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EUIAS End-point Assessment Specification for

Level 4
Electrical Power Protection and Plant Commissioning Engineer

QAN 603/7290/4

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EUIAS End-point Assessment

Specification for

Level 4

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Updates to this specification

Since the first publication of the EUIAS Water process Technician Specification –, the following updates have been made.

Version	Date first published	Section updated	Page(s)
V 3.0	August 2023	Rebranded	All
V 2.0	2023	Republished in revised format	All
V 1.0	2021	First published	All

Section 1: At a Glance EPA Summary

Qualification name	EUIAS Level 4 End-point Assessment for Electrical Power Protection and Plant Commissioning Engineer
Ofqual qualification number	603/7290/4
Standard reference	ST0157
Assessment plan	AP02
Standard title	Electrical Power Protection and Plant Commissioning Engineer
Level	4
Gateway pre-requisites submitted to EUIAS	Apprentice has: • achieved English and mathematics at level 2 • sufficient evidence in the form of a work log which demonstrates consistent achievement of the skills, knowledge and behaviours as described in the standard.
On-programme duration	Typically 30 months
Gateway readiness	Apprentice has met all Gateway pre-requisites. Employer completes, signs and submits Gateway Eligibility Form (GER) form to EUIAS, see Appendix B in EPPPCE Supporting Documents for 'Gateway Eligibility Form'
End-point assessment duration	Typically 6 months after the gateway

Order of end-point assessment methods	The assessments can be taken in any order
End-point assessment methods and component grading	Knowledge assessment (Fail, Pass, Distinction) Technical interview (Fail, Pass, Distinction) Practical observation (Fail, Pass, Distinction)
Overall Grading	Fail, Pass or Distinction
Certification	EUIAS request Apprenticeship completion certificates from the ESFA

Objective

The purpose of the Electrical Power Protection and Plant Commissioning Engineer (EPPPCE) end-point assessment (EPA) is to confirm that an apprentice is fully capable of doing their job before they receive their apprenticeship certificate. It also helps to demonstrate that what an apprentice has learned can be applied in the real world.

Electrical Power Plant, Equipment and Protection Systems require testing and commissioning to confirm that the installation and operation of new and refurbished protection plant & equipment complies with manufacturers' specifications, company procedures and the operating parameters.
Commissioning requires a logical approach which builds from individual component tests through to full system commissioning which means it includes making the equipment live and monitoring equipment integrity when it is first turned on.

Gateway Readiness

The Employer must be satisfied that the apprentice is consistently working at, or above, the level of the occupational standard. Gateway pre-requisites are listed in the summary table above.

Recognition of prior learning (RPL)

EUIAS does not recognise any apprentice prior learning (RPL) or prior achievement (RPA) for the purpose of amending the assessment requirements of any end-point assessments.

Please refer to the EUIAS RPL and RPA policy at www.euias.co.uk/end-point-assessment/policies-and-fees

In order for EUIAS to award an end-point assessment qualification, the apprentice must successfully complete all required assessment components with EUIAS. This means that:

- each of the EPA components must be completed in full with EUIAS
- where an apprentice transfers to EUIAS from another EPAO they have to undertake the entire EPA with EUIAS
- components of the EPA cannot be certificated in isolation
- evidence produced for the work log must be related to the time the apprentice is on their apprenticeship programme to demonstrate current practice
- examples used by the apprentice, during the interview, must relate to the time they were on their apprenticeship programme

This does not affect the Gateway requirements which must be met in order for an apprentice to be eligible for end-point assessment.

This does not affect any reasonable adjustments that may be granted.

Section 2: End-point Assessment Components

Component 1: Knowledge Assessment

Overview

The knowledge assessment is paper based. Apprentices have 2.5 hours to complete the test. It consists of 20 scenario based short answer questions, four of which are safety critical questions. Each question may be split into parts.

The scenarios are based on the following four topic areas:

- A comprehensive understanding of UK electrical power systems
- Protection, control and telemetry equipment and the impact on the electrical network of its operation
- High voltage electrical network operations and topologies
- The application of Electricity Supply Standards, regulations and policies

Each section:

- covers one topic are
- is equally weighted and is worth 40 marks
- contains a safety critical question, worth 8 marks
- has five questions

Apprentices must take the test in a quiet space, free from distractions and influence, in the presence of an invigilator.

The table on pages 17 - 32 lists each of the knowledge elements, assessed in the knowledge assessment with additional amplification and guidance, where appropriate, from EUIAS on the range and depth expected. EUIAS has worked with employers and subject matter experts to develop the amplification and guidance.

Knowledge Assessment Roles and Responsibilities

Role	Responsibility
Invigilator	Is typically provided by the employer or training provider. Attend induction training as directed by EUIAS.
Employer/Training Provider	Ensure that the knowledge assessment is scheduled with EUIAS for a date and time which allow the apprentice to be well prepared.
EUIAS	Arrange for the knowledge assessment to take place, in consultation with the employer/training provider. Mark knowledge assessment answers accurately according to the mark scheme and procedures.

Component 2: Technical Interview based on the work log

Overview

During the Technical Interview each apprentice will be interviewed on the content of their work log which will contain evidence from the more complex work activities which they have undertaken during their on-programme work period.

Step-by-Step Guide

The table below provides a step-by-step guide on how the technical interview based on the work log will be carried out:

Assessors	1 technical expert and 1 independent assessor approved by the EUIAS.
Technical interview (based on the work log)	**Number of questions:** There is no specified number of questions for the interview. Follow-up questions may be asked to probe for further clarification. **Locations**: Employer's premises or a suitable venue for example a training provider's premises. **Time:** Typically, 2 hours and no more than 3 hours **The technical interview will be:** • face to face or remote, as agreed • recorded in writing using the interview record template provided by the EUIAS • video recorded using relevant technology such as Microsoft Teams or an audio recording device • conducted under controlled conditions The apprentice will have access to their work log throughout the technical interview

What topics will be covered?	The technical interview will cover the knowledge, skills and behaviours in relation to the following four specific skill topic areas: • Undertakes testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment • Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system • Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays • Ensures that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system Wherever possible the interviewers questioning will be contextualised to the apprentice's job role and the specific work activities they are presenting from their work log.
When will the work log be submitted and referred to?	**The work log** • will be reviewed by the independent assessor before the interview • can be referred to by the apprentice to illustrate their answers • must be submitted to EUIAS at Gateway **Note:** the work log is not directly assessed
Who will assess the apprentice?	A panel consists of 2 members: • a technical expert who may be from the apprentice's organisation and known to them • an independent assessor Both panel members will be appointed by EUIAS.

	The apprentice responses will be documented by the technical expert during the interview. Following the interview, the technical expert will assign a preliminary mark. The independent assessor will countersign the documentation if they are satisfied that the interview was conducted in line with EUIAS guidance and forward it to the final decision panel.
Grading	Fail, Pass or Distinction.

Work Log Requirements

The requirements are as follows:

The apprentice must include:

- evidence of work from the more complex work activities which they have undertaken during their on-programme work period
- progress review documentation

For further information see Section 5 of this Specification 'What to include in the work log?'

Work log Mapping Document

The apprentice must map their work log of evidence to the KSBs as this evidence will be used by the technical expert to assess the apprentice during the technical interview. The work log mapping document must be clearly referenced and included at the front of the work log.

For further guidance on mapping refer to:

- Section 5 Practice Guidance on Work Log
- Supporting Documents, Appendix G Work Log Mapping Document

How will the employer/training provider submit the apprentice's work log to EUIAS?

