

Mechatronics Maintenance Technician (AP V1.0)

Level 3 Apprenticeship Standard (ST1326)

Specification



This guide describes the different types of End-Point Assessment tests, the test rules and who should be involved. Preparing for End-Point Assessment and working with SIAS are also covered.

SIAS is the science industry assessment service. It is part of the Cogent Skills Group. For further information about apprenticeship standards and Trailblazers please contact info@siasuk.com.

Version History

Version	Updates
1.0	This document relates to Assessment Plan Version 1.0 of the Mechatronics Maintenance Technician Standard.

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Objective

The aim of this End-Point Assessment (EPA) is to ensure that the apprentice is occupationally competent against the knowledge, skills and behaviours outlined in the assessment plan for this standard.

This occupation is found in the aerospace, aviation, automotive, defence, logistics, pharmaceutical, energy, food and drink, and wider advanced manufacturing and engineering sectors which utilise automated equipment with integrated systems and interfaces, where the equipment contains a blend of technologies such as mechanical, electrical, electronic and control, and fluid power.

The broad purpose of the occupation is to ensure that plant and equipment perform to the required standard to facilitate targets regarding safety, quality, delivery, availability and cost within the aerospace, aviation, automotive, logistics, defence and wider advanced manufacturing and engineering sectors. Multi-skilled mechatronics maintenance technicians carry out a broad range of activities which may include installation, testing, fault finding, rectification, modifications and the on-going planned maintenance of complex automated equipment. This requires the application of a blend of skills, knowledge and occupational behaviours across the electrical, electronic, mechanical, fluid power and control systems disciplines. They prepare for the maintenance activity and inform stakeholders of work status. They also complete documentation, handover work, set up their work area and are required to be competent in safe engineering practices for their own safety and those around them. They may be required to work shifts, to work at height and in confined spaces, as well as dealing with equipment which may contain high voltages, high pressures, ionising radiation and other hazards.

In their daily work, an employee in this occupation interacts with a wide range of potential stakeholders and others such as other technicians, engineering leaders, production operators, production leaders, business managers, customers, contractors, external agencies and members of the public. They may work in a range of environments including factories, hangars and workshops, as well as outside.

An employee in this occupation will be responsible for the quality and accuracy of the work they undertake within the limits of their personal authority, whilst complying with national and international legislation, civil or military regulatory and organisational requirements. All work must comply with health and safety legislation, environmental legislation and the employers own specific rules and guidance. They carry out complex maintenance activities on high value equipment across a wide range of equipment types and are responsible for the health and safety of themselves, their colleagues and others who may be affected by the work. They are required to complete tasks within defined timescales. They need to work autonomously, professionally and responsibly to regulatory and organisational requirements. Depending on the organisation they may be required to work on their own or as part of a team. They are responsible for the correct use and fitness for purpose of tools and equipment, and for maintaining their own continued professional development.

Prior Learning and Qualifications

There are no statutory/regulatory or other typical entry requirements.

Overview

A full-time mechatronics maintenance technician apprentice typically spends 42 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.

The End-Point Assessment should be completed within an End-Point Assessment period lasting typically 6 months.

The apprentice must complete their training and meet the gateway requirements before starting their End-Point Assessment. The End-Point Assessment will assess occupational competence.

Competence Evaluation

During the apprenticeship, regular evaluation of the competence of the apprentice against the apprenticeship standard will help to ensure that they achieve full occupational competence by the end of their training, and they are ready for End-Point Assessment. Confirmation from the employer that the apprentice is fully competent is needed before End-Point Assessment can take place.

As competence evaluation is an in-programme activity, the process that is used for this has not been mandated. It is for the employer supported by their training provider to decide how they wish to do this. To help with this SIAS has produced the SIAS Competence Tracker.

Gateway Requirements

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 End-Point Assessment. 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 End-Point Assessment.

They must:

- confirm they are ready to take the End-Point Assessment.
- have achieved English and mathematics qualifications in line with the apprenticeship funding rules.
- have passed one of the following mandatory qualifications: Level 3 Diploma in Advanced Manufacturing Engineering (Development Knowledge) or Pearson BTEC Level 3 Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge).
- submit a portfolio of evidence for the interview underpinned by a portfolio of evidence.

