



EPA DRAFT PREVIEW

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DRAFT END-POINT ASSESSMENT PLAN ST0243/1.2 FOR THE LAND-BASED SERVICE ENGINEERING TECHNICIAN APPRENTICESHIP

APPRENTICESHIP REFERENCE NUMBER	LEVEL OF THIS END-POINT ASSESSMENT (EPA)	INTEGRATED
ST0243	3	No

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Introduction and overview

This document explains the requirements for end-point assessment (EPA) for the land-based service engineering technician apprenticeship. End-point assessment organisations (EPAOs) must follow this when designing and delivering the EPA.

Land-based service engineering technician apprentices, their employers and training providers should read this document.

The land-based service engineering technician apprentice typically spends 24 months on-programme. The apprentice must spend at least 12 months on-programme and complete the required amount of off-the-job training in line with the apprenticeship funding rules.

Upon completion of the gateway requirements, the EPA should be completed within an EPA period lasting typically 6 months.

The apprentice must complete their training and meet the gateway requirements before starting their EPA. The EPA will assess occupational competence.

An approved EPAO must conduct the EPA for this apprenticeship. Employers must work with the training provider to select an approved EPAO from the apprenticeship providers and assessment register (APAR).

This EPA has 3 assessment methods.

The grades available for each assessment method are below.

Assessment method 1 - knowledge test:

- fail
- pass
- merit

- distinction

Assessment method 2 - practical tasks with questions:

- fail
- pass
- distinction

Assessment method 3 - professional discussion underpinned by a portfolio of evidence:

- fail
- pass
- distinction

The result from each assessment method is combined to decide the overall apprenticeship grade. The following grades are available for the apprenticeship:

- fail
- pass
- merit
- distinction

EPA summary table

<p>On-programme - typically 24 months</p>	<p>The apprentice must:</p> <ul style="list-style-type: none"> • complete training to develop the knowledge, skills and behaviours (KSBs) outlined in this apprenticeship's standard • complete training towards English and mathematics qualifications in line with the apprenticeship funding rules • compile a portfolio of evidence
<p>End-point assessment gateway</p>	<p>The apprentice's employer must be content that the apprentice is occupationally competent.</p> <p>The apprentice must:</p> <ul style="list-style-type: none"> • confirm they are ready to take the EPA • have achieved English and mathematics qualifications in line with the apprenticeship funding rules <p>For the professional discussion underpinned by a portfolio of evidence, the apprentice must submit a portfolio of evidence.</p> <p>Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.</p>
<p>End-point assessment - typically 6 months</p>	<p>The grades available for each assessment method are below</p> <p>Knowledge test:</p> <ul style="list-style-type: none"> • fail • pass • merit • distinction <p>Practical tasks with questions:</p> <p>fail</p>

	<ul style="list-style-type: none"> • pass • distinction <p>Professional discussion underpinned by a portfolio of evidence:</p> <ul style="list-style-type: none"> • fail • pass • distinction <p>Overall EPA and apprenticeship can be graded:</p> <ul style="list-style-type: none"> • fail • pass • merit • distinction
<p>Professional recognition</p>	<p>This apprenticeship aligns with:</p> <ul style="list-style-type: none"> • The Institution of Agricultural Engineers (IAgrE) for Engineering Technician (EngTech)
<p>Re-sits and re-takes</p>	<ul style="list-style-type: none"> • re-take and re-sit grade cap for the overall final epa grading: merit • re-take and re-sit grade cap for the individual methods: pass • re-sit timeframe: typically 1 months • re-take timeframe: typically 3 months

Duration of end-point assessment period

The EPA is taken in the EPA period. The EPA period starts when the EPAO confirms the gateway requirements have been met and is typically 6 months.

The EPAO should confirm the gateway requirements have been met and start the EPA as quickly as possible.

EPA gateway

The apprentice's employer must be content that the apprentice is occupationally competent. That is, they are deemed to be working at or above the level set out in the apprenticeship standard and ready to undertake the EPA. The employer may take advice from the apprentice's training provider, but the employer must make the decision. The apprentice will then enter the gateway.

The apprentice must meet the gateway requirements before starting their EPA.

They must:

- confirm they are ready to take the EPA
- have achieved English and mathematics qualifications in line with the apprenticeship funding rules
- submit a portfolio of evidence for the professional discussion underpinned by a portfolio of evidence

Portfolio of evidence requirements:

The apprentice must compile a portfolio of evidence during the on-programme period of the apprenticeship. It should only contain evidence related to the KSBs that will be assessed by this assessment method. It will typically contain evidence relating to 15 jobs. Evidence must be mapped against the KSBs. Evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested. The jobs should demonstrate the breadth of knowledge and skills mapped to the method. Jobs are likely to relate but are not limited to work carried out on:

- Engines
- Transmissions
- Electrical work
- Hydraulics
- Exhaust emissions after treatment systems
- PDI (pre delivery inspection and preparation)
- Land-based machinery and equipment
- GPS / Guidance / Telematics / Technology
- Service and maintenance operations

For each job the following should be provided:

- 1) Job card showing the instructions given
- 2) A company risk assessment – workshop and/or on site dynamic assessment
- 3) Pictures that describe the job from start to finish (must include photographs of the apprentice doing the job)
- 4) Service manual information related to the job
- 5) Saved data from the job (Error codes, software versions, parameter logs etc)
- 6) Check sheets (where appropriate e.g. PDI / Service)
- 7) A description of the job and tasks undertaken, the parts used, and the challenges encountered and how they were overcome

Evidence sources may also include:

- Annotated workplace documentation and records, for example:
- workplace policies and procedures
- details of the employers main business activities/ area of interest
- witness testimonies
- annotated photographs
- video clips (each having a maximum total duration 3 minutes duration); the apprentice must be in view and identifiable
- an individual apprenticeship achievement plan
- progress review records (training provider, employer/ mentor)
- a continuing professional development (CPD) record
- achievement record

The portfolio of evidence should not include reflective accounts or any methods of self-assessment. Any employer contributions should focus on direct observation of performance, for example, witness statements, rather than opinions. The evidence provided should be valid and attributable to the apprentice; the portfolio of evidence should contain a statement from the employer and apprentice confirming this.

The EPAO should not assess the portfolio of evidence directly as it underpins the discussion. The independent assessor should review the portfolio of evidence to prepare questions for the discussion. They are not required to provide feedback after this review.

The apprentice must submit the gateway evidence to their EPAO, including any organisation specific policies and procedures requested by the EPAO.

Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.

Order of assessment methods

The assessment methods can be delivered in any order.

The result of one assessment method does not need to be known before starting the next.

Knowledge test

Overview

In the knowledge test, the apprentice answers questions in a controlled and invigilated environment. It gives the apprentice the opportunity to demonstrate the knowledge mapped to this assessment method.

Short answer questions (SAQs) are open-ended questions. SAQs are used to assess basic knowledge in a test. SAQs need a brief factual or interpretive answer. Long answer questions (LAQs) are open-ended questions. LAQs are used to assess depth of knowledge in a test. LAQs need an extended written response or an evaluative answer.