As part of the pre-requisite gateway requirements the apprentice must have compiled and submitted a work log of evidence at Gateway. The technical interview will be based on the work log.

Technical Interview Based on a Work Log Roles and Responsibilities

Role	Responsibility
Technical Expert	Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by EUIAS.
Independent Assessor	Countersign the documentation to confirm that the technical interview was conducted in line with EUIAS guidance Forward documentation to EUIAS
Employer/Training Provider	Ensure that the work log of evidence has been submitted to EUIAS at Gateway The technical interview must be scheduled with EUIAS for a date and time which allow the apprentice to be well prepared. Ensure the apprentice has access to their work log before and on the day of the interview.
EUIAS	Arrange for the technical interview to take place, in consultation with the employer/training provider, technical expert and independent assessor.

Component 3: Practical Observation:

Overview

In a practical observation, a technical observes an apprentice completing a practical activity in a working environment.

The practical observation will involve an apprentice being observed carrying out a range of activities which typically include the installation, testing and commissioning of protection systems to prove the integrity of power system plant and equipment.

Step-by-Step Guide

The table below provides a step-by-step guide on how the practical skills observation will be carried out:

Practical structure	The total assessment time is typically one day. The actual time will be based on the comparable time a competent worker in the industry would take to achieve successful task(s) completion. At appropriate times during the observation the assessor will question the apprentice to confirm knowledge and understanding of the topic area
Where will the assessment take place?	The practical activities will take place in a working environment.
What are the tasks that will be covered?	Each observation will provide the opportunity for the apprentice to carry out a range of activities which typically include: • testing, commissioning and maintenance activities on a range of electrical power systems and equipment which may include transformers, switchgear, conductors, battery systems and ancillary equipment • undertaking protection testing, commissioning and maintenance activities involving functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range

	of fault conditions and scenarios that can occur on the electrical system • the use of appropriate range of test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection as well as older electromechanical relays • taking appropriate actions to ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system.
Who sets the task(s)?	Employer or training provider set the tasks based on the EUIAS template provided in Support Documents, Appendix E: Practical Observation Planning Form. The task must provide apprentices with the opportunity to achieve all the KSBs assessed in the practical observation. The apprentice must be provided with both written and verbal instructions by the independent assessor on the tasks.
What resources can the apprentice use?	Equipment and resources needed for the observation must be: • provided by the employer or training provider • the tools, equipment and PPE required for the job • in good and safe working condition Work instructions/manuals must be available in hard copy or electronically.
How many questions will the apprentice be asked?	There is no specified number of questions that will be asked. The apprentice must provide sufficient information to correctly answer a minimum of one question for each element.
What will the questions focus on?	The apprentice will be asked questions to confirm their understanding of the rationale for actions taken and the choices made to complete the tasks. The technical expert may, if required, ask follow-up questions to probe for further clarification as necessary.

Who will assess the apprentice?	EUIAS will appoint a technical expert who, due to the specialised nature of the work, may be from within the apprentice's own organisation or someone known to the apprentice. The technical expert will hold the appropriate safety rule authorisation to undertake the activities being undertaken and will be authorised by the organisation that owns the premises where the observation is being conducted.
Grading	Fail, Pass and Distinction

Practical Observation Roles and Responsibilities

Role	Responsibility
Employer Assessor	Provide written and verbal instructions for the practical observation. Record and report assessment outcome decisions for each apprentice, following instructions and using assessment recording documentation provided by EUIAS.
Employer/Training Provider	Provide the venue for the practical observation which must be suitably equipped to allow the apprentice to attempt all aspects of the practical observation. Provide all necessary tools and equipment for the apprentice. Ensure the apprentice has access to the resources used on a daily basis.
EUIAS	Arrange for the practical observation to take place, in consultation with the employer/training provider and technical expert.

Knowledge, Skills and Behaviours (KSBs) coverage, by assessment method

The following pages list each of the elements of the standard and additional amplification and guidance from EUIAS on the range and depth expected

Key to identify the assessment method in the table below:

KA– Knowledge Assessment

PO – Practical Observation

TI – Technical Interview

Key	Assessment Elements: Knowledge	Amplification and Guidance
KA **TI**	**TK1** A comprehensive understanding of UK electrical power systems	Including: • The range of system voltages found on UK power networks and how they are represented on network diagrams • The types of high voltage apparatus used on power networks and their operational symbols • The types and purpose of network transformers, including typical vector groupings and the methods used for voltage control • The purpose and operational capabilities of network circuit breakers, including their method of operation and typical fault activation sequence

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• The types of electrical relay used for the protection of power networks, including their operating characteristics and typical settings • The purpose of “electrical discrimination” and the methods and types of apparatus used to achieve it on the network • The requirements and methods used for earthing substations, the dangers which can arise, and the methods used to manage them • The effect of load on the electrical network including the methods and equipment used to monitor and control its effects • The factors which determine the circuit ratings of network apparatus, including underground cables and operational switchgear
TI	**TK2** The application and operation of system plant & equipment	Application of knowledge to: • Influence and / or organise the planning of protection and commissioning projects using company equipment and methodology • Conduct protection and / or commissioning operations on relevant plant and equipment • Gain further technical information / specifications about plant and equipment which is being worked on during projects

Key	Assessment Elements: Knowledge	Amplification and Guidance
		Plant and equipment such as circuit breakers, switchgear, relays, transformers, isolators, resistors Operations such as operating cycles, safe isolation requirements
TI	**TK3** Fault analysis methods and how to interpret results	Application of knowledge to: • Determine the appropriate fault analysis method/s, to use through critical thinking and analysis of the options available • Plan and organise fault analysis operations in a logical and systematic manner for the work to be undertaken • Conduct fault analysis operations, taking ownership of the work and solving problems as they arise in the project • Interpret the results of fault analysis operations to identify and implement solutions to resolve engineering problems **Fault analysis methods** such as pre inspection, visual inspection, physical examination using approved tools/equipment, testing procedures to determine condition of equipment/plant
TI	**TK4** How high voltage power generation, transmission and distribution plant & equipment operates	Application of knowledge to: • Plan and organise work projects, using knowledge of the relevant plant and apparatus requirements

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Conduct protection and commissioning operations on relevant plant and equipment during work projects
KA TI	**TK5** Protection, control and telemetry equipment and the impact on the electrical network of its operation	Including: • The purpose and methods of the equipment used for unit protection on the network, including knowledge of typical protection schemes, types of relay and their settings, protection zones and the positioning / arrangement of equipment used in the circuit • The purpose and principles of earthing power network systems including the terminology used and the causes and effects of poor / inadequate earthing of systems • The purpose and principles of voltage transformers (VT) and current transformers (CT) in relation to the operation of power circuits, including knowledge of the different uses of CT's and VT's and their characteristics • The function and benefits offered by the remote control of network apparatus via telemetry including the type of systems and equipment used and the advantages and disadvantages • The role of a Commissioning and Protection Engineer working on network protection equipment including their technical duties and responsibilities

Key	Assessment Elements: Knowledge	Amplification and Guidance
		Application of knowledge, during protection / commissioning projects, to: • Support the planning of work on protection / control / telemetry systems • Influence work decisions and support work conducted on protection / control / telemetry systems
TI	**TK6** Commissioning and testing procedures & processes on high voltage apparatus	Application of knowledge to: • Plan and organise commissioning and testing procedures on plant and equipment • Influence and support work decisions made during commissioning and testing operations on plant and equipment • Identify and resolve technical problems during commissioning and testing operations **Testing procedures** such as ROEP, CB timing test, use of equipment such as CT analysers
TI	**TK7** Failure mode(s) of plant and equipment, their impact on the electrical network and the required remedial actions	Application of knowledge to: • Recognise the symptoms and causes of relevant plant / equipment failure, such as RCD burnout, during work conducted on the network

