor can check.

Highfield Assessment will accept the following as proof of an apprentice's identity:

- a valid passport (any nationality)
- a signed UK photocard driving licence
- a valid warrant card issued by HM forces or the police
- another photographic ID card, e.g. employee ID card, travel card, etc.

[Click here to return to contents](#)

The electrical, electronic product service and installation engineer apprenticeship standard

The following pages contain the electrical, electronic product service and installation engineer apprenticeship standard and the assessment criteria in a format that is suitable for delivery.

Multiple-choice test

Health and safety

Knowledge

Health & Safety regulations and practices relevant to the role

Testing to **EU/BS Product Standards**

PAT (Portable Appliance Testing)

Multiple-choice test

Assessment criteria

- HS1 Outline an **employer's main duties** under the Health and Safety at Work etc. Act
- HS2 Outline the **main duties of an employee** under the Health and Safety at Work etc. Act
- HS3 State how injuries, ill health and other damage may result following exposure to common **workplace hazards**
- HS4 Explain how risks from different hazards may be affected by **occupational, environmental, human and organisational factors**
- HS5 Outline the steps involved in a **risk assessment**
- HS6 State **risk controls** while at work
- HS7 Explain the **benefits of assessing and controlling risks at work**
- HS8 State how to **minimise risk to personal safety and security**
- HS9 Outline **methods of safe transportation for goods**
- HS10 State the purpose of **PAT testing**
- HS11 Describe **EU/BS product standards** that are relevant to own role

HS12 Define what **safe isolation** is
 HS13 Explain **insulation resistance testing**
 HS14 Identify the **environmental factors that will impact on insulation test results**
 HS15 State how to **identify if electrical tools are fit for purpose**
 HS16 Outline the **importance of earthing**
 HS17 Describe the key features of **earth continuity testing**

Amplification and guidance

- **EU/BS product standards**, for example:
 - Oven internal temperature and surface temperature tests
 - BS7671 Wiring Regulations
 - BS EN 60335-1 – safety requirements for household electrical appliances
 - Energy Efficiency Labels
 - GS38 Electrical test equipment
 - IPX4 - appliances installed in bathrooms
 - Kitemark signal
 - BS 1363 – requirements for plugs and sockets
- **Employer's main duties:**
 - providing, so far as is reasonably practicable a safe place to work
 - provide safe equipment
 - provide information, instruction, training and supervision
 - provide adequate welfare facilities, such as the required number of toilets and providing drinking water
 - first aid
 - provide equipment and personal protective equipment (PPE) which is suitable and fit for purpose
 - ensure that new starters are competent and have had training
 - protect the health and safety of employees and those affected by their business
 - conduct risk assessments
 - ensure policies and procedures are:
 - in place

- reviewed
- updated

- **Main duties of an employee:**

- must take reasonable care of their own and others health and safety
- duty of care
- must follow the instructions, guidance and training given by their employer including on equipment
- must not interfere with equipment provided for health and safety
- must report and record:
 - hazards that could cause a risk
 - accidents
 - near misses
 - diseases

- **Workplace hazards:**

- electric shock/burns
- fire
- slips, trips and falls
- ergonomics
- manual handling
- stress
- hazardous materials and substances
- violence

- **Occupational, environmental, human and organisational factors** may include:

- occupational:
 - exposure to hazardous substances
 - working with dangerous materials such as live parts
 - manual handling requirements
- environmental:

- weather conditions when driving
- wet floors
- lighting conditions
- work locations, such as appliances in different areas such as sheds or garages or working in confined spaces
- human:
 - customers wanting to observe
 - being unwell
 - ergonomics while driving, working or repairing
 - lifting ability
 - lack of knowledge
- organisational:
 - workload and schedules such as how many jobs are allocated
 - availability of resources
 - lack of support and training
 - safety culture
 - management
 - staff shortages
- **Risk assessment:**
 - the steps to be taken to complete a simple risk assessment:
 - the 5-step process for risk assessment: identify the hazards, decide who might be harmed and how, evaluate the risks and decide on precautions, record your findings and implement them and review the risk assessment and update if necessary
 - employee consultation with their representatives
 - risk evaluation method
- **Risk controls:**
 - good housekeeping
 - barriers and enclosures
 - safe lifting techniques and equipment
 - visual checks