Rationale

This assessment method is being used because:

- it can assess knowledge.
- it is easy to administer.
- it can be completed online and or remotely, providing appropriate controls are in place.
- it has potentially high reliability and validity.
- tests taken in examination conditions are considered to be rigorous and reliable.
- everyone taking the test has the same experience, which enables direct comparisons between apprentices across the country and over time.
- a question bank can be used which helps to ensure that the difficulty of the tests remains stable over time.
- apprentices have the opportunity to explain their thinking and articulate their responses through written tests.
- the use of Short Answer Questions (SAQs) and test structure increases the accessibility of the assessment method.

Delivery

The knowledge test must be structured to give the apprentice the opportunity to demonstrate the knowledge mapped to this assessment method to the highest available grade. The test can be computer or paper based. The apprentice must be given at least 14 days' notice of the date and time of the test. The test must consist of 16 Short Answer Questions (SAQs) questions and 2 Long Answer Questions (LAQs) and always total **44** marks.

To support comparability, the distribution of marks will be allocated at theme level (see mapping of KSBs to themes) using the design detailed below.

Each theme must include the following:

- **Data management** (x2 questions totalling 3 marks overall)
 - 1x SAQ worth 1 mark
 - 1x SAQ worth 2 marks
- **Environmental and sustainability** (x1 question totalling 4 marks overall)
 - 1x SAQ worth 4 marks
- **Health and safety** (x5 questions totalling 10 marks overall)
 - 2x SAQs worth 1 mark,
 - 2x SAQs worth 2 marks
 - 1x SAQ worth 4 marks
- **Root cause analysis, repair machinery and equipment, prime movers and electrical and electronic systems** (x7 questions totalling 16 marks overall)
 - 2x SAQs worth 1 mark
 - 3x SAQs worth 2 marks
 - 1x SAQ worth 4 marks
 - 1x LAQ worth 6 marks
- **Machinery settings and field operations** (x3 questions totalling 7 marks overall)
 - 1x SAQ worth 1 mark,
 - 1x SAQ worth 2 marks
 - 1x LAQ worth 6 marks

Responses to SAQs may be one word, a phrase, a sentence or a paragraph and should be reflective of the mark allocation in terms of expected demand. For example, a 1 mark SAQ will typically require either a one word or single sentence response. A 2 mark SAQ will typically require a phrase or a few sentences, whereas a 6 mark LAQ will typically require several sentences, forming a longer paragraph.

Marking scheme and grading guidance

The grading descriptors show both the numerical grade boundaries required for each level of achievement for the written test and the required level of demand for competency. The grading descriptors should be used by EPAOs to create valid and reliable mark schemes. The marks scheme design and approach can be determined by the EPAO (e.g. either levels based, points based or a mixture). EPAOs should ensure that the questions within the knowledge test mirror the level of demand set by the grading descriptors at the pass level. This should be done by using the same command verb where possible (or a comparable verb, in terms of demand, where not). The grading descriptors should inform the question writing whilst also providing EPAOs with the numerical outcomes required for each level of attainment.

Test administration

The apprentice must have 90 minutes to complete the test.

The test is closed book which means that the apprentice cannot refer to reference books or materials whilst taking the test.

The test must be taken in the presence of an invigilator who is the responsibility of the EPAO. The EPAO must have an invigilation policy setting out how the test must be conducted. It must state the ratio of apprentices to invigilators for the setting and allow the test to take place in a secure way.

The EPAO must verify the apprentice's identity and ensure invigilation of the apprentice for example, with 360-degree cameras and screen sharing facilities.

The EPAO is responsible for the security of the test including the arrangements for on-line testing. The EPAO must ensure that their security arrangements maintain the validity and reliability of the test.

Marking

The EPAO must develop a marking scheme based on the grading descriptors for this assessment method. The test must be marked by an independent assessor or marker employed by the EPAO. They must follow the marking scheme produced by the EPAO.

Any incorrect or missing answers get zero marks.

The EPAO is responsible for overseeing the marking of the test. The EPAO must ensure standardisation and moderation of tests with written answers.

Assessment location

The apprentice must take the test in a suitably controlled and invigilated environment that is a quiet room, free from distractions and influence. The EPAO must check the venue is suitable.

The test can take place remotely if the appropriate technology and systems are in place to prevent malpractice.

Question and resource development

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO should maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

The EPAO must produce the following materials to support the test:

- assessment materials for independent assessors and markers which includes:
 - training materials
 - administration materials
 - moderation and standardisation materials
 - guidance materials
 - grading guidance
 - test specification
 - sample test and mark schemes
 - live tests and mark schemes
 - question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

Practical tasks with questions

Overview

In the practical assessment with questions, an independent assessor observes the apprentice completing a series of tasks set by the EPAO. The EPAO decides in which of the simulated environments it takes place. The assessment environment must closely relate and be resourced to reflect the apprentice's natural working environment. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

Rationale

This assessment method is being used because it:

- tests knowledge, skills and behaviours holistically and objectively
- enables the practical assessment of competencies (unlikely to occur in a direct observation in the workplace)
- enables direct testing under controlled conditions

Delivery

The practical tasks with questions must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An independent assessor must conduct and assess the practical tasks with questions.

The independent assessor may observe a maximum of 3 apprentice's at a time to ensure quality and rigour. They must be as unobtrusive as possible.

Suitable control measures should be in place to ensure consistency, reliability and authenticity of work and that there is no interference or security issues as a result of assessing 3 apprentice's at a time.

The EPAO must give an apprentice 14 days' notice of the practical tasks with questions.

The series of 3 practical tasks with questions are to be completed within a total of 4.5 hours.

The independent assessor can increase the time of the practical tasks with questions by up to 10%. This time is to allow the apprentice to complete a task or respond to a question if necessary.

The practical tasks with questions cannot be split, other than for comfort breaks or to allow apprentices to move from one location to another. Where breaks occur, they will not count towards the total EPA time.

The EPAO must manage invigilation of the apprentice during the assessment, to maintain security of the EPA, in line with their malpractice policy. This includes breaks and moving between locations.

The independent assessor must explain to the apprentice the format and timescales of the practical tasks with questions before it starts. This does not count towards the assessment time.

The independent assessor must observe the following during the practical assessment:

*5 days advance notice of the machine used for each task can be given to the apprentice by the EPAO. This reflects the practice in industry that the individual would be aware of the machine type prior to commencing work.

The EPAO must ensure that the machines are configured in such a way that the assessment can function. This should not exclude the use of used machinery and equipment.

Task 1 installation handover (90 mins)

Perform installation and handover of self propelled machinery or prime mover, explaining their safe operation, the settings required for the environmental conditions and application, the maintenance and warranty requirements.

The apprentice is required to establish the level of customer understanding following installation and handover and communicate findings to stakeholders.

The equipment must be relevant to the sector in which the apprentice is employed. Advance notice of the machine type or manufacturer's model, specification and year of manufacture should be provided to the apprentice 5 days in advance of the tasks. Machines can be new or used.

Task 2 diagnose and report repair recommendations (90 mins).

The task requires the apprentice to consider mechanical, electrical, and hydraulic symptoms to diagnose the root cause of an electrical fault. The electrical fault should be such that it could indicate mechanical or hydraulic or an electrical fault.