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Assess potential impact on the wider network of plant, of equipment failure • Support the analysis for decisions made to undertake remedial work on relevant plant and equipment following failure • Support remedial testing / work conducted on the network
KA	**TK8** High voltage electrical network operations and topologies	Including: • The critical factors to take into consideration when commissioning substation Current Transformers (CT''s) and the purpose and method of conducting Primary Injection tests • The typical method and sequence of operations for an auto recloser detecting a fault on the network and the actions should a circuit breaker fail to clear a fault successfully • How substations are controlled remotely using a networked system, identifying the function and benefits offered by telemetry including the type of systems and equipment used • The typical power transformer vector groupings found on power networks and how to identify the different vector groups • The typical operational process undertaken for the safe isolation of a piece of network apparatus, identifying the symbols used to identify apparatus on the network and the responsibilities of persons involved

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• The typical tests and checks which should be carried out on a primary substation feeder circuit breaker with overcurrent and earth fault protection to ensure correct operation and the reason for each
TI	**TK9** High voltage safe systems of work and risk management	Application of knowledge to: • Plan and carry out safe systems of work and risk management procedures relevant to their work projects • Enable recognition of the range of roles and responsibilities of persons involved in implementing and maintaining safe systems of work • Identify and manage risks relevant to their work during projects conducted on the network Safe systems of work such as toolbox talks, checklists, safeguarding equipment, Safety Rules, RAMS, putting people to work & RAMS, Work at height, COSHH, RIDDOR
KA **TI**	**TK10** The application of the UK power standards, regulations and policies	Including: • Recognise and implement the requirements of the Electricity at Work Regulations 1989 and the Electricity Safety, Quality and Continuity Regulations 2002 during work projects, identifying the differing responsibilities of persons involved

Key	Assessment Elements: Knowledge	Amplification and Guidance
		• Recognise the effect and influence the power industry regulator Ofgem has on the planning and operational activities conducted during work projects on the network. Identifying the methods used by the regulator to control price increases and maintain standards • Support the process of the issue, receipt and / or cancellation of a safety document and identification of the responsibilities of the persons involved in the process
TI	**TK11** The type and application of test equipment used for commissioning purposes	Application of knowledge to: • Plan the use of test equipment and procedures required for protection and / or commissioning work • Conduct relevant test procedures in a logical and methodical manner on plant and / or apparatus for protection and / or commissioning work • Correctly interpret and record in a clear and concise manner test results which have been gained during the testing conducted Test equipment such as multimeters, test sets, analysers

Key	Assessment Elements: Skills	Amplification and Guidance
	Core Skills	
TI **PO**	**S1** Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant and equipment	Application of knowledge on: • Relevant company engineering processes such as maintenance tests, commissioning procedures
TI **PO**	**S2** Demonstrate application of safe working practices in line with company processes and legislative requirements	Application of knowledge to: • Relevant company safe working practices, processes, and legislative requirements, such as isolations, NSIs. risk assessment, managing hazards, manual handling, working at height, use of PPE, method statements
TI **PO**	**S3** Use of a wide range of test equipment to confirm the suitability of the high voltage plant for conformity and operational service	Application of knowledge to: • Use different types of test equipment, for calibration and testing procedures e.g. voltage, polarity, earth loop impedance, to confirm the suitability and conformity of high voltage plant / equipment for operational service • Apply testing procedures and processes in a planned and methodical manner • Correctly interpret the test results

Key	Assessment Elements: Skills	Amplification and Guidance
		• Use test information to make informed decisions and solve problems by using a logical and systematic approach
TI **PO**	**S4** Accurately reads and interprets a wide range of engineering diagrams and drawings	Application of knowledge covering: • A core knowledge of the range and specific use / purpose of a range of **engineering diagrams and drawings** such as tripping diagrams, circuit diagrams, wiring diagrams, layout diagrams, single line diagram, AC & DC schematic diagrams • Ability to use technical engineering diagrams and drawings to plan and organise the work activity
TI	**S5** Prepares and checks technical reports	Application of knowledge covering: • A detailed knowledge of the Company reporting methods and processes • The ability to produce and check technical reports in a methodical manner to record and inform the business of work projects • The ability to present technical information from reports in a clear and effective manner to sufficient depth for the audience • A clear understanding of the company process for reporting, amending incorrect and inaccurate technical information when identified

Key	Assessment Elements: Skills	Amplification and Guidance
TI **PO**	**S6** Effectively communicate with others to confirm that the tests meet the required standards/specifications	Application of knowledge covering: • Ability to identify the relevant internal / external stakeholders and the information they need to be given for confirmation of the testing • Ability to communicate both verbal and written information ensuring that all relevant parties understand the information given • Ability to present all information to others in a clear and concise manner and listen and respond to queries / questions • Ability to ensure that recipient/s understand any critical safety / technical information and confirm their understanding where necessary
	Skill-Specific Activities: Plant Skills	
TI **PO**	**PL1** Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment	PL1 forms the subject title of a main topic area for discussion in the interview. • A core knowledge of the company testing, commissioning and maintenance procedures relevant to the electrical systems / equipment relevant to their work activity • A clear plan of action to undertake the work operations in a logical manner which considers the resources required for the work

Key	Assessment Elements: Skills	Amplification and Guidance
		• The ability to competently follow the appropriate policy / procedure and implement the work plan to achieve their objectives • The ability to competently deliver the work objectives to meet the agreed deadlines / timescales • The ability to recognise and define potential problems and identifies and solve them in a step by step logical way, where necessary • The ability to take ownership and personal responsibility for the work of themselves and others under their control during the work activity
	Skill-Specific Activities: Protection Skills	
TI **PO**	**PR1** Undertake protection, testing, commissioning and maintenance activities involving functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system	PR1 forms the subject title of a main topic area for discussion in the interview. • A core knowledge and understanding of the method and purpose of injection testing on the high voltage equipment • A clear plan of action to undertake testing operations in a logical manner which considers the resources required for the testing operations

Key	Assessment Elements: Skills	Amplification and Guidance
		• The ability to inspect and use the test / injection equipment in accordance with the Company polices / manufacturer's instructions • The ability to identify and apply testing / injection procedures in a methodical manner as appropriate to the situation • The ability to gather and interpret the test / injection results gained to meet the objectives of the testing operation • The ability to record / report the test / injection results gained to meet Company requirements / standards
TI PO	**PR2** Use appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection as well as older electromechanical relays	PR2 forms the subject title of a main topic area for discussion in the interview. • A core knowledge of the purpose and operation of microprocessor / numerical based protection • A core knowledge of the relevant test procedures and control settings used to verify the correct operation of the protection equipment being worked on • The ability to choose and follow the correct methods / procedures to carry out the installation / testing of protection equipment