- safe storage of hazardous materials
 - design and layout of workstations
 - machine guards
 - personal protective equipment as the last line of defence
 - safety features on equipment such as a circuit breaker
 - health surveillance
 - emergency procedures, for example, in the case of a fire
 - regular breaks/reporting procedures
- **Benefits of assessing and controlling risks at work:**
 - benefits of good health and safety standards
 - legal compliance
 - reducing risks and controlling hazards
 - promoting a positive health and safety culture
 - reducing accidents
 - complying with the hierarchy of control in relation to work activities and ill health
- **Minimise risk to personal safety and security:**
 - lone workers must have a sufficient and regular check-in system in place
 - be aware of personal safety
 - avoid taking risks
 - training on safe isolation
 - follow health and safety procedures
 - follow safe lifting techniques
- **Methods of safe transportation for goods:**
 - the loading of the vehicle and the use of manual handling equipment to transport to and from the vehicle
 - stop and think before completing manual handling tasks
 - maintain a natural upright posture when lifting items
 - when transporting hazardous goods wear the correct personal protective equipment (PPE)

- **PAT testing:**
 - portable appliance testing (PAT) is the term used to describe the examination of electrical appliances and equipment to ensure they are safe to use. It is not compulsory; the law requires an employer to ensure that their electrical equipment is maintained to prevent danger, but it does not say how this should be done or how often. Employers should take a risk-based approach, considering the type of equipment and what it is being used for.
- **Safe isolation:**
 - this is to securely 'disconnect' (isolate) one or all parts of the installation from the live electrical supply.
- **Insulation resistance testing:**
 - an insulation tester should be set to 500V when checking an appliance
 - ohms is commonly used to measure insulation resistance
- **Environmental factors that will impact on insulation test results:**
 - damp area
 - the appliance's location
 - moisture
 - extreme temperature changes
 - humidity
- **Identify if electrical tools are fit for purpose:**
 - visually checking the tools insulation and parts
 - switch off any equipment and unplug it before inspection
 - dispose of any tools responsibly that are damaged
- **Importance of earthing:**
 - improves safety by keeping people safe from electric shock, avoiding fires and overvoltage
 - provides a path for an electrical current to flow to the ground in the event of a fault

- **Earth continuity testing:**
 - used to test the connection between the mains plug and earth wire
 - if the earth connection is damaged, the resistance will increase

Environmental legislation	
Knowledge	
Environmental legislation i.e. WEEE (Waste Electrical & Electronic Equipment) Directive	
Multiple-choice test	
Assessment criteria	
EL1	State the key features of the Waste Electrical and Electronic Equipment Regulations 2013
EL2	Outline the purpose of energy efficiency labels
EL3	Describe features that manufacturers use to make products energy efficient
EL4	Identify organisational procedures regarding the environment
EL5	Identify best practice procedures for repair and safe transportation of products
Amplification and guidance	
• Waste Electrical and Electronic Equipment Regulations: ○ regulations to help reduce the amount of waste electrical and electronic equipment being incinerated or sent to landfill sites. This reduction is achieved through various schemes to encourage recovery, reuse and recycling of products and components. ○ disposal through certified procedures such as correctly identified bins for electronic waste and using certified companies to dispose of WEEE. The disposal process is dependent on company policy and procedure. ○ procedures must keep a record for at least 4 years of all electrical equipment put on the market. ○ the WEEE symbol is shown as a bin with a cross through it. • Energy efficiency labels:	

