

End-point assessment plan for the **Healthcare engineering specialist technician** apprenticeship standard

Apprenticeship standard reference number	Apprenticeship standard level	Integrated end-point assessment
ST0950	3	No

Contents

Introduction and overview.....	2
Summary table.....	4
Length of end-point assessment period.....	5
EPA gateway.....	5
End-point assessment methods.....	7
Reasonable adjustments.....	13
Overall grading of assessment methods	14
Re-sits and re-takes.....	15
Roles and responsibilities.....	16
Internal Quality Assurance (IQA).....	20
Value for money	21
Professional Body recognition.....	21
Mapping of knowledge, skills and behaviours (KSBs).....	22
Grading descriptors.....	28

Introduction and overview

Healthcare engineering specialist technician is a core and options apprenticeship standard. Apprentices must be trained and assessed against the core and one option. There are two options:

- Option 1: **Healthcare medical devices technician**
- Option 2: **Healthcare estates technician**

This document sets out the requirements for end-point assessment (EPA) for the **healthcare engineering specialist technician** apprenticeship standard. It explains how EPA for this apprenticeship must operate.

It provides the EPA design requirements for end-point assessment organisations (EPAOs) for this apprenticeship standard. It will also be useful for apprentices undertaking this apprenticeship, their employers and training providers.

EPA must be conducted by an EPAO approved to deliver EPA for this apprenticeship standard. Each employer should select an approved EPAO from the Education & Skills Funding Agency's Register of end-point assessment organisations (RoEPAO).

Full-time apprentices will typically spend **48** months on-programme (before the gateway) working towards this occupational standard. All apprentices must spend a minimum of 12 months on-programme. All apprentices must spend a minimum of 20% of on-programme time undertaking off-the-job training.

Before starting EPA, an apprentice must meet the gateway requirements. For this apprenticeship they are:

- the employer must be content that the apprentice is working at or above the occupational standard
- apprentices must have achieved English and mathematics at Level 2¹
- **apprentices must have compiled and submitted a portfolio of evidence to support the interview**

The EPAO must confirm that all required gateway evidence has been provided and accepted as meeting the gateway requirements. The EPAO is responsible for confirming gateway eligibility. Once this has been confirmed, the EPA period starts. This EPA should then be completed within an EPA period lasting typically for **3** months.

This EPA consists of **3** discrete assessment methods.

¹ For those with an education, health and care plan or a legacy statement, the apprenticeship's English and mathematics minimum requirement is Entry Level 3. British Sign Language (BSL) qualifications are an alternative to English qualifications for those who have BSL as their primary language.

It will be possible to achieve the following grades in each end-point assessment method:

Assessment method 1. **Observation with questions:**

- fail
- pass
- **distinction**

Assessment method 2. **Interview underpinned by a portfolio of evidence:**

- fail
- pass

Assessment method 3. **Multiple-choice test:**

- fail
- pass
- **distinction**

Performance in these end-point assessment methods will determine the overall apprenticeship standard grade of:

- fail
- pass
- **merit**
- **distinction**

Summary table

On-programme (typically, 48 months)	<ul style="list-style-type: none"> • Training to develop the knowledge, skills and behaviours (KSBs) of the relevant occupation (devices or estates). • Training towards English and mathematics Level 1 and 2, if required. • Compiling a portfolio of evidence.
End-point assessment gateway	<ul style="list-style-type: none"> • The employer must be content that the apprentice is working at or above the level of the occupational standard for their option. • Apprentices must have achieved English and mathematics Level 2. • Apprentices must submit a portfolio of evidence to underpin the EPA interview. • The employer must provide the EPAO with any workplace specific policies, requirements and or instructions as requested at least two weeks in advance of the apprentice being assessed.
End-point assessment (typically, 3 months)	<p>Assessment method 1: Observation with questions</p> <ul style="list-style-type: none"> • fail • pass • distinction <p>Assessment method 2: Interview underpinned by a portfolio of evidence</p> <ul style="list-style-type: none"> • fail • pass <p>Assessment method 3: Multiple-choice test</p> <ul style="list-style-type: none"> • fail • pass • distinction <p>Performance in these assessment methods will determine the EPA/overall apprenticeship standard grade of:</p> <ul style="list-style-type: none"> • fail • pass • merit • distinction
Professional recognition	<p>This apprenticeship standard has professional recognition.</p> <p>The Institution of Healthcare Engineering and Estate Management (IHEEM):</p> <ul style="list-style-type: none"> • Member of the Institute of IHEEM (MIHEEM) <p>Engineering Council:</p> <ul style="list-style-type: none"> • Engineering Technician (EngTech)

Length of EPA period

The EPA will be completed within an EPA period lasting typically for 3 months, starting when the EPAO has confirmed that all gateway requirements have been met.