Assessment Methods

This End-Point Assessment has 2 assessment methods.

The grades available for each assessment method are below.

Assessment method 1 - observation with questions:

- fail
- pass

Assessment method 2 - interview 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
- distinction

In exceptional circumstances, where national security clearance and or restricted access, for example to normal working hours, exists to administer any of the assessment methods at an employer's site, the End-Point Assessor must take advice from SIAS on access arrangements, and how to record assessment evidence in line with the employer's requirements. In these circumstances, any assessment materials relating to national security and commercial sensitivities must not be submitted to SIAS.

Assessment Method 1: Observation with Questions

In the observation with questions, an End-Point Assessor observes the apprentice in their workplace and asks questions. The apprentice completes their day-to-day duties under normal working conditions. Simulation is not allowed. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

The observation 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 End-Point Assessor must conduct and assess the observation with questions.

The End-Point Assessor must only observe one apprentice at a time to ensure quality and rigour. They must be as unobtrusive as possible.

SIAS will give the apprentice 2 weeks' notice of the observation with questions.

The observation must take 3 hours.

The End-Point Assessor can increase the time of the observation 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 observation with questions cannot be split, except for comfort breaks or to allow the apprentice to move from one location to another. Such breaks will not count towards the total observed time.

SIAS will manage invigilation of the apprentice during the assessment, to maintain security of the End-Point Assessment, in line with their malpractice policy. This includes breaks and moving between locations.

The End-Point Assessor must explain to the apprentice the format and timescales of the observation with questions before it starts. This does not count towards the assessment time.

The End-Point Assessor should observe the following during the observation:

- interpreting documentation
- planning work
- selecting consumables and materials
- using tool and equipment
- working safely
- working sustainably
- undertaking visual inspection and risk assessment
- isolating equipment
- carrying out planned or preventative maintenance
- completing checks and testing
- restoring the work area
- completing documentation and handover of equipment

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

The End-Point Assessor must ask questions. The purpose of the questioning is to assess the level of competence against the KSBs and grading descriptors.

Questioning can occur during the observation. The time for questions asked during the observation is included in the overall assessment time. The End-Point Assessor must ask at least 4 questions during the observation. To remain as unobtrusive as possible, the End-Point Assessor should ask questions during natural stops between tasks rather than disrupting the apprentice's flow. Follow-up questions are allowed where clarification is required. The End-Point Assessor must use the questions from the SIAS's question bank or create their own questions in line with the SIAS's training.

The End-Point Assessor must ask questions about KSBs that were not observed to gather assessment evidence. These questions are in addition to the set number of questions for the observation with questions and should be kept to a minimum.

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 End-Point Assessor or SIAS must ensure the apprentice is fully aware of all assessment requirements. The End-Point Assessor or SIAS cannot suggest or choose to

end the assessment methods early, unless in an emergency. SIAS is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The End-Point Assessor may suggest the assessment continues. The End-Point Assessor must document the apprentice’s request to end the assessment early.

The End-Point Assessor must make the grading decision. The End-Point Assessor must assess the observation and responses to questions holistically when deciding the grade.

The End-Point Assessor must keep accurate records of the assessment. They must record:

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

The observation with questions must take place in the apprentice’s normal place of work for example, their employer’s premises or a customer’s premises. Equipment and resources needed for the observation must be confirmed to be available by SIAS, who can liaise with the employer to provide these. They must be in good and safe working condition.

Questioning that occurs after the observation should take place in a suitable environment, for example a quiet room, free from distractions and influence.

Observation with Questions Grading Descriptors

Theme KSBs	Pass
Preparation K3 K5 K7 S2 S5 S6	<p>P1 Obtains, reads, and interprets task related documentation to meet the needs of the maintenance activity in line with employer's procedures. (S2)</p> <p>P2 Formulates a plan of work that sets out the methodology of the maintenance activity, including timescales and resources to meet the needs of the maintenance activity. (K3, K5, K7, S5)</p> <p>P3 Selects, prepares, and uses materials, consumables, tools and equipment to meet the needs of the maintenance activity in line with health and safety procedures. (S6)</p>
Health and safety K9 S7 B4	<p>P4 Takes personal responsibility for applying and promoting safe systems of work and complies with health and safety regulations and organisational requirements whilst meeting the needs of the maintenance activity. (K9, S7, B4)</p>
Planned maintenance K11 K18 K35 S4 S8 S9 S14	<p>P5 Conducts an initial assessment of the equipment to meet the needs of the maintenance activity. (K35, S4)</p> <p>P6 Applies dynamic risk assessment and hazard identification processes of the work environment and mitigates any risks in line with organisational policies to meet the needs of the maintenance activity. (K11, S8)</p>