- shows an appliance's energy consumption and its energy rating, such as an appliance in the red category is not energy efficient and an appliance in the dark green category is very energy efficient
- **Features that manufacturers use to make products energy efficient** may include:
 - holiday mode on fridge freezers
 - heat pump tumble dryers
 - lower temperature washes
 - recirculation pumps
 - standby mode
 - fan-assisted ovens
 - automatic drying sensors
 - power management systems
- **Organisational procedures regarding the environment:**
 - waste generated from business operations must be stored safely, treated and either collected or recycled
 - using environmentally friendly and sustainable suppliers
 - reducing emissions
 - disposing of spares from repairs appropriately
- **Repair:**
 - this includes warranty and the right to repair products within a certain time of being produced along with components for appliances.
- **Transportation:**
 - this includes disposal process through certified procedures such as correctly identified bins for electronic waste and using certified companies to dispose of WEEE. The disposal process is dependent on company policy and procedure.
 - flammable goods must be stored in a cool, dry place away from sunlight.
 - appliances must be appropriately packaged to protect them from damage.

Principles of servicing electrical & electronic products	
Knowledge	
The principles by which the product operates to help diagnose the faulty area and component or software.	
Multiple-choice test	
Assessment Criteria	
PS1	State product operational cycles
PS2	State required factors and resources for an appliance to function
PS3	Identify how different variables impact on the output of appliances
PS4	Explain the impact of a singular component failure on the overall appliance operation
PS5	State appliance functions used to isolate potential causes of breakdown
PS6	Identify logical steps to isolate potential causes of breakdown
Amplification and guidance	
These assessment criteria will be generic or tailored to white goods, brown goods, depending on what the apprentice has studied. • Product operational cycles: ○ each type of appliance has a unique operational cycle ○ the appliance's service manual features flow charts/sequence charts of the programme steps • Resources: ○ for example, water, electrical, and waste ○ dependent on the appliance, such as for good wash results, wash temperature and detergent are necessary • Variables may include: ○ laundry load size ○ programme selection ○ detergents and conditioner used	

- water hardness
- incorrect loading/overloading
- humidity
- advanced technology and features
- component failures
- voltage variation
- **Impact of a singular component failure:**
 - long-term consequences of a singular component failure include decreased efficiency and lifespan, complete appliance failure and increased energy consumption
 - cascade failure may happen in complex appliances
 - it will typically lead to appliance inoperability
- **Appliance functions:**
 - examples of this include error codes, laundry fill drain and self-scan/troubleshooting
 - technical bulletins can be used to support fault diagnosis
 - service mode can be used to isolate components
 - diagnostic mode is used to identify faulty electrical components
 - error codes on an appliance are typically on the display panel
 - more information on appliance error codes can be found in the service manual
- **Steps to isolate potential causes of breakdown:**
 - using suitable questioning to identify issues
 - test cycles
 - electrical testing
 - appliance's user manual
 - seeking expert advice

Practical skills test

Fault diagnosis

Skills

Identify and use the appropriate mode of communication and be able to deal with and listen to customers	Understand Apps and use them in product function & troubleshooting Apply electrical safety tests
Comply with health and safety procedures to protect colleagues, customers and their family	Avoid the hazard left by residual energy Ensure all tools and equipment are safe and fit for purpose
Select, use and apply diagnostic tools and aids to locate fault	Apply Portable Appliance Testing
Ensure that there is not a primary reason for fault occurring	Communicate technical findings and product claim investigations, both verbally and in writing
Observe and adhere to the principles of Electrostatic Discharge (ESD) when handling spare parts and open products	Ensure replacement components are correct and meet specification

Practical skills test

Assessment criteria

- FD1 Asking relevant questions about the reported fault
- FD2 Carrying out the safe isolation procedure
- FD3 Carrying out the correct opening safety check
- FD4 Using manufacturers technical information to aid diagnosis
- FD5 Using the correct diagnostic tools available
- FD6 Identifying the correct area of the product that the fault relates to
- FD7 Correctly identifying the faulty component
- FD8 Accurately recording the diagnostic process and test results