The fault should require the consideration of mechatronics. For example:

- a controller area network (CANBUS)
- local interconnect network (LINBUS)
- ISOBUS
- potentiometer
- speed or proximity sensor
- proportional solenoid
- linear actuator

Diagnosis equipment must include the use of a multimeter and/ or an oscilloscope. The apprentice will be required to reference a schematic drawing and carry out the diagnosis and report repair recommendations to the independent assessor.

Task 3 Verification of a reported Engine, Transmission or Hydraulic symptom (90 mins)

The apprentice is required to investigate reported underperformance of land-based machinery, equipment and prime movers using logical problem-solving techniques.

The apprentice is required to consider symptoms and measure inputs and outputs to determine a diagnosis and present their findings to the assessor.

The use of one or more of the following diagnostic tools should be used; diagnostic / scan software, oscilloscope, pressure gauges, flow meter, multi-meter to verify the findings.

The presented findings must be supported by manufacturer documentation, schematics, flow diagrams or drawings as found in the appropriate service manual.

Examples of symptoms are:

- Low engine power.
- Engine will not start.
- Jerky transmission shifts.
- No drive.
- Poor hydraulic performance.
- Poor bale density.

These activities provide the apprentice with the opportunity to demonstrate the KSBs mapped to this assessment method.

The independent assessor must ask questions.

The purpose of the questions is:

- to seek clarification where required
- to assess the level of competence against the grading descriptors

Questioning must occur during the practical assessment. The time for questioning is included in the overall assessment time.

The independent assessor must ask at least 6 questions in total during the practical assessment (at least 2 per task). To remain as unobtrusive as possible, the independent assessor should ask questions during natural breaks in work rather than disrupting the apprentice's flow. The independent assessor must use the questions from their EPAO's question bank or create their own questions in line with the EPAO's training.

The independent assessor can ask follow-up questions to clarify answers given by the apprentice. These questions are in addition to the above set number of questions for the practical tasks with questions.

The apprentice may choose to end the assessment method early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless the apprentice commits a serious breach of health and safety or there is an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

The independent assessor must make the grading decision. The independent assessor must assess the practical assessment and responses to questions holistically when deciding the grade.

The independent assessor must keep accurate records of the assessment. They must record:

- the KSBs observed
- the apprentice's answers to questions
- KSBs demonstrated in answers to questions
- the grade achieved

Assessment location

The practical tasks with questions must take place in a simulated environment selected by the EPAO for example, the training provider's premises, the EPAO's or employer's premises, a test centre or a similar simulated environment. This simulated environment must relate to the apprentice's natural work environment. Equipment and resources needed for the practical tasks with questions must be available. The EPAO, has responsibility for ensuring that the equipment and resources are suitable and are available and may liaise with the employer/ provider to supply these.

Question and resource development

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and occupational sector of the apprentice and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different task or tasks and questions in the case of re-sits and retakes, to minimise predictability.

If a task is failed, it is only a requirement to resit or retake that specific task rather than the entire method.

The EPAO must produce the following materials to support the practical tasks with questions:

- independent assessor assessment materials which include:
 - assessor training materials
 - administration materials
 - moderation and standardisation materials
 - guidance materials
 - grading guidance
 - question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

Professional discussion underpinned by a portfolio of evidence

Overview

In the professional discussion, an independent assessor and apprentice have a formal two-way conversation. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence.

Rationale

This assessment method is being used because it:

- allows the holistic assessment of KSBs
- enables the independent assessor to draw on examples of work carried out by the apprentice
- allows the use of the portfolio followed by questioning. This will assist the apprentice to amplify their examples and to demonstrate the work carried out
- will enable the independent assessor to test underpinning knowledge, and understanding and behaviours
- will enable the consistent assessment of activities that might be carried out in different locations at different times of the year
- enables criteria to be assessed that would not occur regularly or would take too long to observe

Delivery

The professional discussion must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An independent assessor must conduct and assess the professional discussion.

The professional discussion will cover the following themes:

- career and professional development
- diagnostics
- machine settings and field operations
- mentoring and support
- hydraulic and pneumatic repairs
- customer interaction
- complex repairs

The EPAO must give an apprentice 14 days' notice of the professional discussion.

The independent assessor must have at least 2 weeks to review the supporting documentation.

The apprentice must have access to their portfolio of evidence during the professional discussion.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence however, the portfolio of evidence is not directly assessed.

The professional discussion must last for 60 minutes. The independent assessor can increase the time of the professional discussion by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The independent assessor must ask at least 15 questions. The independent assessor must use the questions from the EPAO's question bank or create their own questions in line with the EPAO's training. Follow-up questions are allowed where clarification is required.

The apprentice may choose to end the assessment method early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless in an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

The independent assessor must make the grading decision.

The independent assessor must keep accurate records of the assessment. They must record:

- the apprentice's answers to questions
- the KSBs demonstrated in answers to questions
- the grade achieved

Assessment location

The professional discussion must take place in a suitable venue selected by the EPAO for example, the training provider's or employer's premises.

The professional discussion should take place in a quiet room, free from distractions and influence.

Question and resource development

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

The EPAO must produce the following materials to support the professional discussion underpinned by a portfolio of evidence:

- independent assessor assessment materials which include:
training materials

- administration materials
- moderation and standardisation materials
- guidance materials
- grading guidance
- question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

Grading

Knowledge test

Fail - does not meet pass criteria

THEME KSBS	PASS 26 TO 31 MARKS	MERIT 32 TO 37 MARKS	DISTINCTION 38 TO 44 MARKS
Data management K18	<p>The written descriptors that support the grade boundaries are:</p> <p>Describe the differences between ownership, stewardship and custodianship of big data and how it is utilised in the land-based sector. (K18)</p>	See grade boundaries for merit.	See grade boundaries for distinction.
Environmental and sustainability K4	<p>The written descriptors that support the grade boundaries are:</p> <p>Explain how to identify and evaluate environmentally friendly and sustainable land based working practices. (K4)</p>	See grade boundaries for merit.	See grade boundaries for distinction.
Health and safety K1 K2 K3	<p>The written descriptors that support the grade boundaries are:</p> <p>Describes the importance of ensuring compliance with health and safety legislation and ensuring the safety of self, colleagues and others in the work environment. (K1)</p>	See grade boundaries for merit.	See grade boundaries for distinction.