Theme KSBs	Pass
	<p>P7 Applies isolation principles and techniques to equipment undergoing maintenance, including dissipation of stored energies as required, in line with health and safety regulations and organisational policies to meet the needs of the maintenance activity. (S9)</p> <p>P8 Applies techniques and processes used in planned and preventative maintenance activities on engineered systems in line with schedules and procedures. Explains how long-term operational efficiency and effectiveness of equipment is maximised, and how downtime is minimised. (K18, S14)</p>
Testing K24 S15	<p>P9 Applies functional testing and checking techniques and processes after maintenance interventions in line with organisational procedures to meet the needs of the maintenance activity. (K24, S15)</p>
Restoring the work area and documentation K15 K25 S3 S11 B5	<p>P10 Records information and completes reporting and documentation requirements to meet the needs of the maintenance activity in line with legal, organisational and manufacturer’s requirements. (K15, K25, S3)</p> <p>P11 Acts in a professional manner restoring the workplace and completing a return of resources and consumables, and handover of equipment to the process owner on completion of the maintenance activity in line with organisational policies and procedures. (S11, B5)</p>

Fail – An apprentice will fail where they do not demonstrate all the pass descriptors.

Observation with Questions Knowledge, Skills and Behaviours

Ref	KSB Statement
Knowledge	
K3	How to plan and communicate activities.
K5	Fundamentals of engineering maintenance: documentation, safety checks, standard operating procedures, estimating planned equipment downtime, cost management and document validity.
K7	Engineering standards and regulations requiring compliance in the engineering workplace: British Safety (BS) or European standards (EN) and wiring regulations.
K9	Organisational safety compliance requirements: permits to work, risk assessment, method statements, near miss and accident reporting, hazard reduction hierarchy including use of PPE.
K11	Principles and procedures to identify and mitigate hazards associated with work equipment: trailing leads or hoses, damaged tools and equipment, and damaged or poor fitting handles.

K15	Documentation: validity, compliance, traceability and audit, approval and change management processes.
K18	Processes and techniques of planned and preventative maintenance activities. Principles of equipment selection and use and minimising down time.
K24	Principles, procedures and benefits of full operational and functional tests and checks on maintained, repaired and installed equipment.
K25	Principles, processes and importance of maintaining documentation: accuracy, engineering discipline and signatures.
K35	Principles and techniques of conducting initial assessment of equipment that requires maintenance.
Skills	
S2	Obtain, read and interpret task related documentation, such as work instructions, quality control documents, drawings, operation manuals, specifications and service manuals.
S3	Record information for example job sheets, risk assessments, equipment service records, test results, handover documents and manufacturers' documentation, asset management records, work sheets, checklists, waste environmental records and any legal reporting requirements.
S4	Conduct initial assessment of equipment that requires maintenance.
S5	Formulate plans setting out the methodology of the maintenance activity including timescales and resources.
S6	Select, prepare and use material, consumables, tools and equipment.
S7	Comply with health and safety regulations and organisational requirements applicable in the workplace. For example, COSHH, PUWER, LOLER, PPE and applying safe systems of work.
S8	Apply dynamic risk assessment, hazard identification and risk mitigation principles and techniques.
S9	Apply isolation principles and techniques to equipment undergoing maintenance, including dissipation of stored energies as required.
S11	Restore the workplace on completion of the maintenance activity. Handover resources, consumables and equipment to process owner.
S14	Apply techniques and processes used in planned and preventative maintenance activities on engineered systems such as electrical, electronic, mechanical, fluid power and control systems.
S15	Apply functional testing and checking techniques and processes after maintenance interventions, and handover to the operational team.
Behaviours	
B4	Take personal responsibility for and promote health and safety.
B5	Act in a professional manner.