Installation of a product		
Skills		Behaviour
Deliver product	Understand and complete Network & Router set-up	Showing respect for customers property and possessions
Apply electrical safety tests		
Apply Portable Appliance Testing	Relate performance to speed and/or set-up of the customer network	
Identify and use the appropriate mode of communication and be able to deal with and listen to customers	Understand Apps and use them in product function & troubleshooting	
Comply with health and safety procedures to protect colleagues, customers and their family	Advise customers on energy-saving practices and choosing environmentally friendly purchases in the future	
Agree suitable site, with customer, for installation	Fit/remove safety bolts	
Install product to manufacturer’s regulations	Complete paperwork including re-call registration if agreed with customer	
Demonstrate product to customer’s satisfaction ensuring customer can operate product	Make network connections including Wi-Fi, Internet and Bluetooth	
Ensure product is working properly, test is for electrical safety, EU/BS Standards and demonstrate it to the customer		
Practical skills test		
Assessment criteria		
IP1 Pre-installation survey		

IP2	Referring to manufacturer's instructions
IP3	Completion of all necessary safety checks
IP4	Correct installation
IP5	Functional test/s
IP6	Explanation of correct function including energy saving features
IP7	The connection to a wireless network

Replacement of a faulty component		
Skills		Behaviour
Apply electrical safety tests Avoid the hazard left by residual energy Ensure all tools and equipment are safe and fit for purpose Apply Portable Appliance Testing Use the correct lifting techniques Apply safe stowing procedures Carry out electrical safety tests Understand Apps and use them in product function & troubleshooting Standards and demonstrate it to the customer Observe and adhere to the principals of Electrostatic Discharge (ESD) when handling spare parts and open products	Comply with health and safety procedures to protect colleagues, customers and their family Replace components or reinstate software using correct sequence, appropriate tools and techniques Ensure no damage to other components Ensure product is working properly, test it for electrical safety, EU/BS	Having concern for the safety of colleagues, customers, their family and pets
Practical skills test		
Assessment criteria		
RC1 Safe isolation RC2 Electrostatic discharge		

- RC3 Manual handling
- RC4 Health and safety awareness
- RC5 Replacing components using appropriate tools and technique
- RC6 Electrical safety checks
- RC7 Functional test/s

Professional discussion

Knowledge

Knowledge

Customer care techniques including any particular **company policies**

Assessment criteria

- PDK1 Explain effective **customer care techniques**
- PDK2 Outline **company policies** relating to customer care
- PDK3 State the customer care approach regarding **vulnerable customers**

Amplification and guidance

- **Company policies:**
 - brand promise
 - core values
 - customer service charter
 - policies that support customer service
 - after-sales policies and General Data Protection Regulation (GDPR) followed
 - understand reputational damage to the employer
 - awareness of customer metrics

- **Customer care techniques:**

- providing a personalised customer experience
- being helpful
- being professional
- building trust
- using interpersonal skills
- building rapport
- answering queries honestly and accurately
- using customer-friendly language
- appropriate body language and tone of voice
- keeping promises
- being sensitive to customers' needs
- keeping customers informed

- **Vulnerable customers:**

- someone who, due to personal circumstances is susceptible to detriment. A vulnerable customer can be someone who is physically, emotionally, socially or economically vulnerable.

Skills	
Skills	
Understand and apply EU/BS product standards	
Resolve disputes and know who to report to in case of problems	
Research and apply environmental legislation that is current and appropriate to installations and repairs	
Apply the appropriate electrical, electronic & software principles to understanding the nature and reason for faults	
Assessment criteria	
PDS1	Explain the principles of the EU/BS product standards
PDS2	Explain how to resolve disputes and know who to report to in case of problems
PDS3	Research and apply environmental legislation that is current and appropriate to installations and repairs
PDS4	Explain the principles of electrical safety and how to work safely
PDS5	Explain how electrical, electronic and software issues can be caused and how these lead to faults in equipment
PDS6	Describe different fault-finding techniques
Amplification and guidance	
• EU/BS product standards examples include: ○ BS7671 - wiring Regulations ○ IPX4 - appliances installed in bathrooms ○ GS38 - electrical test equipment	