Key	Assessment Elements: Skills	Amplification and Guidance
		• The ability to apply the correct methods / procedures to verify the correct control settings / operation of the protection equipment in a methodical manner • The ability to correctly gather and interpret test results obtained to inform actions taken for the protection system being worked on • The ability to communicate progress to others by recording / reporting the outcome of their installation / testing operations in accordance with Company policies and procedures
TI PO	**PR3** Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system	PR3 forms the subject title of a main topic area for discussion in the interview. • A core knowledge of how the protection system being worked on interfaces with the associated high voltage equipment and the wider network • A core knowledge of the relevant test procedures and equipment used to verify the correct interface of the protection equipment with the system • The ability to choose and follow the correct methods and procedures to practically achieve the testing / verification of the protection system being worked on

Key	Assessment Elements: Skills	Amplification and Guidance
		• The ability to methodically apply the correct methods and procedures to verify the correct interface of the protection system being worked on • The ability to recognise and tackle technical issues in a step by step logical and methodical way and achieve an effective resolution • Their ability to communicate progress to others by recording / reporting the outcome of their protection operations in accordance with Company policies and procedures

Key	Assessment Elements: Behaviours	Amplification and Guidance
	B1 Team working: safely working as a member of a team to achieve required outcomes within time, cost, quality and budget constraints	
	B2 Interpersonal skills: able to relate to people at all levels and take others' views into account to ensure the best possible outcome	

Key	Assessment Elements: Behaviours	Amplification and Guidance
	B3 Communication: confident and effective communicator both verbally and in writing ensuring that all parties understand	
TI	**B4** Problem solving: pro-actively identifies and solves problems, within personal area of expertise, by using a logical and systematic approach	
TI	**B5** Methodical: identifies and applies procedures and processes as appropriate to the situation	
	B6 Ownership: takes personal responsibility for the work of themselves and others under their control	

Section 3: Grading and Grading Criteria

Component 1: Knowledge Assessment

The total mark for the knowledge assessment is 160 marks.

All questions must be answered.

The paper is split into four sections. Each section is based on one of the following four topic areas:

- A comprehensive understanding of UK electrical power systems
- Protection, control and telemetry equipment and the impact on the electrical network of its operation
- High voltage electrical network operations and topologies
- The application of Electricity Supply Standards, regulations and policies

Each section:

- is worth 40 marks
- contains a safety critical question, worth 8 marks. Each safety critical question must be awarded at least 62% marks to achieve a pass.
- has five questions, each typically worth 8 marks

The component is graded as follows

Grade	If an apprentice achieves
Fail	less than 104 marks OR the response to at least ONE safety critical question is awarded less than 62% (4 marks or less.)
Pass	a minimum of 65% (104-143 marks) AND Each safety critical question must be awarded at least 62% (5 marks or more).
Distinction	90% (144-160 marks) or above. AND Each safety critical question must be awarded at least 62% (5 marks or more).

Component 2: Technical interview based on the work log

The following criteria are indicative of the pass and distinction criteria the independent assessor will be looking for when the apprentice takes part in the technical interview.

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
TK1 A comprehensive understanding of electrical power systems	*All the pass criteria must be achieved by providing evidence which demonstrates:*	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:*

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	A comprehensive knowledge of the relevant Company's electrical power system, network relevant to their work projects and job role How they have applied their knowledge when planning their protection and commissioning projects ensuring compliance with Company policies How they have applied their knowledge to influence, support their decisions during their protection and commissioning projects How they have used their knowledge to make contingency plans for their protection and commissioning projects	A comprehensive knowledge and **detailed understanding** of the Company's electrical power network relevant to their work projects and job role and **how it influences protection designs** How they have applied their knowledge to make protection, commissioning **proposals which have led to improved efficiencies and operations** How they have used their knowledge to **challenge and report identified non-compliance** with the relevant Company engineering policies How they have **conducted analysis of the network design to support** their protection and commissioning operations
TK2 Detailed understanding of the application/operation of relevant plant & equipment	*All the pass criteria must be achieved by providing evidence which demonstrates:*	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:*

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	A detailed knowledge of the application, operation of the relevant plant and equipment involved in their work projects and job role How they used their knowledge of the application, operation of plant & equipment to influence the planning of their protection and commissioning projects How they have applied their knowledge to conduct operations on relevant plant and equipment during their protection and commissioning projects The process they would follow to gain further technical information, specifications about plant and equipment if required	A detailed knowledge and **thorough understanding** of the application, operation of the relevant plant and equipment involved in their work projects, job role and **its interaction with the wider network** How they have applied their knowledge of plant and equipment to make protection, commissioning **proposals which have led to improved efficiencies and operations** How they have used their knowledge of plant and equipment **to challenge and report identified non-compliance** with the relevant Company engineering policies How they have **researched the operation of plant, equipment to support** their protection and commissioning operations

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
TK3 Fault analysis methods in order to interpret results	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant fault analysis methods used in relation to their work projects and job role How they have applied critical thinking to determine which fault analysis method/s to use during their work projects and job role They have taken ownership of their fault analysis work, and where relevant those affected by the work How they have taken a systematic and logical approach to apply a range of fault analysis procedures to solve problems during their work projects and job role How they interpreted the results of their fault analysis to identify and implement solutions to resolve engineering problems	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **thorough technical understanding** of the relevant fault analysis methods in relation to their work projects and job role Ability to **use appropriate engineering theories and principles to justify** their fault analysis approach **to achieve successful outcomes** Ability to **compare and analyse the differing** fault analysis methods **to ensure the optimum method is chosen** How they have used their knowledge of fault analysis to **identify issues and influence operational changes** which have **led to an improved performance**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
TK4 How high voltage power generation, transmission and distribution plant and equipment operates	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the Company's electrical network layout, configuration relevant to their work projects and job role A detailed knowledge of the Company's high voltage plant and equipment and how it operates relevant to their work projects and job role How they used their knowledge of the plant & equipment to influence the planning of their protection and commissioning projects How they have applied their knowledge to conduct operations on relevant plant and equipment during their protection and commissioning projects	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **thorough understanding** of the Company's electrical network design **and operating parameters** How they have **applied** their knowledge of plant and equipment to make protection, commissioning **proposals which have led to improved efficiencies and operations** How they have **used** their knowledge of plant and equipment **to challenge and report identified non-compliance** with the relevant Company engineering policies How they have **researched the operation** of plant and equipment to support their protection and commissioning operations

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
TK5 Understands protection, control and telemetry equipment and the impact on the electrical network of its operation	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the protection and control equipment used on the network which are relevant to their work projects and job role A detailed knowledge of the telemetry equipment used on the network which is applicable to their work projects and job role and the impact of its use on the network How they have used their knowledge to influence, support the planning of their protection and commissioning work projects How they have used their knowledge to influence their decisions when conducting their protection and commissioning work	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **thorough technical understanding** of the protection and control equipment used on the network which are relevant to their work projects and job role A detailed knowledge and **thorough technical understanding** of the telemetry equipment used on the network which is relevant to their work projects and job role How they have **used appropriate engineering theories and principles** to make **suggestions**, **proposals** which have led to an **improved system and network performance** How they have used their knowledge **to appropriately challenge and report identified non-compliance**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
		with the relevant Company engineering policies
TK6 Understands commissioning and testing procedures & processes	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant Company commissioning and testing procedures and processes which are relevant to their work projects and job role How they have used their knowledge of the relevant Company commissioning and testing processes, procedures to plan and conduct their work projects and job role How they have applied their knowledge to influence, support their decisions during their commissioning and testing operations How they have used their knowledge to identify and resolve problems	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **thorough technical understanding** of the relevant Company commissioning procedures and processes which are relevant to their work projects and job role A detailed knowledge and **thorough technical understanding** of the relevant Company testing procedures and processes which are relevant to their work projects and job role How they have **used** their knowledge of relevant commissioning and testing procedures **to make suggestions which have influenced or led to an improved performance**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	during their commissioning and testing operations	How they have used their knowledge to appropriately **to challenge and report identified non-compliance** with the relevant Company engineering policies
TK7 Understands failure mode(s) of plant and equipment and the impact on the electrical network and the knowledge to identify required remedial actions	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the symptoms, causes of plant and equipment failure which is relevant to their work projects and job role A detailed knowledge of the potential impact on the wider network of plant, equipment failure which is relevant to their work projects and job role How they have used their knowledge of plant and equipment failure to support their protection, commissioning decisions in their work projects and job role	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **thorough technical understanding** of the symptoms, causes of plant and equipment failure which is relevant to their work projects and job role A detailed knowledge and **thorough technical understanding** of the potential impact of plant and equipment failure which is relevant to their work projects and job role How they have **analysed** plant, equipment failure **to implement remedial action/s** in their work projects and job role