	<p>Explains how to administer emergency first aid and implications when working remotely in isolated rural locations. (K2)</p> <p>Analyse risks encountered when working onsite in the land-based sector, the procedures to monitor and review risk assessments, identify new hazards, risks and methods of mitigation. (K3)</p>		
<p>Root cause analysis, repair machinery, equipment and prime movers and electrical and electronic systems K10 K13 K14 K17</p>	<p>The written descriptors that support the grade boundaries are:</p> <p>Outline/define root cause analysis and fault finding techniques. (K10)</p> <p>Describe methods used to repair complex mechanical land-based prime movers. (K13)</p> <p>Describes methods used to repair land-based machinery and equipment attachments. (K14)</p> <p>Explains how to maintain the integrity of electrical components. (K17)</p>	<p>See grade boundaries for merit.</p>	<p>See grade boundaries for distinction.</p>

<p>Machinery settings and field operations K21</p>	<p>The written descriptors that support the grade boundaries are:</p> <p>Evaluate factors to consider when conducting land-based technical consultations including, floatation tyres, ballast, cutting or working width, power requirements, range of adjustments, service ability, speeds of operation, combinations of machinery and residual values. (K21)</p>	<p>See grade boundaries for merit.</p>	<p>See grade boundaries for distinction.</p>
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Practical tasks with questions

Fail - does not meet pass criteria

THEME KSBS	PASS APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS	DISTINCTION APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS AND ALL OF THE DISTINCTION DESCRIPTORS
Diagnostics K7 S5 S12 S13 S15 S18 B5 B9	<p>Applies principles and processes to diagnostics to reach logical, evidence based conclusions and effective diagnosis, determining whether the reported symptoms are a characteristic or fault. (K7, S5, S12)</p> <p>Demonstrates commitment and motivation when using approved diagnostic procedures and equipment to diagnose faults and reported underperformance, differentiating between root cause and symptoms of land-based machinery, equipment and prime movers as required. (S13, S15, B9)</p> <p>Performs verification tests to check performance against manufacturer specification land-based machinery, equipment and prime mover performance in a sustainable manner, taking responsibility for the use of resources and appropriate handling and disposal of waste products connected with land-based engineering machinery and equipment. (S18, B5)</p>	None
Handover and installation K23 S25 S26	Demonstrates an installation and handover of machinery, equipment and prime movers (in accordance with the job requirements), explaining their safe operation, the settings required for the environmental conditions and application, the	None

	<p>maintenance and warranty requirements. (K23, S25)</p> <p>Conducts handover (following installation) and ensures customer understands how to operate machinery or equipment. (S26)</p>	
<p>Interpret and apply data K6 S1 S3 S4 S9</p>	<p>Interpret technical data, documentation, schematic diagrams, wiring diagrams and technical specifications to form dynamic, logical fault finding and diagnostic processes, identifying components that require either repair or replacement and suggesting alternative solutions as appropriate. (K6, S1, S9)</p> <p>Demonstrates the use of digital equipment to extract data by interrogating land-based machinery, equipment and prime mover performance, communicating (and obtaining as required) information to stakeholders employing a range of techniques. (S3, S4)</p>	<p>Justifies the suggested solution(s) for the repair and (or) replacement of components, supported by detailed examples from the fault finding and diagnostic process. (K6, S1, S9)</p>
<p>Repair electrical and electronic systems K15 S32 B3 B4</p>	<p>Demonstrates attention to detail, employing a logical approach to problem resolution that uses own initiative to repair complex electrical and electronic systems, in accordance with the job requirements. (K15, S32, B3, B4)</p>	<p>Justifies methods used to repair complex electrical and electronic systems in accordance with the job requirements. (K15, S32)</p>
<p>Technical reporting K12 S22</p>	<p>Produces technical reports and statements in accordance with the job requirements. (K12, S22)</p>	<p>None</p>

Professional discussion underpinned by a portfolio of evidence

Fail - does not meet pass criteria

THEME KSBS	PASS APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS	DISTINCTION APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS AND ALL OF THE DISTINCTION DESCRIPTORS
Career an professional development K25 S30 B8	Describes how they keep up to date with industry best practice, relevant legislation and technological advancement, and share best practice. (K25, S30, B8)	None
Diagnostics K8 S11 S24 S31	<p>Explains how they test the validity of customer complaints by simulating the circumstances and conditions that give rise to reported faults. (K8, S11)</p> <p>Explain how contextual factors (including operational techniques, application, crop, soil types and conditions, environments, weather and climatic conditions) impact on machine performance and faults, using examples from their own job cards. (S31)</p> <p>Describes how they create estimates and quotations for the reinstatement of land-based machinery, equipment and prime movers, using examples from their own job cards. (S24)</p>	None
Machinery settings and field operations K9 K11 K16 K20 K22 S16 S17 B1 B7	<p>Describes how crop, soil, climatic and environmental factors, operational technique and machine application impact on the performance of land-based machinery, equipment and prime movers (K9, S16).</p> <p>Outlines the application of precision land based technology, electronic management systems (K16).</p>	Explain why they changed equipment settings due to crop, soil types, conditions and environments, weather and climatic conditions, using examples from their own job cards and justifying their decisions. (S17)

	<p>Summarises how to set-up, operate and validate the performance of land-based prime-movers machinery and equipment and the factors that impact optimum performance including, crop condition, crop types, weather conditions, soil and surface types, maintenance, and operating techniques, using examples from their own job cards. (K20)</p> <p>Describes how to determine compatibility of machinery combinations with prime movers and their interaction with one another, using examples from their own job cards. (K22)</p> <p>Describes how crop, soil types, conditions and environments, weather and climatic conditions impact on equipment settings, using examples from their own job cards. (S17)</p> <p>Actively complies with and promotes a safe and healthy working environment , adapting to change in work environments and tasks as required, using examples from their own job cards. (B1, B7)</p> <p>How to assess land-based machinery and equipment for repair considering crop and revenue loss when determining options. (K11)</p>	
<p>Mentoring and support K5 S20</p>	<p>Explains how they develop junior colleagues through supervision and mentoring techniques. (K5, S20)</p>	<p>Appraises the impact of mentoring techniques used to develop junior colleagues. (K5, S20)</p>

<p>Hydraulic and pneumatic repairs K19 S2 S7 S21 S28</p>	<p>Explains how to repair hydraulic, pneumatic, hydrostatic and fluid powered systems technologically advanced land-based machinery, equipment and prime movers in accordance with manufacturer's guidelines and industry standards using examples from their own job cards. (K19, S7)</p> <p>Summarises how they plan and prepare maintenance or repair work schedules for showing task allocation, sequencing, workflow and time management. (S21)</p> <p>Describes how they work in accordance with Safe Systems of Work and apply control measures put in place due to toxic and hazardous substances and environments. (S2, S28)</p>	<p>Evaluates how they plan and prepare maintenance or repair work schedules for showing task allocation, sequencing, workflow and time management. (S21)</p>
<p>Customer interaction K24 S6 S19 B2 B6 B10</p>	<p>Explains how they communicate technical matters to technical and non-technical stakeholders and deal with demanding customers, customer complaints, and unrealistic expectations. (K24, S6)</p> <p>Describes how they act ethically and with integrity, provide tailored advice that informs their selection and operation of appropriate machinery, equipment and prime movers to meet the land based environment in which it will be operated, and follow up on unresolved matters (as required). (S19, B6)</p> <p>Describes how they promote equality, diversity and inclusion, act as an ambassador for the business, respecting confidentiality, working efficiently, treating customers, employees</p>	<p>None</p>

	and colleagues respectfully whilst meeting customer and employer expectations. (B2, B10)	
Complex repairs S8 S10 S14 S23 S27 S29	<p>Explains how they measure and assess wear tolerances and deformation, and repair or replace components in line with manufacturer instructions or guidance. (S8, S10)</p> <p>Explains how they maintain, interrogate, calibrate and repair electronic equipment and systems, including precision technology, electronic management systems, telemetry, autonomous and automated operations used in the land-based sector. (S14).</p> <p>Describes how they provide technical input to facilitate the compilation of repair schedules, action plans, quotations and estimates. (S23)</p> <p>Describes how they use predictive and preventative maintenance effectively to minimise land-based machinery, equipment and prime mover downtime. (S27)</p> <p>Summarises how they dispose of equipment, components and substances in accordance with environmental regulations, industry standards and company policy. (S29)</p>	None

Overall EPA grading

Performance in the EPA determines the overall grade of:

- fail

- pass
- merit
- distinction

An independent assessor must individually grade the knowledge test, practical tasks with questions and professional discussion underpinned by a portfolio of evidence in line with this EPA plan.