EPA gateway

The apprentice should only enter the gateway once the employer is content that the apprentice is working at or above the level of the occupational standard. In making this decision, the employer may take advice from the apprentice's training provider(s), but the decision must ultimately be made solely by the employer.

The EPAO determines when all other gateway requirements have been met, and the EPA period will only start once the EPAO has confirmed this.

In addition to the employer's confirmation that the apprentice is working at or above the level of the occupational standard, the apprentice must have completed the following gateway requirements prior to starting EPA:

- achieved English and mathematics at Level 2. For those with an education, health and care plan or a legacy statement, the apprenticeship's English and mathematics minimum requirement is Entry Level 3. British Sign Language (BSL) qualifications are an alternative to English qualifications for those who have BSL as their primary language
- for the interview, compiled and submitted a portfolio of evidence – see below
- for the observation with questions the employer needs to provide any workplace specific policies, requirements and or instructions as requested by the EPAO
- for the multiple-choice test, there are no specific requirements to submit supporting materials

Portfolio of evidence requirements:

- apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship
- it must contain evidence related to the KSBs that will be assessed by the interview
- the portfolio of evidence will typically contain 15 discrete pieces of evidence
- evidence should be mapped by the apprentice against the KSBs assessed by the interview
- evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested
- evidence sources may include:
 - workplace documentation, for example workplace policies/procedures, records, log books
 - witness statements
 - annotated photographs
 - video clips (maximum total duration 10 minutes); the apprentice should always be in view and identifiable

This is not a definitive list; other evidence sources are possible.

- it should not include 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 must be valid and attributable to the apprentice; the portfolio of evidence must contain a statement from the employer and apprentice confirming this
- the portfolio of evidence must be submitted to the EPAO at the gateway

The portfolio is not directly assessed. It underpins the interview and therefore should not be marked by the EPAO. EPAOs should review the portfolio in preparation for the interview but are not required to provide feedback after this review of the portfolio.

End-point 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.

The apprentice will be assessed against the KSBs assigned to the assessment methods outlined below, as shown in the mapping section of this EPA plan.

Assessment method 1: Observation with questions

Overview

This assessment method has 1 component.

An observation with questions involves an independent assessor observing and questioning an apprentice undertaking work as part of their normal duties, in the workplace. This allows for a demonstration of the KSBs through naturally occurring evidence. The observation must be of an apprentice completing their usual work and simulation is not permitted. Apprentices must be observed by the independent assessor completing work under normal working conditions.

The independent assessor will ask questions in relation to KSBs that have not been observed although these should be kept to a minimum.

The rationale for this assessment method is:

- this is a practical role, best demonstrated through completing tasks in a real work setting
- observation makes use of employer resources and equipment, which will be familiar to the apprentice and thus allow them to perform at their best
- questioning allows for the assessment of the breadth and depth of underpinning knowledge against the grading descriptors
- tasks completed during the observation should contribute to workplace productivity and are valid
- it is a holistic assessment method

Delivery

The observation with questions must take **3** hours (assessment time). The time for questioning is included in the overall assessment time.

The observation with questions may not be split, other than to allow comfort breaks as necessary or to allow the apprentice to move from one location to another as required.

Where breaks occur, they will not count towards the total assessment time. EPAOs must manage invigilation of apprentices during breaks to maintain security of the assessment in line with their malpractice policy.

The independent assessor has the discretion to increase the time of the observation with questions by up to 10% to allow the apprentice to complete a task or respond to a question.

One independent assessor may observe only 1 apprentice at any one time, to ensure quality and rigour.

Apprentices must be provided with information on the format of the observation with

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questions, including the timescales they will be working to before the start of the observation with questions. The time taken to give this information is exclusive of the assessment time.

The following activities should be observed during the observation:

- conduct planned and preventative maintenance for healthcare engineering specialist equipment
- conduct testing and checks for healthcare engineering specialist equipment.
- ensure availability and performance of maintenance tools and equipment
- complete documentation for healthcare engineering specialist work

The observation should be conducted in the following way, to take account of the occupational context in which the apprentice operates:

- the tasks should not take place in the presence of patients
- the tasks must involve working with at least two different types of healthcare engineering specialist equipment relevant to the apprentice's option

The independent assessor must be unobtrusive whilst conducting the observation.

Questions must be asked. The purpose of questioning is **to test the apprentice's breadth and depth of underpinning knowledge against the grading descriptors.**

As only naturally occurring work is observed, those KSBs that the apprentice did not have the opportunity to demonstrate can be assessed via questioning, although these should be kept to a minimum.

The independent assessor must ask a minimum of **10** open questions. They may ask follow-up questions where clarification is required.