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	How they have used their knowledge of plant and equipment failure to implement remedial action/s in their work projects and job role	How they have **applied** the correct engineering theories and principles **to take remedial actions** which have **achieved successful outcomes**
TK8 Understands high voltage electrical network operations and topologies	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant Company high voltage electrical network operations and procedures relevant to their work projects and job role A detailed knowledge of the roles and responsibilities of the persons involved in high voltage electrical network operations A detailed knowledge of the relevant Company high voltage topologies (network symbols and layout) used during their work projects How they have used their knowledge of high voltage electrical network	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed **technical** knowledge of the relevant Company high voltage electrical network operations and procedures relevant to their work projects and job role How they have **applied** their knowledge of network operations **to make proposals** which have **led to improved operational efficiencies and performance** How they have **applied** their knowledge of network topologies (network layout) **to make proposals** which have **led to improved**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	operation, topologies to plan and conduct their work projects	**operational efficiencies and performance** How they have **conducted analysis of the network design** to identify issues and solve problems which have to **led to improved network efficiencies**
TK9 Understands high voltage safe systems of work and risk management	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant Company safe systems of work and risk management procedures relevant to their work projects and job role A detailed knowledge of the roles and responsibilities of the persons involved in implementing and maintaining safe systems of work relevant to their work projects and job role A detailed knowledge of the Company processes and procedures for	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **thorough understanding** of the relevant Company safe systems of work and risk management procedures relevant to their work projects and job role How they have **applied their knowledge** of safe systems of work **to make proposals** which have **led to improved safety performance** How they have **applied their knowledge o**f risk management **to**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	identifying and managing risk relevant to their work projects and job role How they have used their knowledge of safe systems of work and risk management procedures to plan and conduct their work projects	**make proposals** which have **led to improved safety performance** They used their knowledge of safe systems of work and risk management procedures to **challenge unsafe behaviour and practices using appropriate techniques**
TK10 Understands the application of Electricity Supply Standards, regulations and policies	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the Company's regulatory obligations and how they influence their own work projects and job role A detailed knowledge of the Electricity Supply Regulations and how they have applied them when planning, conducting their work projects and job role A detailed knowledge of the Company policies which are relevant to their work projects, job role and how they	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed and **thorough knowledge** of the business's regulatory obligations and the impact they have on the Company's **strategic planning** A detailed and **thorough knowledge** of the Electricity Supply Regulations and the impact they have on the Company's **strategic planning** How have used their knowledge **to propose, implement solutions** which have led to an **improved regulatory performance**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	have applied them when planning and conducting their work How they have used their knowledge of the regulatory requirements when planning and conducting their work projects	How they have **gathered and analysed** relevant information in order to identify, implement workable solutions to support and meet regulatory requirements
TK11 Understands test equipment to select appropriate equipment for commissioning	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant test equipment and procedures required for commissioning A detailed knowledge of the test results, parameters for commissioning plant, systems relevant to their work projects and job role How they have conducted testing procedures and processes relevant to their work projects and job role in a logical and methodical manner Ability to correctly interpret and record, present the test results gained in a	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **technical understanding** of the relevant test equipment and the test procedures required for their work projects and job role A detailed knowledge and **technical understanding** of the relevant test results and parameters and the **causes / implications of not achieving the expected results** How they have used appropriate engineering theories and principles to **analyse test results** to gain a **deeper**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	clear and concise manner from the testing conducted	**understanding** of the equipment and system being commissioned How they have used the results gained to **identify and solve technical issues** which has led to a **successful outcome**
S1 Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant Company engineering and analytical processes during both normal and abnormal conditions on high voltage plant & equipment Ability to apply the relevant Company engineering operations on high voltage plant, equipment during both normal and abnormal work situations and conditions Ability to apply the relevant Company analytical processes when conducting	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* Ability to **take the lead and organise and control engineering operations** on high voltage plant, equipment during both normal and abnormal work situations Ability to **make suggestions for improvement** which support, enhance the outcome of the work activity Ability to **accurately and confidentially describe the rationale** for their operations and can **justify** the actions they have taken

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	work on high voltage plant. equipment in a logical and methodical manner How they have developed clear plans for dealing with contingencies which may occur during normal and abnormal work situations How they have used a systematic and logical approach to pro-actively solve problems during normal and or abnormal work situations and conditions	Ability to **use the appropriate engineering theories and principles** to **technically explain the operations undertaken**
S2 Demonstrate application of safe working practices in line with company processes and legislative requirements	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant Company safe working practices, process's and legislative requirements relevant to their work projects and job role Ability to plan and organise the relevant Company safe working practices, process's and legislative	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge and **through understanding** of the relevant Company safe working practices, process's and legislative requirements relevant to their work activity Ability to **assess the impact** of safety related problems and **seek out and solve their root cause(s)**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	requirements relevant to their work project and job role Ability to take ownership of the operations and apply the relevant Company safe working practices and process's using a logical and systematic approach How they have taken personal responsibility for the safety of themselves and others under their control or affected by their operations How they have monitored and maintained a safe working environment and taken action where necessary to maintain this condition	Ability to **challenge unsafe working practices** using appropriate techniques to effectively **resolve issues and situations** Ability to make **suggestions** which **significantly improve, rectify the safety arrangements and conditions** for the work being conducted
S3 Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the relevant Company high voltage test equipment and the procedure(s) for use, relevant to their work projects and job role	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed **technical** knowledge and **understanding** of the relevant test equipment and the test procedures

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to use different types of test equipment to confirm the suitability of high voltage plant, equipment for conformity and suitability for operational service Ability to take ownership of the operations and apply testing procedures and processes in a planned and methodical manner Ability to correctly interpret the test results gained from their testing operations and present, record the test information gained in a clear and concise manner Ability to use test information to make informed decisions and solve problems by using a logical and systematic approach	required for their work projects and job role Ability to **gather and analyse test information** to support their course of action and **assess the impact in different approaches**. Ability to use the **appropriate engineering theories and principles to technically explain** the testing operations undertaken Ability to **assess** the impact of problem situations and **pro-actively identify and solve problems**
S5 Prepares and checks technical reports	*All the pass criteria must be achieved by providing evidence which demonstrates:*	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:*