Assessment Method 2: Interview Underpinned by a Portfolio of Evidence

In the interview, an End-Point Assessor asks the apprentice questions. 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.

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

An End-Point Assessor must conduct and assess the interview.

The purpose is to assess the apprentice's competence against the following themes:

- equity, diversity and inclusion
- communication
- information technology
- continuous improvement
- condition monitoring and testing
- sustainability
- work environment
- maintenance activities
- fault diagnosis and rectification
- professional development
- knowledge evidenced through the mandatory qualification

SIAS will give an apprentice 2 weeks' notice of the interview.

The End-Point Assessor must have at least 2 weeks to review the supporting documentation.

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

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 interview must last for 60 minutes. The End-Point Assessor can increase the time of the interview by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The End-Point Assessor must ask at least 8 questions. The End-Point Assessor must use the questions from SIAS's question bank or create their own questions in line with the SIAS'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 End-Point Assessor or SIAS must ensure the apprentice is fully aware of all assessment requirements. The End-Point Assessor or SIAS cannot suggest or choose to end the assessment methods early, unless in an emergency. SIAS is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to

do so. The End-Point Assessor may suggest the assessment continues. The End-Point Assessor must document the apprentice’s request to end the assessment early.

The End-Point Assessor must make the grading decision.

The End-Point 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.

The interview must take place in a suitable venue selected by SIAS, for example, the employer’s premises.

The interview can be conducted by video conferencing. SIAS must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

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

Interview Underpinned by a Portfolio of Evidence Grading Descriptors

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass and distinction descriptors
Equity, diversity and inclusion K4 S26 B1	P1 Explains how they support the needs and concerns of others and follow equity, diversity, and inclusion procedures in line with organisational policies and procedures. (K4, S26, B1)	None.
Communication K31 K32 K33 S20 S25	<p>P2 Explains how they communicate in writing by preparing technical reports and documents using engineering terminology to meet the needs of the work activity in line with legal and organisational procedures. (K32, S20)</p> <p>P3 Describes how they communicate with others verbally and apply non-verbal techniques to match their style to the audience. Explains how they negotiate with colleagues or</p>	None.

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass and distinction descriptors
	stakeholders to overcome barriers in communication to complete work tasks. (K31, K33, S25)	
Information technology K1 K17 S1 S13	P4 Outlines how they use information technology to produce, maintain, update, record and store electronic documentation in line with legal and organisational requirements. (K1, K17, S1, S13)	None.
Continuous improvement K16 K29 K30 S23 S24	P5 Describes how they apply continuous improvement techniques to collect and record data including using graphical techniques. (K16, K29, S24) P6 Identifies opportunities and makes recommendations from data analysis to improve operational performance in line with organisational objectives. (K30, S23)	D1 Explains how they have agreed and implemented a business improvement. (K29, K30, S23, S24)
Condition monitoring and testing K12 K19 K20 S16	P7 Explains how they apply techniques to complete either condition monitoring, non-destructive testing, or sensory testing, including recording their findings and taking necessary actions, to meet the needs of the mechatronic maintenance activity in line with organisational processes. (K12, K19, K20, S16)	D2 Identifies opportunities to implement condition monitoring that increase equipment serviceability. (K20, S16)
Sustainability K26 K27 S21	P8 Describes how they segregate, separate, and dispose of waste streams	None.

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass and distinction descriptors
B3	and by-products to support sustainability processes, taking responsibility for their own sustainable working practices in line with legal requirements and organisational policies. (K26, K27, S21, B3)	
Work environment K28 S22	P9 Describes how they apply techniques and principles of good housekeeping to the work environment, including '4S' or '5S', in line with organisational policies. (K28, S22)	D3 Explains how they identify and implement housekeeping improvements in the work environment. (K28, S22)
Maintenance activities K22 K34 S10 S17 S18 S19	<p>P10 Describes how they apply calculation techniques and produce sketches or drawings to support mechatronics maintenance activities in line with organisational and task requirements. (S17, S19)</p> <p>P11 Explains how they select, confirm calibration and use electrical and mechanical testing and measuring equipment to support mechatronic maintenance activities in line with organisational requirements. (K22, S18)</p> <p>P12 Explains how they manufacture, repair and refurbish components using hand and machine tools to meet the needs of the maintenance activity in line with organisational policy and procedures. (K34, S10)</p>	None.