Behaviours	
Behaviours	
Giving a good impression of their employer and themselves by being polite and appropriately dressed	
Having a friendly greeting and manner to colleagues and customers	
Continuing ' personal professional development ' in an industry that is changing rapidly	
Developing a trusting relationship with customer and colleagues	
Assessment criteria	
PDB1	Give a good impression of their employer and themselves by being polite and appropriately dressed
PDB2	Use a friendly manner to colleagues and customers
PDB3	Undertake ' personal professional development ' in an industry that is changing rapidly
PDB4	Develop a trusting relationship with customer and colleagues
Amplification and guidance	
• Personal professional development: ○ define own strengths and weaknesses, goals, reflection and planning regarding self-improvement within the organisation. Use appropriate sources of information to maintain knowledge of current technology	

[Click here to return to contents](#)

Assessment Summary

The end-point assessment for the Electrical, Electronic Product Service and Installation Engineer Apprenticeship Standard is made up of 3 components.

1. 90-minute multiple-choice test.
2. 4 practical skills tests, each of approximately 60-75 minutes duration.
3. Approximately 60-75 minute professional discussion.

As an employer/training provider, you should agree on a plan and schedule with the apprentice to ensure all assessment components can be completed effectively.

Each component of the end-point assessment will be assessed against the appropriate criteria laid out in this kit and a mark allocated. The grade will be determined using the combined mark.

The EPA is expected to last for a total duration of two days.

Multiple-choice test

The multiple-choice test is weighted at 40% of the total end-point assessment grade.

The total marks available for this assessment method is 100. There will be a total of 50 questions in the multiple-choice test and each question is worth 2 points.

- To achieve a **pass**, apprentices must score at least 66 out of 100
- To achieve a **merit**, apprentices must score at least 76 out of 100
- To achieve a **distinction**, apprentices must score at least 90 out of 100
- **Unsuccessful** apprentices will have scored 64 or below

The test may be delivered online or be paper-based and should be in a 'controlled' environment.

Practical skills test

The practical skills test is weighted at 40% of the total end-point assessment grade.

The apprentice will take 4 practical skills tests, each worth 100 marks. The marks for the four practical tests will be added together, divided by four and an average calculated.

- To achieve a **pass**, apprentices must score an average of at least 65
- To achieve a **merit**, apprentices must score an average of at least 75
- To achieve a **distinction**, apprentices must score an average of at least 90
- **Unsuccessful** apprentices will have scored an average of 64 or less

Professional discussion

The professional discussion is weighted at 20% of the total end-point assessment grade.

The professional discussion is marked out of 100.

- To achieve a **pass**, apprentices must score at least 65 out of 100
- To achieve a **merit**, apprentices must score at least 75 out of 100
- To achieve a **distinction**, apprentices must score at least 90 out of 100
- **Unsuccessful** apprentices will have scored 64 or below

The professional discussion may be conducted using technology such as video link, as long as fair assessment conditions can be maintained.

Grading

To pass, the apprentice must achieve at least a pass mark in all three assessment methods.

Each of the assessment components is weighted as follows:

Assessment method	Weighting
Multiple-choice test	40%
Practical skills test	40%
Professional discussion	20%

The marks awarded for each assessment component will be weighted in line with the above table and the sum of this will be used to calculate a final weighted mark.

The final weighted mark will determine the overall grade, as per the table below:

Total mark achieved	Grade
64 or below	Fail
65	Pass
75	Merit
90	Distinction

Retake and resit information

If an apprentice fails an end-point assessment method, it is the employer, provider and apprentice's decision whether to attempt a resit or retake. If a **resit** is chosen, please call the Highfield scheduling team to arrange the resit. If a **retake** is chosen, the apprentice will require a period of further learning and will need to complete a new retake checklist. Once this is completed, please call the Highfield scheduling team to arrange the retake.