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	A detailed knowledge of the Company reporting methods and processes relevant to their work projects and job role Ability to produce and check technical reports in a methodical manner to record and inform the business of their work projects Ability to present technical information from their reports in a clear and effective manner to sufficient depth for the audience A clear understanding of the Company process for reporting, amending incorrect and inaccurate technical information identified during their work activities	**Ability to analyse and interpret complex technical information** from engineering diagrams, specifications and use it to **produce clear and accurate reports** Ability to **communicate complex technical information** contained in their reports in a clear and understandable manner Ability to **pro-actively identify and solve problems** with engineering diagrams, drawings by **using a logical and systematic approach** Ability to **accurately capture i**n their reports their actions on plant and equipment and **justify** the actions / and approach taken
PL1 Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors,	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the Company's testing, commissioning	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed **technical** knowledge of the Company's testing, commissioning

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
battery systems and ancillary equipment	and maintenance activities on electrical power systems relevant to their work projects and job role Ability to methodically conduct testing procedures in line with Company procedures on electrical power systems relevant to their work projects and job role Ability to methodically conduct commissioning procedures in line with Company procedures on electrical power systems relevant to their work projects and job role Ability to methodically conduct maintenance procedures in line with Company procedures on electrical power systems relevant to their work projects and job role Ability to take ownership of their work and the work of others to achieve successful outcomes	and maintenance activities relevant to their work projects and job role which **demonstrates excellent levels of understanding** in all areas Ability to **accurately and confidently describe the impact and effect of their actions** on the plant, equipment and electricity network as a whole and can **provide justification** for their course of action during their work projects Ability to **use and describe the appropriate engineering theories and principles** underpinning their projects and can j**ustify their approach taken to achieve successful outcomes** Ability to **proactively take the lead** and **methodically resolve the root cause of problems** by using a logical and systematic approach

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to methodically solve problems by using a logical and systematic approach Ability to communicate effectively and provide internal and or external stakeholders with relevant information when required	
PR1 Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the Company's injection testing procedures on electrical power systems relevant to their work projects and job role Ability to methodically conduct injection testing procedures in line with Company procedures on electrical power systems relevant to their work projects and job role	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed **technical** knowledge of the Company's injection testing procedures relevant to their work projects and job role which demonstrates **excellent levels of understanding** Ability to **accurately and confidently describe the impact / effect of their actions** on the equipment / network being tested and can provide **justification** for their course of action during their work projects

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to follow Company procedures to systematically interpret the test results gained Ability to use the results gained to make informed decisions on the actions to take Ability to take ownership of their work and the work of others to achieve successful outcomes Ability to methodically solve problems by using a logical and systematic approach Ability to communicate effectively and provide internal and or external stakeholders with relevant information when required	Ability to **use and describe** the appropriate engineering theories and principles underpinning their activities and can **justify their approach** taken to achieve successful outcomes Ability to **proactively take the lead** and **methodically resolve the root cause of problems** by using a logical and systematic approach
PR2 Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include electromechanical relays	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the Company's protection and control settings on equipment, electrical	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed **technical** knowledge of the Company's injection testing procedures relevant to their work

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	networks relevant to their work projects and job role Ability to methodically test and verify protection and control settings on equipment, electrical networks relevant to their work projects and job role Ability to methodically ensure correct installation and operation of microprocessor and numerical based protection on equipment, electrical networks relevant to their work projects and job role Ability to correctly interpret and use the results gained to make informed decisions on the actions to take Ability to take ownership of their work and the work of others to achieve successful outcomes Ability to methodically solve problems by using a logical and systematic approach	projects and job role which demonstrates **excellent levels of understanding** Ability to **accurately and confidently describe the impact / effect of their actions** on the equipment, network being tested and can **provide justification** for their course of action during their work projects Ability to use and describe the **appropriate engineering theories and principles** underpinning their activities and can **justify their approach** taken to achieve **successful outcomes** Ability to **proactively take the lead and methodically resolve the root cause** of problems by using a logical and systematic approach

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to communicate effectively and provide internal and or external stakeholders with relevant information when required	
PR3 Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system	*All the pass criteria must be achieved by providing evidence which demonstrates:* A detailed knowledge of the Company's protection systems and how they interface with the associated high voltage equipment relevant to their work projects and job role Ability to methodically interface operations on high voltage equipment, electrical systems relevant to their work projects and job role Ability to methodically check and confirm correct interface on high voltage equipment, electrical systems relevant to their work projects and job role	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed **technical** knowledge of the Company's protection systems and interfaces with the associated high voltage equipment relevant to their work projects and job role which demonstrates excellent levels of understanding Ability to **accurately and confidently describe the impact, effect of their actions** on the equipment, system being worked on and can provide **justification for their course of action** during their work projects Ability to use and describe the **appropriate engineering theories**

Technical Interview KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to correctly interpret and use the results gained to make informed decisions on the actions to take Ability to take ownership of their work and the work of others to achieve successful outcomes Ability to methodically solve problems by using a logical and systematic approach Ability to communicate effectively and provide internal and or external stakeholders with relevant information when required	**and principles** underpinning their activities and can **justify their approach** taken to achieve successful outcomes Ability to **proactively take the lead and methodically resolve the root cause of problems** by using a logical and systematic approach

Component 3: Practical observation

The following criteria are indicative of the criteria the assessor will be looking for when the apprentice takes part in the practical observation.

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
Core Skill Activities		
S1 Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant and equipment	*All the pass criteria must be achieved by providing evidence which demonstrates:* A working knowledge of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions Ability to choose and follow the appropriate policy and procedure to achieve the engineering objectives required for the activity Ability to apply an organised and analytical approach to achieve the engineering objectives required for the activity	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed technical knowledge and understanding of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions Ability to make suggestions for improvement which support / enhance the outcome of the work activity Ability to challenge / question processes which may adversely affect the effectiveness of the work activity

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to identify and apply procedures and processes as appropriate to the situation A clear plan for dealing with contingencies which could occur during normal / abnormal work situations Ability to take personal responsibility for their own work activities and others under their control	Ability to assess the impact of different approaches and analyse information to support their course of action
S2 Demonstrate application of safe working practices in line with company processes and legislative requirements	*All the pass criteria must be achieved by providing evidence which demonstrates:* A working knowledge of the relevant Company safe working practices / process's and legislative requirements relevant to their work activity Ability to identify and apply the appropriate safety policy and procedure and choose the appropriate course of action depending on the work activity / situation	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed** knowledge of the relevant Company safe working practices / process's and legislative requirements relevant to their work activity Ability to **assess the impact of** safety related problems and **seek out and solve** their root cause/s

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	How they have taken personal responsibility for the safety of themselves and others under their control How they can work safely to achieve required work outcomes within time, cost, quality and budget constraints How they regularly monitor / check the work activity / environment and take action when necessary to maintain a safe working environment	Ability to **challenge** unsafe working practices using appropriate techniques to effectively resolve issues / situations Ability to make **suggestions** which **significantly improve** / rectify the safety arrangements / conditions for the work being conducted
S3 Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service	*All the pass criteria must be achieved by providing evidence which demonstrates:* A working knowledge of the relevant test equipment and the test procedures required for the testing operation/s being undertaken Ability to follow the appropriate Company testing policy and procedure. and choose the appropriate course of action depending on the situation	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge and **understanding** of the relevant test equipment and the test procedures required for the work activity Ability to take a **pro-active lead** in accepting **additional responsibility / autonomy** to improve the work process