Theme KSBs	Pass The apprentice must demonstrate all of the pass descriptors	Distinction The apprentice must demonstrate all of the pass and distinction descriptors
Fault diagnosis and rectification K2 K6 K13 K14 K36 S12 S28	<p>P13 Describes how they apply techniques and processes to complete reactive maintenance and repair activities on complex engineered systems in line with organisational policy and procedures. (K2, K6, K13, K36, S12)</p> <p>P14 Explains how they apply fault finding techniques used in reactive maintenance on complex integrated systems including six point technique, function or performance testing, unit or component substitution and equipment diagnostics in line with organisational procedures. (K14, S28)</p>	<p>D4 Explains how they identify reasons for faults recurring and outlines preventative actions in line with organisational policy and procedures. (K14, K36, S12, S28)</p>
Professional development S27 B2	<p>P15 Outlines the planned and unplanned learning and development activities they have carried out and shows a commitment to future continued professional development to maintain and enhance competence. (S27, B2)</p>	<p>D5 Explains how they maintain and update a continued professional development plan or log. (S27)</p>
Knowledge evidenced through the mandatory qualification K8 K10 K21 K23	<p>P16 Achieved the Level 3 Diploma in Advanced Manufacturing Engineering (Development Knowledge) evidenced at the EPA gateway. (K8, K10, K21, K23)</p>	None.

Fail – An apprentice will fail where they do not demonstrate all the pass descriptors.

Interview Underpinned by a Portfolio of Evidence Knowledge, Skills and Behaviours

Ref	KSB Statement
Knowledge	
K1	Information technology: spreadsheets, presentations, word processing, email and digital collaboration tools.
K2	The typical engineering problems which may arise within the maintenance environment.
K4	Principles of equity, diversity, and inclusion in the workplace. Unconscious bias. Conscious inclusion.
K6	Engineering materials and consumables, their structure, properties and characteristics, how and why engineering materials can fail.
K8	Health and safety regulations to include Health and Safety at Work Act 1974, Control of Substances Hazardous to Health (COSHH), Reporting Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), Safe Systems of Work, Risk Assessments, Manual Handling, Lifting Operations and Lifting Equipment Regulations (LOLER), working at height, personal protective equipment (PPE), Provisions and Use of Work Equipment Regulations (PUWER), Noise Regulations, Display Equipment Regulations, confined spaces, Dangerous substances and Explosive atmospheres regulations.
K10	Principles and procedures to identify and mitigate risks associated with electrical, mechanical, gas, air and fluids: isolation, dissipation of stored energy, lock off, tag out and verifying procedures.
K12	Principles, techniques and processes of sensory testing: sight, touch and smell.
K13	Principles of mechanical, electrical, electronic, control, robotic and AI applications. Knowledge of key technologies, fluid power, hydraulic, electrical, electronic, programmable logic controller's (PLC's), robotics, mechanical, control systems and how these are combined in complex mechatronics systems.
K14	Fault finding techniques used in reactive maintenance on complex integrated systems: half split, input output, six point technique, function or performance testing, unit or component substitution and equipment diagnostics.
K16	Quality management systems and accreditations: ISO9001.
K17	Maintenance and storage of software programmes and back-up copies.
K19	Principles, techniques and processes of non-destructive testing in a mechatronics maintenance environment.
K20	Condition monitoring methods and equipment used. How the information gained supports the planning of maintenance activities.
K21	Engineering, mathematical and scientific principles, methods and techniques used in the mechatronics maintenance environment: graphical expressions, symbols, formulae, units, measures, calculations and scaling.
K22	Principles of using and calibrating electrical and mechanical testing and measuring equipment.
K23	Types of engineering drawings and diagrams and their purpose.
K26	Environmental hazards that can arise from maintenance operations. Types of pollution and control measures: noise, smells, spills, and waste. Environmental permits. Waste Electrical and Electronic Equipment Directive (WEEE).