The EPAO must combine the individual assessment method grades to determine the overall EPA grade.

If the apprentice fails one assessment method or more, they will be awarded an overall fail.

To achieve an overall pass, the apprentice must achieve at least a pass in all the assessment methods.

Grades from individual assessment methods must be combined in the following way to determine the grade of the EPA overall.

KNOWLEDGE TEST	PRACTICAL TASKS WITH QUESTIONS	PROFESSIONAL DISCUSSION UNDERPINNED BY A PORTFOLIO OF EVIDENCE	OVERALL GRADING
Fail	Any grade	Any grade	Fail
Any grade	Fail	Any grade	Fail
Any grade	Any grade	Fail	Fail
Pass	Pass	Pass	Pass
Merit	Pass	Pass	Pass
Pass	Pass	Distinction	Pass
Distinction	Pass	Pass	Pass
Distinction	Pass	Pass	Pass
Pass	Distinction	Pass	Merit
Pass	Distinction	Distinction	Merit
Distinction	Pass	Distinction	Merit
Distinction	Distinction	Pass	Merit
Merit	Distinction	Distinction	Distinction
Distinction	Distinction	Distinction	Distinction

Re-sits and re-takes

If the apprentice fails one assessment method or more, they can take a re-sit or a re-take at their employer's discretion. The apprentice's employer is required to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, whereas a re-take does. The apprentice should have a supportive action plan to prepare for a re-sit or a re-take.

The employer and the EPAO should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 1 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.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat or re-taken in full.

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

The apprentice will get a maximum EPA grade of pass for each assessment method(s) that require a re-sit or re-take, unless the EPAO determines there are exceptional circumstances.

A re-sit or re-take only limits an apprentice's achievement in the assessment method(s) retaken/sat and does not prohibit higher achievement for the apprenticeship as a whole.

The apprentice is not required to retake or resit all of the tasks that form part of the practical assessment but just those that they fail.

Roles and responsibilities

ROLES	RESPONSIBILITIES
Apprentice	<p>As a minimum, the apprentice should:</p> <ul style="list-style-type: none"> • complete on-programme training to meet the KSBs as outlined in the apprenticeship standard for a minimum of 12 months • complete the required amount of off-the-job training specified by the apprenticeship funding rules and as arranged by the employer and training provider • understand the purpose and importance of EPA • prepare for and undertake the EPA including meeting all gateway requirements
Employer	<p>As a minimum, the apprentice's employer must:</p> <ul style="list-style-type: none"> • select the training provider • work with the training provider to select the EPAO • work with the training provider, where applicable, to support the apprentice in the workplace and to provide the opportunities for the apprentice to develop the KSBs • arrange and support off-the-job training to be undertaken by the apprentice • decide when the apprentice is working at or above the apprenticeship standard and is ready for EPA • ensure the apprentice is prepared for the EPA • ensure that all supporting evidence required at the gateway is submitted in line with this EPA plan • confirm arrangements with the EPAO for the EPA in a timely manner, including who, when, where • provide the EPAO with access to any employer-specific documentation as required for example, company policies • ensure that the EPA is scheduled with the EPAO for a date and time which allows appropriate opportunity for the apprentice to meet the KSBs • ensure the apprentice is given sufficient time away from regular duties to prepare for, and complete the EPA • ensure that any required supervision during the EPA period, as stated within this EPA plan, is in place • ensure the apprentice has access to the resources used to fulfil their role and carry out the EPA for workplace based assessments

	<ul style="list-style-type: none"> • remain independent from the delivery of the EPA • pass the certificate to the apprentice upon receipt
EPAO	<p>As a minimum, the EPAO must:</p> <ul style="list-style-type: none"> • conform to the requirements of this EPA plan and deliver its requirements in a timely manner • conform to the requirements of the apprenticeship provider and assessment register • conform to the requirements of the external quality assurance provider (EQAP) • understand the apprenticeship including the occupational standard and EPA plan • make all necessary contractual arrangements including agreeing the price of the EPA • develop and produce assessment materials including specifications and marking materials, for example mark schemes, practice materials, training material • maintain and apply a policy for the declaration and management of conflict of interests and independence. This must ensure, as a minimum, there is no personal benefit or detriment for those delivering the EPA or from the result of an assessment. It must cover: <ul style="list-style-type: none"> • apprentices • employers • independent assessors • any other roles involved in delivery or grading of the EPA • have quality assurance systems and procedures that ensure fair, reliable and consistent assessment and maintain records of internal quality assurance (IQA) activity for external quality assurance (EQA) purposes • appoint independent, competent, and suitably qualified assessors in line with the requirements of this EPA plan • appoint administrators, invigilators and any other roles where required to facilitate the EPA • deliver induction, initial and on-going training for all their independent assessors and any other roles involved in the delivery or grading of the EPA as specified within this EPA plan. This should include how to record the rationale and evidence for grading decisions where required

	<ul style="list-style-type: none"> • conduct standardisation with all their independent assessors before allowing them to deliver an EPA, when the EPA is updated, and at least once a year • conduct moderation across all of their independent assessors' decisions once EPAs have started according to a sampling plan, with associated risk rating of independent assessors • monitor the performance of all their independent assessors and provide additional training where necessary • develop and provide assessment recording documentation to ensure a clear and auditable process is in place for providing assessment decisions and feedback to all relevant stakeholders • use language in the development and delivery of the EPA that is appropriate to the level of the apprenticeship • arrange for the EPA to take place in a timely manner, in consultation with the employer • provide information, advice, and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA • confirm the gateway requirements have been met before they start the EPA for an apprentice • arrange a suitable venue for the EPA • maintain the security of the EPA including, but not limited to, verifying the identity of the apprentice, invigilation and security of materials • where the EPA plan permits assessment away from the workplace, ensure that the apprentice has access to the required resources and liaise with the employer to agree this if necessary • confirm the overall grade awarded • maintain and apply a policy for conducting appeals
Independent assessor	<p>As a minimum, an independent assessor must:</p> <ul style="list-style-type: none"> • be independent, with no conflict of interest with the apprentice, their employer or training provider, specifically, they must not receive a personal benefit or detriment from the result of the assessment • have, maintain and be able to evidence up-to-date knowledge and expertise of the occupation • have the competence to assess the EPA and meet the requirements of the IQA section of this EPA plan