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to select and safely use a minimum of **TWO** different types of test equipment on electrical plant / apparatus for the work being undertaken Ability to correctly interpret the test results gained from the operations being conducted Ability to present test information gained in a clear and concise manner to sufficient depth for the audience Ability to identify and apply testing procedures and processes as in a planned and methodical manner Ability to take ownership and personal responsibility for the work of themselves and others under their control	Ability to **gather and analyse test information** to support their course of action and **assess the impact** in different approaches Ability to **assess the impact of** problem situations and **solve the root causes** of problems
S4 Accurately reads and interprets a wide range of engineering diagrams and drawings	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of the range of engineering diagrams and drawings	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed** knowledge of the range of engineering diagrams and drawings

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	available within their Company and their specific use / purpose How they have used technical engineering diagrams and drawings to plan and organise their work activity Ability to present technical information in a clear and concise manner to sufficient depth for the audience Ability to analyse and use engineering diagrams / drawings to methodically apply procedures and processes for their work activity Ability to communicate information in a confident and effective manner ensuring that all relevant parties understand A clear understanding of the Company process for reporting / amending incorrect / inaccurate information identified in engineering diagrams and drawings	available within their Company and explain their specific use and purpose Ability to analyse and **interpret complex** technical information from engineering diagrams and drawings to plan and organise their work activity Ability to transmit **difficult technical** information to others in an understandable manner Ability to **pro-actively** identify and **solve problems** with engineering diagrams / drawings by using a logical and systematic approach

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
S6 Effectively communicate with others to confirm that the tests meet the required standards/specifications	*All the pass criteria must be achieved by providing evidence which demonstrates:* Ability to identify the relevant internal / external stakeholders and the information they need to be given for confirmation of their testing Ability to confidently and effectively communicate both verbal and written information ensuring that all relevant parties understand the information given Ability to present all information to others in a clear and concise manner and listen and respond to queries / questions Ability to ensure that recipient/s understand any critical safety / technical information and confirms their understanding where necessary Ability to take personal responsibility and ownership for confirmation of their testing operations	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* Ability to transmit **difficult technical** information in an understandable manner Ability to **prioritise activities** to meet objectives and communicate progress to others Ability to **consult and involve** the appropriate people to **capitalise on different skills, perspectives, experience and knowledge** to confirm testing Ability through positive relationships to actively **address conflict** with positive outcomes
Skill-Specific Activities		

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
PL1 Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of the company testing, commissioning and maintenance procedures relevant to the electrical systems / equipment relevant to their work activity A clear plan of action to undertake their work operations in a logical manner which considers the resources required for the work Ability to competently follow the appropriate policy / procedure and implement their work plan to achieve their objectives Ability to competently deliver their work objectives to meet the agreed deadlines / timescales Ability to recognise and define potential problems and identifies and solve them in a step by step logical way, where necessary Ability to take ownership and personal responsibility for the work of themselves and others under their control during the work activity	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A detailed technical knowledge of the Company testing, commissioning and maintenance procedures of systems / equipment relevant to their work activity Ability to consult and involve the appropriate people to capitalise on different skills, perspectives, experience and knowledge to confirm testing Ability to assess the impact of different approaches and is able to gather and analyse information to support their decisions / course of action Ability to seek out and attempt to solve the root causes of problems and make suggestions for improvement

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
PR1 Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge and understanding of the method and purpose of functionality and injection testing on the high voltage equipment being worked on A clear plan of action to undertake their testing operations in a logical manner which considers the resources required for the testing operations Ability to inspect and use the test / injection equipment in accordance with the Company polices / manufacturer's instructions Ability to identify and apply testing / injection procedures in a methodical manner as appropriate to the situation Ability to gather and interpret the test / injection results gained to meet the objectives of the testing operation	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge and understanding of the range and purpose of functionality and injection testing on the high voltage equipment being worked on Ability to **gather and analyse** technical test data to **inform their actions** or change their approach Ability to communicate / transmit **difficult** technical information in an understandable manner to relevant persons Ability to seek out and attempt to solve the root causes of problems and **make suggestions for improvement**

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to record / report the test / injection results gained to meet Company requirements / standards	
PR2 Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of the purpose and operation of the microprocessor / numerical based protection being worked on A core knowledge of the relevant test procedures and control settings used to verify the correct operation of the protection equipment being worked on Ability to choose and follow the correct methods and procedures to practically achieve the installation / testing of protection equipment Ability to methodically apply the correct methods and procedures to verify the correct control settings / operation of the protection equipment	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge of the purpose and operation of microprocessor / numerical based protection being worked on and its effect relevant to the network A **detailed technical** knowledge and **understanding** of the relevant test procedures and control settings used to verify the correct operation of the protection equipment being worked on Ability to **assess the impact of different approaches** to the installation / testing operations

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to correctly gather and interpret the test results obtained to inform their actions for the protection system being worked on Ability to communicate progress to others by recording / reporting the outcome of their installation / testing operations in accordance with Company policies and procedures	Ability to **gather and analyse** technical information to support their course of action
PR3 Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of how the protection system being worked on interfaces with the associated high voltage equipment and the wider network A core knowledge of the relevant test procedures and equipment used to verify the correct interface of the protection equipment with the system Ability to choose and follow the correct methods and procedures to practically	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge of how the protection system being worked on interfaces with the associated high voltage equipment and the wider network Ability to transmit **difficult technical** information in an understandable manner Ability to **assess the impact** of technical interface problems and seek out and

Practical Observation KSBs	Indicative Pass Criteria	Indicative Distinction Criteria
	achieve the testing / verification of the protection system being worked on Ability to methodically apply the correct methods and procedures to verify the correct interface of the protection system being worked on Ability to recognise and tackle technical issues in a step by step logical and methodical way and achieve an effective resolution Ability to communicate progress to others by recording / reporting the outcome of their protection operations in accordance with Company policies and procedures	attempt to solve the root causes of problems to achieve a solution Ability to **consult** with others to **capitalise on different skills, perspectives, experience and knowledge to resolve issues**

Overall grading

The knowledge assessment, practical observation and technical interview are individually graded and awarded either a fail, pass or distinction.

Grading Criteria

The final grade will be determined by collective performance in the three assessment tools in the end-point assessment. Grades from individual assessment methods are combined in the following way to determine the overall grade awarded for the EPA.

Knowledge Assessment	Technical **Interview**	Practical Observation	Overall Grade
Fail	Any grade	Any grade	Fail
Any grade	Fail	Any grade	Fail
Any grade	Any grade	Fail	Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Pass
Pass	Distinction	Pass	Pass
Pass	Pass	Distinction	Pass
Distinction	Distinction	Pass	Pass
Distinction	Pass	Distinction	Pass
Pass	Distinction	Distinction	Distinction
Distinction	Distinction	Distinction	Distinction

Final Decision Panel

The role of the final decision panel is to assign the mark for the observation following a presentation of the observation evidence by the observation technical expert. They will check and confirm marks awarded for the knowledge assessment and technical interview. They will then combine the results of three assessments and assign the overall apprenticeship grade, based on the grading requirements detailed above.

Decision panels will consist of three people:

- Technical expert who has undertaken the observation
- Technical expert independent of the apprentice and their employer i.e., not from their employer or training provider and with a background in commissioning and protection
- An additional member independent of the apprentice and their employer with appropriate electrical technical experience or a representative from a relevant professional body

One of the independent panel members will act as chair of the panel.

EUIAS will co-ordinate the final decision panels ensuring comparable decisions consistently and comparably across panels and over-time.

Section 4: Resits and retakes

Apprentices who fail one or more EPA methods can take a re-sit or a re-take at the employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, but a re-take does.

Apprentices should have a supportive action plan to prepare for a re-sit or a re-take.