K27	Sustainability principles and processes: the 3 'R's' (Reduce, Re-use, Recycle), segregation and disposal of waste and by-products.
K28	Principles and techniques of good housekeeping including '4S' and '5S'.
K29	Continuous improvement methods, concepts and techniques to collect and record data including graphical techniques.
K30	Data analysis principles used to identify trends and issues impacting operational performance.
K31	Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and how to overcome them.
K32	Written communication techniques. Plain English principles. Engineering terminology. Report writing.
K33	Non-verbal communication techniques: gestures, facial expressions, tone of voice and body language.
K34	Principles and techniques for manufacturing, repairing and refurbishing components using hand and machine tools.
K36	Techniques and processes used in reactive maintenance and repair activities on complex engineered systems such as electrical, electronic, mechanical, fluid power and control systems.
Skills	
S1	Use information technology, for example to create documentation, communication and information management.
S10	Manufacture, repair and refurbish components using hand and machine tools.
S12	Apply the techniques and processes used in reactive maintenance and repair activities on complex engineered systems such as electrical, electronic, mechanical, fluid power and control systems.
S13	Produce, maintain, update, record and store documentation including electronic items such as PLC and robot programmes.
S16	Apply techniques and processes used in condition monitoring, non-destructive or sensory testing. Record findings and take necessary actions.
S17	Apply calculation techniques such as, feeds, speeds, tolerances, electrical calculations using Ohms law, power calculations and cable sizing calculations.
S18	Select, use and confirm calibration of electrical and mechanical testing and measuring equipment.
S19	Produce sketches or drawings to support maintenance activities.
S20	Communicate in writing. Prepare communications, documents and reports on technical matters.
S21	Segregate, separate and dispose of waste streams and by-products.
S22	Apply 4S or 5S principles of housekeeping to the work environment.
S23	Identify opportunities and make recommendations to improve operational performance.
S24	Apply continuous improvement techniques.
S25	Communicate with others verbally. Negotiate with colleagues or stakeholders. For example, to access equipment or arrange access to equipment.
S26	Follow equity, diversity and inclusion procedures.
S27	Carry out and record planned and unplanned learning and development activities.

S28	Apply fault finding techniques used in reactive maintenance on complex integrated systems including half split, input output, six point technique, function or performance testing, unit or component substitution and equipment diagnostics.
Behaviours	
B1	Supportive of the needs and concerns of others, for example relating to diversity and inclusion.
B2	Committed to continued professional development (CPD) to maintain and enhance competence.
B3	Take personal responsibility for their own sustainable working practices.

Final Grade

Performance in the End-Point Assessment determines the overall grade of:

- fail
- pass
- distinction

An End-Point Assessor must individually grade the observation with questions and interview underpinned by a portfolio of evidence in line with this End-Point Assessment plan.

SIAS will combine the individual assessment method grades to determine the overall End-Point Assessment 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. To gain an overall distinction, the apprentice must gain a distinction in the interview underpinned by a portfolio and a pass in the observation with questions.

Grades from individual assessment methods must be combined in the following way to determine the grade of the End-Point Assessment overall.

Observation with Questions	Interview Underpinned by a Portfolio of Evidence	Overall Grading
Any Grade	Fail	Fail
Fail	Any Grade	Fail
Pass	Pass	Pass
Pass	Distinction	Distinction

Moderation

Assessment organisations will undertake moderation of end-point assessor decisions through observations and examination of documentation on a risk sampling basis. Results cannot be confirmed until moderation has been completed.

Re-takes and re-sits

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 needs 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 SIAS should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 3 months of the End-Point Assessment outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 6 months of the End-Point Assessment outcome notification.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the End-Point Assessment outcome notification, otherwise the entire End-Point Assessment 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 End-Point Assessment grade of if pass they need to re-sit or re-take one or more assessment methods, unless SIAS determines there are exceptional circumstances.

Certification

The outcomes from the End-Point Assessment will be reviewed and a grade conferred by SIAS in accordance with SIAS QA procedures, which are available from SIAS. SIAS will notify the employer of the outcome of each of the assessments.

SIAS will apply for the apprentice's certificate, which will be sent by ESFA. The certificate confirms that the apprentice has passed the End-Point Assessment, has demonstrated full competency across the standard and is job-ready.

Assessment Specification

The assessment specification can be found in the published assessment plan for the standard. Details of which elements of the apprenticeship standard will be tested by each test are given in the Mapping Knowledge, Skills, and Behaviours section of this guide.