When undertaking a resit or retake, the assessment method(s) will need to be re-attempted in full, regardless of any individual assessment criteria that were passed on any prior attempt. The EPA Report will contain feedback on areas for development and resit or retake guidance.

An apprentice who passes the EPA will not be allowed to retake it to try and increase their grade.

If an apprentice has to retake the EPA for extenuating circumstances, then the new grade will stand. Highfield will determine the criteria for extenuating circumstances.

[Click here to return to contents](#)

Assessing the multiple-choice test

The electrical, electronic product service and installation engineer apprenticeship standard multiple-choice test will have a duration of 90-minutes and is designed to assess the apprentice's knowledge of the importance of electrical and electronic principles in diagnosing faults.

The test consists of 50 multiple-choice questions each worth 2 marks. To pass, at least 33 questions must be answered correctly (66 marks).

Multiple-choice test		
Pass	Merit	Distinction
33-37 questions	38-44 questions	45-50 questions

Please refer to the Highfield Examination and Invigilation policy for information regarding the ID verification process and details regarding the set-up of End-Point Assessments.

Before the assessment

- While on-programme, the employer/training provider should brief the apprentice on the areas to be assessed by the multiple-choice examination.
- In readiness for the end-point assessment, the apprentice should complete a mock examination.

Multiple-choice test criteria

Health and safety

- HS1 Outline an employer's main duties under the Health and Safety at Work etc. Act
- HS2 Outline the main duties of an employee under the Health and Safety at Work etc. Act
- HS3 State how injuries, ill health and other damage may result following exposure to common workplace hazards
- HS4 Explain how risks from different hazards may be affected by occupational, environmental, human and organisational factors
- HS5 Outline the steps involved in a risk assessment
- HS6 State risk controls while at work
- HS7 Explain the benefits of assessing and controlling risks at work
- HS8 State how to minimise risk to personal safety and security
- HS9 Outline methods of safe transportation for goods
- HS10 State the purpose of PAT testing
- HS11 Describe EU/BS product standards that are relevant to own role
- HS12 Define what safe isolation is
- HS13 Explain insulation resistance testing
- HS14 Identify the environmental factors that will impact on insulation test results
- HS15 State how to identify if electrical tools are fit for purpose
- HS16 Outline the importance of earthing
- HS17 Describe the key features of earth continuity testing

Environmental legislation

- EL1 State the key features of the Waste Electrical and Electronic Equipment Regulations
- EL2 Outline the purpose of energy efficiency labels
- EL3 Describe features that manufacturers use to make products energy efficient
- EL4 Identify organisational procedures regarding the environment
- EL5 Identify best practice procedures for repair and safe disposal of products

Principles of servicing electrical & electronic products

- PS1 State product operational cycles
- PS2 State required factors and resources for an appliance to function
- PS3 Identify how different variables impact on the output of appliances
- PS4 Explain the impact of a singular component failure on the overall appliance operation
- PS5 State appliance functions used to isolate potential causes of breakdown
- PS6 Identify logical steps to isolate potential causes of breakdown

[Click here to return to contents](#)

Assessing the practical skills test

During the on-programme time, the apprentice will have been practising fault diagnosis, installation of electrical products and replacement of components along with other important skills needed to undertake the role of an electronic product service and installation engineer. The assessment plan states that to demonstrate their competency appropriately they should undertake a total of 4 practical skills tests as part of the end-point assessment.

The practical tests will be conducted on a role-playing basis with the end-point assessor playing the role of the customer.

It is expected that the practical skills tests will take five hours in total with a typical duration of 60 – 75 minutes per test.

The skills tests will consist of:

- fault diagnosis on **two** separate pieces of equipment
- the installation of a product
- the replacement of a faulty component

Each skills test is worth 100 marks. Therefore, the practical skills test end-point assessment component is worth a total of 400 marks.