	<ul style="list-style-type: none"> • understand the apprenticeship's occupational standard and EPA plan • attend induction and standardisation events before they conduct an EPA for the first time, when the EPA is updated, and at least once a year • use language in the delivery of the EPA that is appropriate to the level of the apprenticeship • work with other personnel, where used, in the preparation and delivery of assessment methods • conduct the EPA to assess the apprentice against the KSBs and in line with the EPA plan • make final grading decisions in line with this EPA plan • record and report assessment outcome decisions • comply with the IQA requirements of the EPAO • comply with external quality assurance (EQA) requirements
Training provider	<p>As a minimum, the training provider must:</p> <ul style="list-style-type: none"> • conform to the requirements of the apprenticeship provider and assessment register • ensure procedures are in place to mitigate against any conflict of interest • work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the KSBs as outlined in the occupational standard • deliver training to the apprentice as outlined in their apprenticeship agreement • monitor the apprentice's progress during any training provider led on-programme learning • ensure the apprentice is prepared for the EPA • work with the employer to select the EPAO • advise the employer, upon request, on the apprentice's readiness for EPA • ensure that all supporting evidence required at the gateway is submitted in line with this EPA plan • remain independent from the delivery of the EPA
Marker	<p>As a minimum, the marker must:</p>

	<ul style="list-style-type: none"> • attend induction training as directed by the EPAO • have no direct connection or conflict of interest with the apprentice, their employer or training provider • mark test answers in line with the EPAO's mark scheme and procedures
Invigilator	<p>As a minimum, the invigilator must:</p> <ul style="list-style-type: none"> • attend induction training as directed by the EPAO • not invigilate an assessment, solely, if they have delivered the assessed content to the apprentice • invigilate and supervise the apprentice during tests and in breaks during assessment methods to prevent malpractice in line with the EPAO's invigilation procedures

Reasonable adjustments

The EPAO must have reasonable adjustments arrangements for the EPA.

This should include:

- how an apprentice qualifies for a reasonable adjustment
- what reasonable adjustments may be made

Adjustments must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

Special considerations

The EPAO must have special consideration arrangements for the EPA.

This should include:

- how an apprentice qualifies for a special consideration
- what special considerations will be given

Special considerations must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

Internal quality assurance

Internal quality assurance refers to the strategies, policies and procedures that an EPAO must have in place to ensure valid, consistent and reliable EPA decisions.

EPAOs for this EPA must adhere to the requirements within the roles and responsibilities table.

They must also appoint independent assessors who:

- have recent relevant experience of the occupation or sector to at least occupational level 4 gained in the last 5 years or significant experience of the occupation or sector
- meet the following minimum requirements:
 - hold level 4 experience in a land based engineering discipline or can evidence experience of consistently operating at that level
 - are occupationally competent
 - have 5 years occupational experience within the last 10 years relevant to the land-based engineering discipline being assessed
 - has an evidenced record of cpd within the last 5 years
 - holds an assessor qualification or accreditation

Value for money

Affordability of the EPA will be aided by using at least some of the following:

- completing applicable assessment methods online, for example computer-based assessment
- assessing multiple apprentices simultaneously where the assessment method permits this
- using the employer's premises
- conducting assessment methods on the same day

Professional recognition

This apprenticeship aligns with:

- The Institution of Agricultural Engineers (IAgrE) for Engineering Technician (EngTech)

Mapping of KSBs to assessment methods

KNOWLEDGE	ASSESSMENT METHODS
<p>K1 The importance of ensuring compliance with health and safety legislation and ensuring the safety of self, colleagues and others in the work environment.</p>	Knowledge test
<p>K2 How to administer emergency first aid and implications when working remotely in isolated rural locations.</p>	Knowledge test
<p>K3 Risks encountered when working onsite in the land-based sector, the procedures to monitor and review risk assessments, identify new hazards, risks and methods of mitigation.</p>	Knowledge test
<p>K4 How to identify and evaluate environmentally friendly and sustainable land based working practices.</p>	Knowledge test
<p>K5 Techniques and methods used to support and develop colleagues.</p>	Professional discussion underpinned by a portfolio of evidence
<p>K6 How to interpret diagnostic data (including telematics) and apply this information to form dynamic, logical fault finding and diagnostic processes.</p>	Practical tasks with questions
<p>K7 Principles and processes applied to diagnostics to reach logical, evidence based conclusions.</p>	Practical tasks with questions
<p>K8 Methods used to simulate the conditions and land based work environments and test the validity of customer complaints.</p>	Professional discussion underpinned by a portfolio of evidence
<p>K9 How operational techniques, machine application, crops and soil types, the weather and working environment affect field-based performance.</p>	Professional discussion underpinned by a portfolio of evidence

<p>K10 Root cause analysis and fault finding techniques.</p>	Knowledge test
<p>K11 How to assess land-based machinery and equipment for repair considering crop and revenue loss when determining options.</p>	Professional discussion underpinned by a portfolio of evidence
<p>K12 How to compile technical reports, statements and recommendations.</p>	Practical tasks with questions
<p>K13 Methods used to repair complex mechanical land-based prime movers.</p>	Knowledge test
<p>K14 Methods used to repair land-based machinery and equipment attachments.</p>	Knowledge test
<p>K15 Methods used to repair complex electrical and electronic systems including network communication systems, GPS, telematics, autonomous and automation.</p>	Practical tasks with questions
<p>K16 The application of precision land based technology, electronic management systems.</p>	Professional discussion underpinned by a portfolio of evidence
<p>K17 How to maintain the integrity of electrical components.</p>	Knowledge test
<p>K18 The differences between ownership, stewardship and custodianship of big data and how it is utilised in the land-based sector.</p>	Knowledge test
<p>K19 How to conduct complex repairs to hydraulic, pneumatic, hydrostatic and fluid powered systems.</p>	Professional discussion underpinned by a portfolio of evidence
<p>K20</p>	Professional discussion underpinned by a

<p>How to set-up, operate and validate the performance of land-based prime-movers machinery and equipment and the factors that impact optimum performance including, crop condition, crop types, weather conditions, soil and surface types, maintenance, and operating techniques.</p>	<p>portfolio of evidence</p>
<p>K21 Factors to consider when conducting land-based technical consultations including, floatation tyres, ballast, cutting or working width, power requirements, range of adjustments, service ability, speeds of operation, combinations of machinery and residual values.</p>	<p>Knowledge test</p>
<p>K22 How to determine compatibility of machinery combinations with prime movers and their interaction with one another.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>K23 Handover and installation procedures to colleagues, customers and end users.</p>	<p>Practical tasks with questions</p>
<p>K24 Customer interaction, customer care techniques and how to deal with demanding customers, customer complaints and unrealistic expectations.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>K25 Methods used to keep up to date with land based technological and working practice advances.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>