Mapping of Knowledge, Skills, and Behaviours

Key:	
Observation with Questions	Obs
Interview Underpinned by a Portfolio of Evidence	Int

Ref	KSB to be assessed	Assessment Method
Knowledge		
K1	Information technology: spreadsheets, presentations, word processing, email and digital collaboration tools.	Int
K2	The typical engineering problems which may arise within the maintenance environment.	Int
K3	How to plan and communicate activities.	Obs
K4	Principles of equity, diversity, and inclusion in the workplace. Unconscious bias. Conscious inclusion.	Int
K5	Fundamentals of engineering maintenance: documentation, safety checks, standard operating procedures, estimating planned equipment downtime, cost management and document validity.	Obs
K6	Engineering materials and consumables, their structure, properties and characteristics, how and why engineering materials can fail.	Int
K7	Engineering standards and regulations requiring compliance in the engineering workplace: British Safety (BS) or European standards (EN) and wiring regulations.	Obs
K8	Health and safety regulations to include Health and Safety at Work Act 1974, Control of Substances Hazardous to Health (COSHH), Reporting Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), Safe Systems of Work, Risk Assessments, Manual Handling, Lifting Operations and Lifting Equipment Regulations (LOLER), working at height, personal protective equipment (PPE), Provisions and Use of Work Equipment Regulations (PUWER), Noise Regulations, Display Equipment Regulations, confined spaces, Dangerous substances and Explosive atmospheres regulations.	Int
K9	Organisational safety compliance requirements: permits to work, risk assessment, method statements, near miss and accident reporting, hazard reduction hierarchy including use of PPE.	Obs
K10	Principles and procedures to identify and mitigate risks associated with electrical, mechanical, gas, air and fluids: isolation, dissipation of stored energy, lock off, tag out and verifying procedures.	Int
K11	Principles and procedures to identify and mitigate hazards associated with work equipment: trailing leads or hoses, damaged tools and equipment, and damaged or poor fitting handles.	Obs

Ref	KSB to be assessed	Assessment Method
K12	Principles, techniques and processes of sensory testing: sight, touch and smell.	Int
K13	Principles of mechanical, electrical, electronic, control, robotic and AI applications. Knowledge of key technologies, fluid power, hydraulic, electrical, electronic, programmable logic controller's (PLC's), robotics, mechanical, control systems and how these are combined in complex mechatronics systems.	Int
K14	Fault finding techniques used in reactive maintenance on complex integrated systems: half split, input output, six point technique, function or performance testing, unit or component substitution and equipment diagnostics.	Int
K15	Documentation: validity, compliance, traceability and audit, approval and change management processes.	Obs
K16	Quality management systems and accreditations: ISO9001.	Int
K17	Maintenance and storage of software programmes and back-up copies.	Int
K18	Processes and techniques of planned and preventative maintenance activities. Principles of equipment selection and use and minimising down time.	Obs
K19	Principles, techniques and processes of non-destructive testing in a mechatronics maintenance environment.	Int
K20	Condition monitoring methods and equipment used. How the information gained supports the planning of maintenance activities.	Int
K21	Engineering, mathematical and scientific principles, methods and techniques used in the mechatronics maintenance environment: graphical expressions, symbols, formulae, units, measures, calculations and scaling.	Int
K22	Principles of using and calibrating electrical and mechanical testing and measuring equipment.	Int
K23	Types of engineering drawings and diagrams and their purpose.	Int
K24	Principles, procedures and benefits of full operational and functional tests and checks on maintained, repaired and installed equipment.	Obs
K25	Principles, processes and importance of maintaining documentation: accuracy, engineering discipline and signatures.	Obs
K26	Environmental hazards that can arise from maintenance operations. Types of pollution and control measures: noise, smells, spills, and waste. Environmental permits. Waste Electrical and Electronic Equipment Directive (WEEE).	Int