The questions can be asked by the independent assessor both during and after work completion. To remain as unobtrusive as possible, independent assessors should ask questions during natural stops between tasks and/or after completion of work rather than disrupting the apprentice's flow.

Independent assessors must use their EPAO's question bank as a source for questioning and are expected to use their professional judgment to tailor those questions appropriately. Independent assessors are responsible for generating suitable follow-up questions, in line with the EPAOs training and standardisation process.

The performance observed and responses to questions will be assessed holistically, against the grading descriptors for this assessment method.

The time for questioning is included in the overall assessment time.

KSBs observed, and answers to questions, must be recorded by the independent assessor.

The independent assessor will make all grading decisions.

Assessment location

The observation with questions should take place in the apprentice's workplace.

The employer should ensure the necessary tools, equipment and materials are available for the apprentice during the observation with questions.

Question and resource development

EPAOs will create and set open questions to assess related underpinning KSBs. They must develop 'question banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure the questions they contain are fit for purpose. The questions relating to underpinning KSBs must be varied, yet allow assessment of the relevant KSBs.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

EPAOs will produce the following material to support this assessment method:

- independent assessor training materials
- observation specifications
- grading guidance
- question banks
- outline of the assessment method's requirements
- marking materials
- guidance document for employers and apprentices on the process/timescales for the observation with questions as well as a description of the purpose
- guidance document for independent assessors on how to carry out the assessment

Assessment method 2: Interview underpinned by a portfolio of evidence

Overview

This assessment method has 1 component.

An interview consists of an independent assessor asking an apprentice a series of questions to assess their competence against the KSBs. The independent assessor leads this process to obtain information from the apprentice to enable a structured assessment decision-making process.

The rationale for this assessment method is:

- allows for assessment of KSBs that do not occur on a predictable or regular basis
- it allows for testing of responses where there are a range of potential answers that cannot be tested through the multiple-choice test
- it can be conducted remotely, potentially reducing cost

Delivery

An independent assessor will conduct and assess the interview underpinned by portfolio of evidence.

The interview must last for **90 minutes**. The independent assessor has the discretion to increase the time of the interview by up to 10% to allow the apprentice to complete their last answer.

The interview will have a minimum of **9** open questions – one per topic. During this method, the independent assessor must combine questions from the EPAO's question bank and those generated by themselves.

The purpose of the questions will be to cover the following topics:

Core

- working in a healthcare setting
- organising healthcare engineering specialist work
- arranging stock/supplies
- fault-finding and taking action
- contributing to continuous improvement
- completing written reports
- team working
- installing and decommissioning healthcare engineering specialist equipment

Apprentices will be assessed in the context of healthcare devices or estates, as per the apprenticeship standard option they are completing.

Option 1: Healthcare medical devices technician

- calibrate healthcare equipment

Option 2: Healthcare estates technician

- manufacture basic parts, spares, or components for healthcare estates

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The interview will be conducted as follows.

EPAOs must arrange the interview in conjunction with the apprentice's employer.

Apprentices must be given at least two-weeks' notice of the date and time of the interview.

Questions should be open and competence based. Additional follow up questions are allowed, to seek clarification and to make a judgement against the grading descriptors.

Independent assessors must use the question bank as a source for questioning and are expected to use their professional judgment to tailor those questions appropriately.

Independent assessors are responsible for generating suitable questions in line with the EPAO's training and standardisation process.

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

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

Apprentices are expected to understand and use relevant occupational language that would be typical of a competent person in this occupation.

Evidence from the interview must be assessed holistically using the grading descriptors for this assessment method.

KSBs met and answers to questions, must be recorded by the independent assessor.

The independent assessor will make all grading decisions.

Assessment location

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

Video conferencing can also be used to conduct the interview but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

The interview can take place in any of the following:

- employer's premises
- a suitable venue selected by the EPAO, for example a training provider's premises

Question and resource development

A 'question bank' must be developed by EPAOs. The 'question bank' must be of sufficient size to prevent predictability and the EPAO must review it regularly (at least once a year) to ensure that it, and its content, are fit for purpose. The questions relating to the KSBs, must be varied yet allow assessment of the relevant KSBs.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

EPAOs will produce the following material to support this assessment method:

- question bank
- outline of the assessment method's requirements
- marking materials
- guidance document for employers and apprentices on the process/timescales for the interview as well as a description of the purpose
- guidance document for independent assessors on how to carry out the assessment

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Assessment method 3: Multiple-choice test

Overview

This assessment method has 1 component.

A multiple-choice test is a controlled assessment which consists of a series of questions in which apprentices are asked to provide a response.

The rationale for this assessment method is:

- it allows for the efficient testing of knowledge where there is a right or wrong answer
- it allows for flexibility in terms of when, where and how it is taken
- it allows larger volumes of apprentices to be assessed at one time

Delivery

Test format

The multiple-choice test can be:

- computer based
- paper based

It will consist of 40 questions.