The retake must only be carried out after one month has elapsed since the first scheduled date of the EPA element. The employer and EUIAS agree the timescale for a re-sit or re-take. A re-sit is typically taken within 2 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 3 months of the EPA outcome notification.

Re-sits and re-takes are not offered to apprentices wishing to move from pass to a higher grade.

The apprentice cannot achieve higher than a pass for the EPA element that they have had to retake.

The EUIAS re-sit and re-take policy can be found at
Policies and Fees: End Point Assessment Organisation - EUIAS

Section 5: Practice Guidance

EUIAS recommend that apprentices have a practice or 'mock' assessment covering all components of the EPA in the weeks running up to the live EPA.
EUIAS also recommends that employers/training providers use the EUIAS Practical Skills Observation Review Service to help ensure the tasks prepared for the live practical assessment are appropriate.

The Knowledge Assessment

While on-programme, the employer and or training provider should brief the apprentice on the areas to be assessed by the Knowledge Assessment, as detailed in Section 3. It is good practice to identify the areas within the learning programme where the relevant knowledge is delivered and ensuring that apprentices are aware that elements from each of these criteria might come up in the test.

The Knowledge Assessment is aligned to the standard rather than a specific job role that the apprentice may be doing. The questions have been written to reflect the Electrical Power Protection and Plant Commissioning Engineer role as a whole and are not focussed on specific plant, machinery, or employer-specific processes.

In readiness for end-point assessment, the apprentice should complete the sample test, which is included in Supporting Documents, Appendix C Practice questions for knowledge assessment. This should be undertaken in advance of the Knowledge Assessment, with enough time to mark the assessment, and provide feedback to learners. The employer and or training provider may devise additional questions to create a complete practice test.

For maximum effect, ensure the test is taken in exam conditions similar to those that will be experienced in a live test.

Preparing for the Practical Observation

The practical observation should be designed by the apprentice's employer to assess a broad range of the higher order skills, knowledge and behaviours developed over the period of the apprenticeship. The work activities observed should be carefully

selected to provide coverage for the range of Specific Skill activities identified in Section 3.

The assessment must be conducted in a realistic work situation that reflects the typical hazards and risks of the work environment.

At appropriate times during the practice assessment the tutor or supervisor carrying out the observation should conduct questioning to confirm knowledge and understanding of the topic area. Each apprentice must be asked a range of industry devised questions, for the activity being observed, with further follow up questions being asked where required. These questions should be contextualised to the apprentice's job role and the specific work activity being observed. To prepare the apprentice for this aspect of the practice practical observation, we recommend developing some open-ended questions which focus on the rationale for each part of the task.

The tutor or supervisor carrying out the observation of the practice assessment should record their assessment of how the apprentice performed and provide feedback to the apprentice with guidance on what to do to improve their performance, taking note of the grading descriptors for pass and distinction in Section 5. The tutor or supervisor should take into consideration core behaviours demonstrated by the apprentice which have been built into the relevant criteria

Preparing for the Technical Interview

A practice interview should take place between the apprentice and the person acting the role of a technical expert. The apprentice should draw on evidence from their work log during the discussion to demonstrate competence of the broad range of knowledge, skills and behaviours.

The employer/training provider will be required to confirm that the work log provides an accurate representative of work carried out by the apprentice and is not embellished.

Guidance on Work Log

The work log is not assessed. It serves two purposes:

- The technical expert and independent assessor reviews the work log before the interview to help focus and contextualise their questions
- A carefully prepared mapped work log supports the apprentice during the interview

Quality vs Quantity

The apprentice should be supported in selecting and mapping evidence for their work log.

Choose the best pieces of evidence that have been mapped for each KSB covered by the interview. An independent assessor will look for one suitable piece of evidence for each KSB. To be confident of meeting the standard, apprentices should aim to have two pieces of evidence mapped to each KSB.

What to include in the work log?

The work log:

- must contain a mapping document where evidence is mapped against the KSBs. A template has been produced to help the apprentices with collecting and mapping their evidence. A copy of the template is included in the Supporting Documents, Appendix G Work Log Mapping Document
- must contain evidence related to the KSBs that will be assessed by the interview
- should contain progress review documentation
- will contain quality pieces of evidence
- will be available, during the interview, allowing the apprentice to refer to it
- must contain demonstrations of work carried out over a period of time and must include evidence of work carried out within the last three months of the on programme period
- must contain a minimum of 2 and no more than 3 activities carried out by the apprentice that demonstrates the higher order knowledge, skills and behaviours
- where practicable this should include:
    - photographs

- images
- diagrams
- job descriptions and witness evidence/testimony
- situations that have been difficult and challenging, and how these have been overcome e.g. equipment breakdown which has results in a change in working practice while still adhering to company procedures

Any employer contributions must focus on direct observation of evidence (e.g. review/witness statements) of competence rather than opinions.

The above is not a definitive list. The apprentice can include other relevant evidence sources. The work log **must not** contain any methods of self-assessment.

Evidence must be:

- produced by the apprentice (authentic)
- relevant to the standard (K, S or B) that it is mapped to
- produced during the time the apprentice is carrying out their on-programme training.

What can the apprentice do?

The apprentice should:

- be familiar with the structure of their work log
- know the KSBs covered by the interview
- know the grading criteria
- ensure there is evidence and to cover every KSB in the interview
- practise mapping evidence and completing the evidence mapping grid

1.1.1 The role of the training provider

Training providers are expected to support the apprentice in preparing their work log by:

- clarifying responsibility for supporting the apprentice to select and map evidence for the work log, including employer coaches/mentors where applicable

- advising on which pieces of evidence to select to ensure that when looked at as a whole, they provide coverage of all the required elements of the standard assessed in the interview
- supporting the mapping of evidence and production of a mapping document
- authenticating evidence as valid
- signing off the work log
- submitting the work log to EUIAS at least 2 weeks to interview, the apprentice will submit a work log setting out examples of work they have carried out

What to expect in the practice interview?

The practice interview provides the apprentice with the opportunity to practice discussing their KSBs gained throughout their on-programme and by referring to the evidence from the apprentice's work log using the mapping document. A suitable person should be chosen to play the part of the technical expert. See Supporting Documents, Appendix F Practice Technical Interview Template to be used to prepare the appropriate questions to ask and to record the apprentices' performance in the practice interview.

As part of the practice exercise, apprentices should have access to their work log to support their responses.

Section 6: Authenticity and security of apprentice work

The apprentices must be advised by their training provider and employer that copying of any work (whether it is from another apprentice or from internal, external documents or source) and presenting it as their own will be deemed as malpractice and will lead to their work being disqualified. Apprentices must not share their work or allow any person to copy their work as this is not allowed and would also be deemed as malpractice.

In signing off the work log, training providers and employers must be satisfied that the evidence in the work log is:

- **adequate**: evidence must cover all relevant KSBs within the assessment plan. Adequate does not mean a large quantity of evidence. The evidence should focus on quality rather than quantity

- **authentic**: apprentices must be able to confirm and talk about the evidence that they submit with the independent assessor, appointed by the EUIAS. It is vitally important apprentices only submit evidence relating to them
- **appropriate**: all evidence must be relevant to the KSBs assessed during the technical interview
- **recent and up to date**: all evidence must be linked to KSBs must be recent and current which demonstrate the apprentice's competence. The independent assessors, appointed by the EUIAS will assess current competencies, and the apprentice must map the evidence to demonstrate the relevant work to the KSB. Apprentices must gather the evidence during their on-programme training