Ref	KSB to be assessed	Assessment Method
K27	Sustainability principles and processes: the 3 'R's' (Reduce, Re-use, Recycle), segregation and disposal of waste and by-products.	Int
K28	Principles and techniques of good housekeeping including '4S' and '5S'.	Int
K29	Continuous improvement methods, concepts and techniques to collect and record data including graphical techniques.	Int
K30	Data analysis principles used to identify trends and issues impacting operational performance.	Int
K31	Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and how to overcome them.	Int
K32	Written communication techniques. Plain English principles. Engineering terminology. Report writing.	Int
K33	Non-verbal communication techniques: gestures, facial expressions, tone of voice and body language.	Int
K34	Principles and techniques for manufacturing, repairing and refurbishing components using hand and machine tools.	Int
K35	Principles and techniques of conducting initial assessment of equipment that requires maintenance.	Obs
K36	Techniques and processes used in reactive maintenance and repair activities on complex engineered systems such as electrical, electronic, mechanical, fluid power and control systems.	Int
Skills		
S1	Use information technology, for example to create documentation, communication and information management.	Int
S2	Obtain, read and interpret task related documentation, such as work instructions, quality control documents, drawings, operation manuals, specifications and service manuals.	Obs
S3	Record information for example job sheets, risk assessments, equipment service records, test results, handover documents and manufacturers' documentation, asset management records, work sheets, checklists, waste environmental records and any legal reporting requirements.	Obs
S4	Conduct initial assessment of equipment that requires maintenance.	Obs
S5	Formulate plans setting out the methodology of the maintenance activity including timescales and resources.	Obs
S6	Select, prepare and use material, consumables, tools and equipment.	Obs

Ref	KSB to be assessed	Assessment Method
S7	Comply with health and safety regulations and organisational requirements applicable in the workplace. For example, COSHH, PUWER, LOLER, PPE and applying safe systems of work.	Obs
S8	Apply dynamic risk assessment, hazard identification and risk mitigation principles and techniques.	Obs
S9	Apply isolation principles and techniques to equipment undergoing maintenance, including dissipation of stored energies as required.	Obs
S10	Manufacture, repair and refurbish components using hand and machine tools.	Int
S11	Restore the workplace on completion of the maintenance activity. Handover resources, consumables and equipment to process owner.	Obs
S12	Apply the techniques and processes used in reactive maintenance and repair activities on complex engineered systems such as electrical, electronic, mechanical, fluid power and control systems.	Int
S13	Produce, maintain, update, record and store documentation including electronic items such as PLC and robot programmes.	Int
S14	Apply techniques and processes used in planned and preventative maintenance activities on engineered systems such as electrical, electronic, mechanical, fluid power and control systems.	Obs
S15	Apply functional testing and checking techniques and processes after maintenance interventions, and handover to the operational team.	Obs
S16	Apply techniques and processes used in condition monitoring, non-destructive or sensory testing. Record findings and take necessary actions.	Int
S17	Apply calculation techniques such as, feeds, speeds, tolerances, electrical calculations using Ohms law, power calculations and cable sizing calculations.	Int
S18	Select, use and confirm calibration of electrical and mechanical testing and measuring equipment.	Int
S19	Produce sketches or drawings to support maintenance activities.	Int
S20	Communicate in writing. Prepare communications, documents and reports on technical matters.	Int
S21	Segregate, separate and dispose of waste streams and by-products.	Int
S22	Apply 4S or 5S principles of housekeeping to the work environment.	Int
S23	Identify opportunities and make recommendations to improve operational performance.	Int
S24	Apply continuous improvement techniques.	Int

Ref	KSB to be assessed	Assessment Method
S25	Communicate with others verbally. Negotiate with colleagues or stakeholders. For example, to access equipment or arrange access to equipment.	Int
S26	Follow equity, diversity and inclusion procedures.	Int
S27	Carry out and record planned and unplanned learning and development activities.	Int
S28	Apply fault finding techniques used in reactive maintenance on complex integrated systems including half split, input output, six point technique, function or performance testing, unit or component substitution and equipment diagnostics.	Int
Behaviours		
B1	Supportive of the needs and concerns of others, for example relating to diversity and inclusion.	Int
B2	Committed to continued professional development (CPD) to maintain and enhance competence.	Int
B3	Take personal responsibility for their own sustainable working practices.	Int
B4	Take personal responsibility for and promote health and safety.	Obs
B5	Act in a professional manner.	Obs

Further Information

For information about SIAS policies, quality assurance, re-sits, appeals, complaints and general enquiries please see our website: www.siasuk.com

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