These questions will consist of multiple-choice questions. The multiple-choice questions will have four options of which one will be correct. The questions must be varied, to avoid the multiple-choice test becoming too predictable, yet allow assessment of the relevant KSBs.

Test administration

Apprentices must have 60 minutes to complete the multiple-choice test.

The multiple-choice test is closed book which means that the apprentice cannot refer to reference books or materials.

Assessment

Multiple-choice tests must be marked by independent assessors or markers employed by the EPAO following a marking guide produced by the EPAO. Alternatively, marking by computer is permissible where questions types allow this.

A correct response will be assigned one mark.

Any incorrect or missing answers must be assigned zero marks.

Grading boundaries

The following grade boundaries apply to the multiple-choice test:

Grade	Minimum mark	Maximum mark
Fail	0	29
Pass	30	35
Distinction	36	40

Assessment location

Apprentices must take the multiple-choice test in a suitably controlled environment that is a quiet space, free from distractions and influence, in the presence of an invigilator. The invigilator may be any independent person appointed by the EPAO. The EPAO is required to have an invigilation policy that will set out how the multiple-choice test is to be carried out. This will include specifying the most appropriate ratio of apprentices to invigilators to best take into account the setting and security required in administering the multiple-choice test.

The EPAO is responsible for ensuring the security of any multiple-choice tests they administer to ensure the test remains valid and reliable (this includes any arrangements made using online tools). The EPAO is responsible for verifying the identity of the person taking the multiple-choice test. The EPAO must also verify the suitability of the venue for multiple-choice test-taking.

Question and resource development

Questions must be written by EPAOs and must be relevant to the occupation. It is recommended that this be done in consultation with employers of this occupation. EPAOs should maintain the security and confidentiality of their questions when consulting employers.

EPAOs must develop 'multiple-choice test specifications' and 'question banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the questions they contain, are fit for purpose. The specifications, including questions relating to underpinning KSBs must be varied, yet allow assessment of the relevant KSBs.

EPAOs must ensure that apprentices have a different set of questions in the case of re-sits/re-takes.

EPAOs will produce the following material to support this assessment method:

- a question bank
- a multiple-choice test specification
- sample multiple-choice tests and mark schemes
- live multiple-choice tests and mark schemes
- analysis reports which show areas of weakness for completed multiple-choice tests/exams and an invigilation policy

Reasonable adjustments

The EPAO must have in place clear and fair arrangements for making reasonable adjustments to the assessment methods for the EPA for this apprenticeship standard. This should include how an apprentice qualifies for reasonable adjustments and what reasonable adjustments will be made. The adjustments must maintain the validity, reliability and integrity of the assessment methods outlined in this EPA plan.

Overall grading of assessment methods

All assessment methods are weighted equally in their contribution to the overall EPA grade.

Performance in the EPA will determine the apprenticeship grade of fail, pass, **merit or distinction**.

Independent assessors must individually grade the observation with questions and interview supported by a portfolio of evidence assessment methods, according to the requirements set out in this plan. A person appointed by the EPAO must grade the multiple-choice test. Alternatively, marking by computer is permissible where question type allows this.

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

Apprentices who fail one or more assessment method will be awarded an overall EPA fail.

To gain an overall EPA pass, apprentices must achieve a pass in all the assessment methods.

To achieve an overall EPA **merit**, apprentices must achieve a distinction in the observation with questions, a pass in the interview underpinned by a portfolio of evidence and a pass in the multiple-choice test.

To achieve an overall EPA **distinction**, apprentices must achieve a distinction in the observation with questions, a pass in the interview underpinned by a portfolio of evidence and a distinction in the multiple-choice test.

Grades from individual assessment methods should be combined in the following way to determine the grade of the EPA as a whole:

Assessment method 1 – Observation with questions	Assessment method 2 – Interview underpinned by a portfolio of evidence	Assessment method 3 – Multiple-choice test	Overall grading
Fail	Any grade	Any grade	Fail
Any grade	Fail	Any grade	Fail
Any grade	Any grade	Fail	Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Merit
Distinction	Pass	Distinction	Distinction

Any grade = fail, pass, distinction

Re-sits and re-takes

Apprentices who fail one or more assessment method(s) will be offered the opportunity to take a re-sit or a re-take at the employer's discretion. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action.

A re-sit does not require further learning, whereas a re-take does.

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

The timescale for a re-sit/re-take is agreed between the employer and EPAO. A re-sit is typically taken within 2 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 4 months of the EPA outcome notification.

All failed assessment methods must be re-sat/re-taken within a 6 month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat/re-taken.

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

Where any assessment method has to be re-sat or re-taken, the apprentice will be awarded a maximum EPA grade of **pass**, unless the EPAO determines there are exceptional circumstances.