The marks achieved within the 4 practical skills tests will be added together, divided by 4 and then given a 40% weighting. This number will be carried forward and combined with the mark achieved in the other assessment components to determine the overall grade of the apprenticeship.

Equipment requirements

For the apprentice to be able to conduct the practical skills tests, suitable equipment must be made available and set up in advance of the assessment.

Set up will include ensuring the following are available on the day of assessment:

- two separate pieces of equipment, each containing a fault to diagnose
- another piece of equipment that requires a component to be replaced
- another piece of equipment to be installed, which should have wi-fi capability

A list of products that may form the basis of the practical skills test are below:

White goods

- Washing machine
- Tumble drier
- Fridge
- Freezer
- Fridge/freezer
- Dishwasher
- Oven
- Hob

Brown goods

- Laptop
- PC
- Mobile phone
- Tablet

A **Practical Skills Test Plan** document will need to be completed by the centre and submitted at Gateway. This will list the four pieces of equipment the centre has available for the practical skills test. This is available to download from the Highfield website. Once received, Highfield will review this and will assign faults to be set up on the pieces of equipment. This will then be returned to the centre so that the appropriate equipment can be set up in advance of the assessment.

If an assessor arrives to conduct an assessment and finds the equipment has not been set up, the assessment cannot take place and will need to be rearranged.

The assessor will use an "opening customer statement" to start each skills test and will then answer any questions asked by the learner as a "customer".

Before the assessment:

Employers/training providers should:

- ensure suitable equipment is available (containing appropriate faults) that the apprentice should use when completing their practical skills tests.
- ensure the apprentice knows the date, time and location of the assessment
- ensure the apprentice knows which criteria will be assessed (outlined on the following pages)
- encourage the apprentice to reflect on their experience and learning on-programme to understand what is required to meet the standard and identify real-life examples

- be prepared to provide clarification to the apprentice, and signpost them to relevant parts of their on-programme experience as preparation for this assessment

Practical skills test mock assessment

It is the employer/training provider's responsibility to prepare apprentices for their end-point assessment, and Highfield recommends that the apprentice experiences a mock practical skills test in preparation for the real thing. The most appropriate form of mock practical skills test will depend on the apprentice's setting and the resources available at the time.

In designing a mock assessment, the employer/training provider should include the following elements in its planning:

- the mock practical skills test should take place in a suitable location.
- the employer should play the role of the customer
- a 75-minute time slot should be available to complete each practical skills test.
- consider a video or audio recording of the mock practical skills test and allow it to be available to other apprentices, especially if it is not practicable for the employer/training provider to carry out a separate mock assessment with each apprentice.
- ensure that the apprentice's performance is assessed by a competent trainer/assessor, and that feedback is shared with the apprentice to complete the learning experience. Mock assessment sheets are available to download from the Highfield Assessment website and may be used for this purpose.

Practical skills test criteria

Fault diagnosis	
Assessment criteria	
FD1	Asking relevant questions about the reported fault
FD2	Carrying out the safe isolation procedure
FD3	Carrying out the correct opening safety check
FD4	Using manufacturers technical information to aid diagnosis
FD5	Using the correct diagnostic tools available
FD6	Identifying the correct area of the product that the fault relates to
FD7	Correctly identifying the faulty component
FD8	Accurately recording the diagnostic process and test results

Installation of a product	
Assessment criteria	
IP1	Pre-installation survey
IP2	Referring to manufacturer's instructions
IP3	Completion of all necessary safety checks
IP4	Correct installation
IP5	Functional test/s
IP6	Explanation of correct function including energy-saving features
IP7	The connection to a wireless network

Replacement of a faulty component	
Assessment criteria	
RC1	Safe isolation
RC2	Electrostatic discharge
RC3	Manual handling
RC4	Health and safety awareness
RC5	Replacing components using appropriate tools and technique
RC6	Electrical safety checks
RC7	Functional test/s

[Click here to return to contents](#)

Assessing the Professional Discussion

The 60-75 minute professional discussion will be conducted after the practical skills tests and will focus on the apprentice's understanding of installation and replacing components, as well as other areas as specified by the assessment criteria on the following pages.