SKILL	ASSESSMENT METHODS
<p>S1 Interpret technical data, documentation, schematic diagrams, wiring diagrams and technical specifications.</p>	<p>Practical tasks with questions</p>
<p>S2 Work in accordance with Safe Systems of Work and apply control measures such as Health and Safety at Work Act, lone working, working at height and risk assessments adopting mitigation measures to safeguard, bystanders, the public, property and livestock.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S3 Use digital equipment to interrogate land-based machinery, equipment and prime mover performance and extract data and communicate to stakeholders.</p>	<p>Practical tasks with questions</p>
<p>S4 Obtain information from colleagues and stakeholders employing a range of techniques.</p>	<p>Practical tasks with questions</p>
<p>S5 Establish the information required to perform an efficient and effective diagnosis.</p>	<p>Practical tasks with questions</p>
<p>S6 Communicate technical matters to technical and non-technical stakeholders.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S7 Perform repairs of technologically advanced land-based machinery, equipment and prime movers in accordance with manufacturer's guidelines and industry standards.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S8 Measure and assess wear tolerances and deformation in line with manufacturer instructions or guidance.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S9 Identify components that require either repair or replacement, including providing alternative solutions for repair or replacement as appropriate.</p>	<p>Practical tasks with questions</p>

<p>S10 Repair or replace component parts in accordance with manufacturer guidelines.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S11 Establish and replicate the circumstances and conditions that give rise to reported faults.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S12 Determine whether reported symptoms are a characteristic or a fault.</p>	<p>Practical tasks with questions</p>
<p>S13 Diagnose faults and reported underperformance of land-based machinery, equipment and prime movers using approved diagnostic procedures and equipment and logical problem-solving techniques.</p>	<p>Practical tasks with questions</p>
<p>S14 Maintain, interrogate, calibrate and repair electronic equipment and systems, including precision technology, electronic management systems, telemetry, autonomous and automated operations used in the land-based sector.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S15 Differentiate between the root cause and symptom of land-based machinery, equipment and prime mover failures.</p>	<p>Practical tasks with questions</p>
<p>S16 Identify crop, soil, climatic and environmental factors that impact on the performance of land-based machinery, equipment and prime movers.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S17 Identify the equipment settings appropriate to the working conditions giving due consideration to crop, soil types, conditions and environments, weather and climatic conditions.</p>	<p>Professional discussion underpinned by a portfolio of evidence</p>
<p>S18 Perform verification tests to check performance against manufacturer specification land-based machinery, equipment and prime mover performance.</p>	<p>Practical tasks with questions</p>

<p>S19 Identify stakeholder requirements and provide tailored advice that informs their selection and operation of appropriate machinery, equipment and prime movers to meet the land based environment in which it will be operated.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S20 Applies supervision and mentoring techniques to support junior colleagues' development.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S21 Plan and prepare maintenance or repair work schedules for showing task allocation, sequencing, workflow and time management.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S22 Compile technical reports and statements.</p>	Practical tasks with questions
<p>S23 Provide technical input to facilitate the compilation of repair schedules, action plans, quotations and estimates.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S24 Identify the parts and services required to enable the reinstatement of land-based machinery, equipment and prime movers for the purposes of estimates and quotations.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S25 Perform installation and handover of machinery, equipment and prime movers, explaining their safe operation, the settings required for the environmental conditions and application, the maintenance and warranty requirements.</p>	Practical tasks with questions
<p>S26 Establish level of customer understanding of how to operate the machinery or equipment following installation and handover.</p>	Practical tasks with questions
<p>S27 Use predictive and preventative maintenance effectively to minimise land-based machinery, equipment and prime mover downtime.</p>	Professional discussion underpinned by a portfolio of evidence

<p>S28 Identify toxic and hazardous substances and environments and apply suitable and sustainable control measures.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S29 Dispose of equipment, components and substances in accordance with environmental regulations, industry standards and company policy.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S30 Keep up to date with advances in environment land-based working practices and the land-based engineering technologies and share best practice.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S31 How contextual factors (including operational techniques, application, crop, soil types and conditions, environments, weather and climatic conditions) impact on machine performance and faults.</p>	Professional discussion underpinned by a portfolio of evidence
<p>S32 Repair complex electrical and electronic systems in accordance with job requirements.</p>	Practical tasks with questions

BEHAVIOUR	ASSESSMENT METHODS
<p>B1 Actively complies with and promotes a safe and healthy working environment.</p>	Professional discussion underpinned by a portfolio of evidence
<p>B2 Is an ambassador for the business, respecting confidentiality, working efficiently, treating customers, employees and colleagues respectfully whilst meeting customer and employer expectations.</p>	Professional discussion underpinned by a portfolio of evidence
<p>B3 Uses own initiative to make recommendations and complete work. Completes tasks on schedule and accordance with the job requirements.</p>	Practical tasks with questions
<p>B4 Demonstrates attention to detail and employs a logical approach to problem resolution.</p>	Practical tasks with questions
<p>B5 Embraces a sustainable working culture, taking responsibility for the careful use of resources and appropriate handling and disposal of waste products connected with land-based engineering machinery and equipment.</p>	Practical tasks with questions
<p>B6 Acts ethically and with integrity, giving considered guidance to stakeholders and following up on unresolved matters and outstanding questions.</p>	Professional discussion underpinned by a portfolio of evidence
<p>B7 Adapts to changes in work environments, instructions and tasks.</p>	Professional discussion underpinned by a portfolio of evidence
<p>B8 Committed to keeping up to date with industry best practice, relevant legislation and technological advancement.</p>	Professional discussion underpinned by a portfolio of evidence
<p>B9 Stays motivated and committed when facing adverse challenges.</p>	Practical tasks with questions

B10 Promotes equality, diversity and inclusion.	Professional discussion underpinned by a portfolio of evidence
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Mapping of KSBs to grade themes

Knowledge test

KSBS GROUPED BY THEME	KNOWLEDGE	SKILLS	BEHAVIOUR
Data management K18	The differences between ownership, stewardship and custodianship of big data and how it is utilised in the land-based sector. (K18)	None	None
Environmental and sustainability K4	How to identify and evaluate environmentally friendly and sustainable land based working practices. (K4)	None	None
Health and safety K1 K2 K3	<p>The importance of ensuring compliance with health and safety legislation and ensuring the safety of self, colleagues and others in the work environment. (K1)</p> <p>How to administer emergency first aid and implications when working remotely in isolated rural locations. (K2)</p> <p>Risks encountered when working onsite in the land-based sector, the procedures to monitor and review risk assessments, identify new hazards, risks and</p>	None	None

	methods of mitigation. (K3)		
Root cause analysis, repair machinery, equipment and prime movers and electrical and electronic systems K10 K13 K14 K17	<p>Root cause analysis and fault finding techniques. (K10)</p> <p>Methods used to repair complex mechanical land-based prime movers. (K13)</p> <p>Methods used to repair land-based machinery and equipment attachments. (K14)</p> <p>How to maintain the integrity of electrical components. (K17)</p>	None	None
Machinery settings and field operations K21	Factors to consider when conducting land-based technical consultations including, floatation tyres, ballast, cutting or working width, power requirements, range of adjustments, service ability, speeds of operation, combinations of machinery and residual values. (K21)	None	None