Roles and responsibilities

Role	Responsibility
Apprentice	<p>As a minimum, apprentices should:</p> <ul style="list-style-type: none"> • participate in and complete on-programme training to meet the KSBs as outlined in the occupational standard for a minimum of 12 months • undertake a minimum of 20% off-the-job training as arranged by the employer and EPAO • understand the purpose and importance of EPA • undertake the EPA including meeting all gateway requirements
Employer	<p>As a minimum, employers should:</p> <ul style="list-style-type: none"> • select the EPAO and training provider • 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 a minimum of 20% off-the-job training to be undertaken by the apprentice • decide when the apprentice is working at or above the occupational standard and so is ready for EPA • ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan • remain independent from the delivery of the EPA • confirm arrangements with the EPAO for the EPA (who, when, where) in a timely manner (including providing 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 allow appropriate opportunity for the KSBs to be met • ensure the apprentice is well prepared for the EPA • ensure the apprentice is given sufficient time away from regular duties to prepare for and complete all post-gateway elements of the EPA, and that any required supervision during this time (as stated within this EPA plan) is in place • where the apprentice is assessed in the workplace, ensure that the apprentice has access to the resources used on a daily basis • pass the certificate to the apprentice • provide the EPAO with any workplace specific policies, requirements and or instructions as requested at least two weeks in advance of the apprentice being assessed

EPAO	<p>As a minimum, EPAOs should:</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 Register of End-Point Assessment Organisations (RoEPAO) • conform to the requirements of the external quality assurance provider (EQAP) for this apprenticeship standard • understand the occupational standard • 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) • appoint suitably qualified and competent independent assessors • appoint administrators (and invigilators where required) to administer the EPA as appropriate • provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading • provide adequate information, advice and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA • arrange for the EPA to take place, in consultation with the employer • where the apprentice is not assessed in the workplace, ensure that the apprentice has access to the required resources and liaise with the employer to agree this if necessary • develop and provide appropriate assessment recording documentation to ensure a clear and auditable process is in place for providing assessment decisions and feedback to all relevant stakeholders • have no direct connection with the apprentice, their employer or training provider. In all instances, including when the EPAO is the training provider (i.e. HEI), there must be no conflict of interest • have policies and procedures for internal quality assurance (IQA), and maintain records of regular and robust IQA activity and moderation for external quality assurance (EQA) purposes • deliver induction training for independent assessors, and for invigilators and/or markers (where used)
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	<ul style="list-style-type: none"> • undertake standardisation activity on this apprenticeship standard for all independent assessors before they conduct an EPA for the first time, if the EPA is updated and periodically as appropriate (a minimum of annually) • manage invigilation of apprentices in order to maintain security of the assessment in line with the EPAO's malpractice policy • verify the identity of the apprentice being assessed • use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard • provide details of the independent assessor's name and contact details to the employer • have and apply appropriately an EPA appeals process • request certification via the Apprenticeship Service upon successful achievement of the EPA
Independent assessor	<p>As a minimum, independent assessors should:</p> <ul style="list-style-type: none"> • have the competence to assess the apprentice at this level and hold any required qualifications and experience in line with the requirements of the independent assessor as detailed in the IQA section of this EPA plan • understand the occupational standard and the requirements of this EPA • have, maintain and be able to evidence up-to-date knowledge and expertise of the subject matter • deliver the end-point assessment in-line with the EPA plan • comply with the IQA requirements of the EPAO • have no direct connection or conflict of interest with the apprentice, their employer or training provider; in all instances, including when the EPAO is the training provider (i.e. HEI) • attend induction training • attend standardisation events when they begin working for the EPAO, before they conduct an EPA for the first time and a minimum of annually on this apprenticeship standard • assess each assessment method, as determined by the EPA plan, and without extending the EPA unnecessarily • assess against the KSBs assigned to each assessment method, as shown in the mapping of assessment methods and as determined by the EPAO, and without extending the EPA unnecessarily • make all grading decisions • record and report all assessment outcome decisions, for each apprentice, following instructions and using assessment recording documentation provided by the EPAO, in a timely manner