During the on-programme part of their apprenticeship, the apprentice will have completed a portfolio that details all of the training, learning and workshops they have attended over the course of the apprenticeship, as well as a briefing document of approximately 1500 words (minimum 1350 and maximum 1650) summarising research into the latest developments in both Health & Safety and Environmental Legislation.

During the professional discussion, there will be 2 end-point assessors. The assessors will question the apprentice on environmental legislation and health and safety. They will also ask the apprentice to talk through a repair scenario.

The apprentice may use the contents of the portfolio to illustrate their answers and explain how they went about researching the topics for their briefing report, what conclusions they came to, and provide evidence for the other skills, knowledge and behaviour criteria assessed by the professional discussion.

The professional discussion will be marked out of 100, based on the coverage of the criteria. The result will then be given a weighting of 20%. This number will be carried forward and combined with the mark achieved in the other assessment components to determine the overall grade of the apprenticeship.

Before the assessment:

Employers/training providers should:

- ensure the apprentice knows the date, time and location of the assessment.
- ensure the apprentice knows which criteria will be assessed (outlined on the following pages).
- encourage the apprentice to reflect on their experience and learning on-programme to understand what is required to meet the standard.
- be prepared to provide clarification to the apprentice, and signpost them to relevant parts of their on-programme experience and portfolio as preparation for this assessment.

Professional discussion mock assessment

It is the employer/training provider's responsibility to prepare apprentices for their end-point assessment, and Highfield recommends that the apprentice experiences a mock professional discussion in preparation for the real thing. The most appropriate form of mock professional discussion will depend on the apprentice's setting and the resources available at the time.

In designing a mock assessment, the employer/training provider should include the following elements in its planning:

- the mock professional discussion should take place in a suitable location.
- a 75-minute time slot should be available to complete the professional discussion if it is intended to be a complete professional discussion covering all relevant standards. However, this time may be split up to allow for progressive learning.
- consider a video or audio recording of the mock professional discussion and allow it to be available to other apprentices, especially if it is not practicable for the employer/training provider to carry out a separate mock assessment with each apprentice.
- ensure that the apprentice's performance is assessed by a competent trainer/assessor, and that feedback is shared with the apprentice to complete the learning experience. Mock assessment sheets are available to download from the Highfield Assessment website and may be used for this purpose.
- use structured 'open' questions that do not lead the apprentice but allow them to express their knowledge and experience in a calm and comfortable manner. For example:
 - Tell me about your customer care company policy.
 - How can you deal with electrostatic discharge safely?
 - Tell me about a fault you have diagnosed correctly. What led you to make that diagnosis?
 - Which environmental legislation is applicable to your role as an electrical product service and installation engineer, and in what ways?

Professional discussion criteria

Throughout the 60-75-minute professional discussion, the assessor will review the apprentice's competence in the criteria outlined below.

Knowledge	
Assessment criteria	
PDK1	Explain effective customer care techniques
PDK2	Outline company policies relating to customer care
PDK3	State the customer care approach regarding vulnerable customers

Skills	
Assessment criteria	
PDS1	Explain the principles of the EU/BS product standards
PDS2	Explain how to resolve disputes and know who to report to in case of problems
PDS3	Research and apply environmental legislation that is current and appropriate to installations and repairs
PDS4	Explain the principles of electrical safety and how to work safely
PDS5	Explain how electrical, electronic and software issues can be caused and how these lead to faults in equipment
PDS6	Describe different fault-finding techniques

Behaviours	
Assessment criteria	
PDB1	Give a good impression of their employer and themselves by being polite and appropriately dressed
PDB2	Use a friendly manner to colleagues and customers
PDB3	Undertake 'personal professional development' in an industry that is changing rapidly
PDB4	Develop a trusting relationship with customer and colleagues

[Click here to return to contents](#)