Practical tasks with questions

KSBS GROUPED BY THEME	KNOWLEDGE	SKILLS	BEHAVIOUR
Diagnostics K7 S5 S12 S13 S15 S18 B5 B9	Principles and processes applied to diagnostics to reach logical, evidence based conclusions. (K7)	<p>Establish the information required to perform an efficient and effective diagnosis. (S5)</p> <p>Determine whether reported symptoms are a characteristic or a fault. (S12)</p> <p>Diagnose faults and reported underperformance of land-based machinery, equipment and prime movers using approved diagnostic procedures and equipment and logical problem-solving techniques. (S13)</p> <p>Differentiate between the root cause and symptom of land-based machinery, equipment and prime mover failures. (S15)</p> <p>Perform verification tests to check performance against manufacturer specification land-based machinery, equipment and prime mover performance. (S18)</p>	<p>Embraces a sustainable working culture, taking responsibility for the careful use of resources and appropriate handling and disposal of waste products connected with land-based engineering machinery and equipment. (B5)</p> <p>Stays motivated and committed when facing adverse challenges. (B9)</p>

<p>Handover and installation K23 S25 S26</p>	<p>Handover and installation procedures to colleagues, customers and end users. (K23)</p>	<p>Perform installation and handover of machinery, equipment and prime movers, explaining their safe operation, the settings required for the environmental conditions and application, the maintenance and warranty requirements. (S25)</p> <p>Establish level of customer understanding of how to operate the machinery or equipment following installation and handover. (S26)</p>	<p>None</p>
<p>Interpret and apply data K6 S1 S3 S4 S9</p>	<p>How to interpret diagnostic data (including telematics) and apply this information to form dynamic, logical fault finding and diagnostic processes. (K6)</p>	<p>Interpret technical data, documentation, schematic diagrams, wiring diagrams and technical specifications. (S1)</p> <p>Use digital equipment to interrogate land-based machinery, equipment and prime mover performance and extract data and communicate to stakeholders. (S3)</p> <p>Obtain information from colleagues and stakeholders</p>	<p>None</p>

		<p>employing a range of techniques. (S4)</p> <p>Identify components that require either repair or replacement, including providing alternative solutions for repair or replacement as appropriate. (S9)</p>	
<p>Repair electrical and electronic systems</p> <p>K15</p> <p>S32</p> <p>B3 B4</p>	<p>Methods used to repair complex electrical and electronic systems including network communication systems, GPS, telematics, autonomous and automation. (K15)</p>	<p>Repair complex electrical and electronic systems in accordance with job requirements. (S32)</p>	<p>Uses own initiative to make recommendations and complete work. Completes tasks on schedule and accordance with the job requirements. (B3)</p> <p>Demonstrates attention to detail and employs a logical approach to problem resolution. (B4)</p>
<p>Technical reporting</p> <p>K12</p> <p>S22</p>	<p>How to compile technical reports, statements and recommendations. (K12)</p>	<p>Compile technical reports and statements. (S22)</p>	<p>None</p>

Professional discussion underpinned by a portfolio of evidence

KSBS GROUPED BY THEME	KNOWLEDGE	SKILLS	BEHAVIOUR
Career an professional development K25 S30 B8	Methods used to keep up to date with land based technological and working practice advances. (K25)	Keep up to date with advances in environment land-based working practices and the land-based engineering technologies and share best practice. (S30)	Committed to keeping up to date with industry best practice, relevant legislation and technological advancement. (B8)
Diagnostics K8 S11 S24 S31	Methods used to simulate the conditions and land based work environments and test the validity of customer complaints. (K8)	<p>Establish and replicate the circumstances and conditions that give rise to reported faults. (S11)</p> <p>Identify the parts and services required to enable the reinstatement of land-based machinery, equipment and prime movers for the purposes of estimates and quotations. (S24)</p> <p>How contextual factors (including operational techniques, application, crop, soil types and conditions, environments, weather and climatic conditions) impact on machine performance and faults. (S31)</p>	None
Machinery settings and field operations	How operational techniques,	Identify crop, soil, climatic and	Actively complies with and promotes

<p>K9 K11 K16 K20 K22 S16 S17 B1 B7</p>	<p>machine application, crops and soil types, the weather and working environment affect field-based performance. (K9)</p> <p>How to assess land-based machinery and equipment for repair considering crop and revenue loss when determining options. (K11)</p> <p>The application of precision land based technology, electronic management systems. (K16)</p> <p>How to set-up, operate and validate the performance of land-based prime-movers machinery and equipment and the factors that impact optimum performance including, crop condition, crop types, weather conditions, soil and surface types, maintenance, and operating techniques. (K20)</p> <p>How to determine compatibility of machinery combinations with prime movers and their interaction</p>	<p>environmental factors that impact on the performance of land-based machinery, equipment and prime movers. (S16)</p> <p>Identify the equipment settings appropriate to the working conditions giving due consideration to crop, soil types, conditions and environments, weather and climatic conditions. (S17)</p>	<p>a safe and healthy working environment. (B1)</p> <p>Adapts to changes in work environments, instructions and tasks. (B7)</p>
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	with one another. (K22)		
Mentoring and support K5 S20	Techniques and methods used to support and develop colleagues. (K5)	Applies supervision and mentoring techniques to support junior colleagues' development. (S20)	None
Hydraulic and pneumatic repairs K19 S2 S7 S21 S28	How to conduct complex repairs to hydraulic, pneumatic, hydrostatic and fluid powered systems. (K19)	<p>Work in accordance with Safe Systems of Work and apply control measures such as Health and Safety at Work Act, lone working, working at height and risk assessments adopting mitigation measures to safeguard, bystanders, the public, property and livestock. (S2)</p> <p>Perform repairs of technologically advanced land-based machinery, equipment and prime movers in accordance with manufacturer's guidelines and industry standards. (S7)</p> <p>Plan and prepare maintenance or repair work schedules for showing task allocation, sequencing, workflow and time management. (S21)</p>	None

		Identify toxic and hazardous substances and environments and apply suitable and sustainable control measures. (S28)	
Customer interaction K24 S6 S19 B2 B6 B10	Customer interaction, customer care techniques and how to deal with demanding customers, customer complaints and unrealistic expectations. (K24)	Communicate technical matters to technical and non-technical stakeholders. (S6) Identify stakeholder requirements and provide tailored advice that informs their selection and operation of appropriate machinery, equipment and prime movers to meet the land based environment in which it will be operated. (S19)	Is an ambassador for the business, respecting confidentiality, working efficiently, treating customers, employees and colleagues respectfully whilst meeting customer and employer expectations. (B2) Acts ethically and with integrity, giving considered guidance to stakeholders and following up on unresolved matters and outstanding questions. (B6) Promotes equality, diversity and inclusion. (B10)
Complex repairs S8 S10 S14 S23 S27 S29	None	Measure and assess wear tolerances and deformation in line with manufacturer instructions or guidance. (S8) Repair or replace component parts in accordance with manufacturer guidelines. (S10)	None

		<p>Maintain, interrogate, calibrate and repair electronic equipment and systems, including precision technology, electronic management systems, telemetry, autonomous and automated operations used in the land-based sector. (S14)</p> <p>Provide technical input to facilitate the compilation of repair schedules, action plans, quotations and estimates. (S23)</p> <p>Use predictive and preventative maintenance effectively to minimise land-based machinery, equipment and prime mover downtime. (S27)</p> <p>Dispose of equipment, components and substances in accordance with environmental regulations, industry standards and company policy. (S29)</p>	
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