	<ul style="list-style-type: none"> • use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard • mark open (constructed) test answers accurately according to the EPAO's mark scheme and procedures
Training provider	<p>As a minimum, training providers should:</p> <ul style="list-style-type: none"> • work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the knowledge, skills and behaviours as listed in the occupational standard • conduct training covering any knowledge, skill or behaviour requirement agreed as part of the Commitment Statement (often known as the Individual Learning Plan). • monitor the apprentice's progress during any training provider led on-programme learning • advise the employer, upon request, on the apprentice's readiness for EPA • remain independent from delivery of the EPA. Where the training provider is the EPA (i.e. a HEI) there must be procedures in place to mitigate against any conflict of interest
Marker	<p>As a minimum, markers should:</p> <ul style="list-style-type: none"> • attend induction training • have no direct connection or conflict of interest with the apprentice, their employer or training provider in all instances including when the EPAO is the training provider (i.e. HEI) • mark multiple-choice test answers accurately according to the EPAO's mark scheme and procedures
Invigilator	<p>As a minimum, invigilators should:</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; in all instances, including when the EPAO is the training provider (i.e. HEI) • invigilate and supervise apprentices during tests and in breaks during assessment methods to prevent malpractice in accordance with the EPAO's invigilation procedures

Internal quality assurance (IQA)

Internal quality assurance refers to the strategies, policies and procedures that EPAOs must have in place to ensure valid, consistent and reliable end-point assessment decisions. EPAOs for this EPA must adhere to all requirements within the roles and responsibilities section and:

- have effective and rigorous quality assurance systems and procedures that ensure fair, reliable and consistent assessment across employers, places, times and independent assessors
- appoint independent assessors who are competent to deliver the end-point assessment and who:
 - have recent relevant experience of the occupation/sector to at least occupational level 3 gained in the last 3 years or significant experience of the occupation **and healthcare** sector
- operate induction training for independent assessors and any other personnel involved in the delivery and or/assessment of the EPA (e.g. markers and invigilators)
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- where appropriate provide ongoing training for markers and invigilators
- provide standardisation activity for this apprenticeship standard for all independent assessors:
 - before they conduct an EPA for the first time
 - if the EPA is updated
 - periodically as appropriate (a minimum of annually)
- conduct effective moderation of assessment decisions and grades
- conduct appeals where required, according to the EPAO's appeals procedure, reviewing and making final decisions on assessment decisions and grades

Value for money

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

- completing applicable assessment methods online (i.e. computer-based assessment)
- utilising digital remote platforms to conduct applicable assessment methods
- assessing multiple apprentices simultaneously
- using the employer's premises
- conducting assessment methods on the same day

Professional recognition

This apprenticeship standard has professional recognition as follows:

The Institution of Healthcare Engineering and Estate Management (IHEEM):

- Member of the Institute of IHEEM (MIHEEM)

Engineering Council:

- Engineering Technician (EngTech)

Mapping of knowledge, skills and behaviours (KSBs)

End-point assessment method 1: Observation with questions

Knowledge
K5. Core. Medical protocols for infection prevention and biohazard control for example, cleaning and disinfection of tools, pre-work disinfection requirements, decontamination prior to disposal.
K8. Core. Health & safety requirements: manual handling, Personal Protective Equipment (PPE), risk assessments and method statements, specialist healthcare PPE, clinical risk assessments, signage and barriers.
K11. Core. Communication techniques: verbal, written, electronic. Matching style to audience. Engineering terminology.
K14. Core. Documentation methods and requirements - electronic and paper. For example, job records, timekeeping, service reports, checklists, condemnation certificates.
K15. Core. Data protection requirements: General Data Protection Regulation (GDPR). Information governance. Removal of patient identifiable data.
K19. Core. Machinery, tools, and equipment used in healthcare engineering. Purpose, safe correct use, maintenance, carriage and storage.
K20. Core. Calibrated equipment requirements including calibration certificates.
K22. Core. Manufacturers' instructions: what they are and how to use them. Warranties: what they are and impact on engineering work.
K24. Core. Engineering representations, drawings, and graphical information.
K33. Core. Maintenance practices and techniques: planned, preventative and predictive methods and frequency, and reactive.
K36. Core. Quality assurance principles and practice. Record keeping.
Skills
S3. Core. Check tools and equipment including calibration records of test equipment where applicable. Completes maintenance of tools and equipment including calibration where required.
S4. Core. Select and use hand tools, specialist tools and instruments including electrical safety test equipment.
S5. Core. Store tools and equipment.
S6. Core. Identify and document risks and hazards in the workplace. Advise on and apply control measures.
S7. Core. Comply with health and safety regulations, legislation, and safe working practices including signage and barriers.

S8. Core. Comply with any clinical restrictions in work area. For example, wearing healthcare PPE.
S9. Core. Comply with statutory and organisation environmental and sustainability requirements: safe disposal of waste, re-cycling/re-use of materials and efficient use of resources.
S10. Core. Follow manufacturers' instructions and procedures where applicable.
S11. Core. Follow standard operating procedures where applicable.
S12. Core. Read and interpret information. For example, text, data, engineering drawings, job card, work instructions, risk assessments, method statements, operation manuals.
S13. Core. Collect and record data. For example, energy usage, test results.
S14. Core. Communicate with colleagues and/or stakeholders for example, patients, colleagues, managers,' and the public – verbal, written or electronic. Use sector/industry terminology where appropriate.
S16. Core. Identify and report on progress and issues or concerns where applicable.
S20. Core. Enter information to record work activity. 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.
S21. Core. Lock off and isolate equipment/systems.
S25. Core. Assess condition of components and equipment, identifying action required.
S26. Core. Apply maintenance practices and techniques. For example, clean, lubricate, replace parts.
S29. Core. Test and check equipment or system against quality and/or operational parameters.
S30. Core. Use washer disinfectors, steam sterilisers or alternatives to decontaminate healthcare equipment and maintenance tools and equipment.
S31. Core. Restore the work area on completion of the activity. Return resources and consumables.

Behaviours

B2. Core. Prioritise health, safety, sustainability and the environment.
B3. Core. Act professionally representing employer well. For example, friendly, courteous, tactful, uses appropriate language, instils confidence and takes account of equality and diversity considerations.
B4. Core. Take responsibility. Completes work with minimal supervision. Knows own limitations and asks for help where needed.

End-point assessment method 2: Interview, underpinned by a portfolio of evidence

Knowledge
K1. Core. Engineering function in the healthcare sector; roles, duties, interdependencies and reporting channels. Types of employers. Supply chain. Stakeholder requirements and priorities including the importance of continuity of service. Principles of clinical governance; its benefits for patients and staff.
K3. Core. Working in a clinical environment. The patient's journey. Patient contact protocols. Patient safety, dignity, respect, confidentiality and Caldicott requirements.
K10. Core. Planning techniques, time management, workflow, work scheduling, work plans and documents. Work categorisation systems.
K12. Core. Report writing.
K13i. Core. Information technology: email, word processing, spreadsheets. K13ii. Core. Information technology: work management systems.
K16. Core. Team working techniques. Equality, diversity, and inclusion in the workplace.
K17. Core. Training, mentoring and coaching techniques. How to pass on knowledge and provide guidance to customer/stakeholder.
K21. Core. Stock/services considerations. Availability, stock lead times. Correct handling. The identification of equipment and parts. Function of parts, spares and components. Stock value. Returns process. Salvageability of parts to be removed.
K32i. Core. Installation, commissioning practices and techniques. K32ii. Core. Decommissioning practices and techniques.
K34. Core. Fault finding and problem solving techniques: diagnostics, troubleshooting and testing. Common faults and causes.
K35. Core. Repair practices and techniques.
K37. Core. Continuous improvement principles and practices for the benefit of organisation, patient, client, and/or work process. For example, Lean, Six Sigma, Kaizen.
Skills
S1. Core. Plan and schedule own and others' work.
S2. Core. Monitor, obtain and check stock/supplies, and complete returns.
S15. Core. Negotiate with stakeholders such as clinical team or authorised person. For example, in relation to access or equipment/system outage.
S17. Core. Provide information, guidance, or training to colleagues and/or stakeholders. For example, clinical staff.
S18. Core. Write reports. For example, adverse incident reports, technical investigations, equipment appraisals and specifications, improvement suggestions.

S19. Core. Use information technology. For example, for document creation, communication, and information management.
S22. Core. Commission equipment.
S23. Core. Assemble, position and fix equipment and/or components.
S24. Core. Disconnect and remove equipment or components. Categorise equipment/components for reuse, disposal, or recycling. Complete storage measures to prevent deterioration.
S27. Core. Apply fault-finding and diagnostic testing procedures to identify faults.
S28. Core. Replace/fit and repair components.
S32. Core. Apply continuous improvement techniques. Devise suggestions for improvement.
S33. Option 1. Devices engineering technician. Calibrate healthcare equipment.
S34. Option 2. Healthcare estates technician. Design and cut, drill, weld as appropriate to produce basic part, spare or components where consent to manufacture is given.

Behaviours

B1. Core. Patient focus. For example, aims to maintain continuity of service and improve service, sensitive to clinical environment and maintains patient confidentiality.
B5. Core. Team player. Keeps colleagues informed. Supports colleagues to complete work and develop. Considers implications of their own actions on others in the team.
B6. Core. Adaptable. For example, responds positively to changing priorities and deadlines. Resilient under pressure. Manages multi-skilled tasks and works to deadlines.
B7. Core. Committed to continued professional development. Keeps up to date with developments in the engineering industry and healthcare sector.

End-point assessment method 3: Multiple-choice test

Knowledge
K2. Core. Technological development and innovation in the healthcare engineering sector. Industry 4.0. IT networking.
K4. Core. Engineering standards and regulations. British Standards (BS). International Organisation for Standardisation standards (ISO). European Norm (EN). Standard Operating Procedures (SOP). What they are and how to use them.
K6. Core. Healthcare engineering industry regulations and guidelines. Medicines and Healthcare products Regulatory Agency regulations. Care Quality Commission regulations. Health Technical Memorandums (HTMs). What they are and how to use them.
K7. Core. Health & safety regulations. Health & Safety at Work Act. Control of Substances Hazardous to Health (CoSHH). Working in confined spaces. Lone working. Provision of Work Equipment Regulations (PUWER). Lifting Operations and Lifting Equipment Regulations (LOLER). Electrical safety and compliance. Noise regulation. L8 Legionella. Slips trips and falls. What they are and how to use them.
K9. Core. Environmental regulations and requirements. Environmental Protection Act. Sustainability. Waste Electrical and Electronic Equipment Directive (WEEE). Hazardous waste regulations. Recyclable materials and waste disposal procedures. Energy monitoring. Data logging to optimize energy performance. The Climate Change Agreements. Carbon Reduction Commitment (CRC). What they are and how to use them.
K18. Core. Financial constraints. Service level agreements.
K23. Core. Statutory certificates including electricity certificates, theatre validations.
K25. Core. Engineering mathematical and scientific principles: calculations, conversions, flow rates and equipment sizing.
K26. Core. Materials and their properties.
K27. Core. Mechanical principles: motion and mechanics, storage and transfer of forces and energy in operation, motors and pumps.
K28. Core. Electrical and electronic principles: principles of electricity and electronics, electric circuit theory, motors and pumps.
K29. Core. Mechatronics principles: key components of integrated mechanical and electrical systems; their design, operation.
K30. Core. Control systems principles.
K31. Core. Energy consumption and usage profiling.
K38. Option 1. Healthcare medical devices technician. Purpose and operation of devices: <ul style="list-style-type: none"> • Diagnostic and therapeutic equipment: anaesthetic machines, patient ventilators, and critical life support machines • Operating theatre and pathology equipment • Monitoring and infusion devices • Portable imaging equipment and scanners including hand, CT (Computerised Tomography) and MRI (Magnetic Resonance Imaging)

<ul style="list-style-type: none"> • Renal dialysis equipment • Gas delivery systems • Assistive technology.
K39. Option 1. Healthcare medical devices technician. Physiology and anatomy in relation to medical equipment.
K40. Option 1. Healthcare medical devices technician. BS EN 60601 / BS EN 62353 Safety testing of medical electrical equipment and medical electrical systems.
K41. Option 1. Healthcare medical devices technician. Quality control systems: medical devices directive, lifecycle management and hazard notices.
K42. Option 1. Healthcare medical devices technician. Networking and integration of healthcare medical devices.
K44. Option 2. Healthcare estates technician. Estates engineering industry regulations and guidelines. Health Building Notes. Premises assurance model (PAM). What they are and how to use them.
K45. Option 2. Healthcare estates technician. Health & safety regulations and requirements. Asbestos awareness. Working at height. Permits to work. Safety passports. Food hygiene. Vehicle safety. Pressure Systems Safety Regulations (PSSR). Construction Skills Certification Scheme compliance. EH40 workplace exposure limits. Building Management System (BMS). Site survey requirements and processes. What they are and how to use them. Limits of role and role of specialist contractors on medical gas systems.
K46. Option 2. Healthcare estates technician. System resilience. Site wide energy infrastructure and the associated resilience needed to ensure continuity of service. For example, site and equipment Uninterruptible Power Supply (UPS), Generators, Dual fuel systems.

Grading descriptors

End-point assessment method 1: Observation with questions

Theme/KSBs	Pass descriptors In order to achieve a pass, apprentices must demonstrate all of the pass descriptors	Distinction descriptors In order to achieve a distinction, apprentices must demonstrate all the pass descriptors and all the distinction descriptors
Core		
<p>Work environment</p> <p>K8</p> <p>S6 S7 S8 S9 S31</p> <p>B2</p>	<p>Identifies and documents risks and hazards present in the workplace including clinical risks.</p> <p>Advises on and applies control measures to minimise these risks in line with company procedures, including specialist healthcare PPE where required. (K8, S6)</p> <p>Conducts work in line with health, safety regulations, policy and requirements including signage and barriers. (S7)</p> <p>Conducts work in line with clinical restrictions in the work area. (S8)</p> <p>Conducts work in line with statutory and organisation environmental regulations, policy and requirements, including safe disposal of waste, recycling of materials and efficient use of resources in line with company procedures. (S9)</p> <p>Restores work area on completion of the activity. Returns any unused resources and consumables. (S31)</p> <p>Prioritises health and safety, sustainability, and the environment over other factors</p>	<p>Explains the importance of compliance with health, safety and environmental regulations, policy and requirements and clinical restrictions, with reference to the impact on individuals, the workplace and the environment. (K8)</p>

	for example time and cost. (B2)	
Tools and equipment K19 S3 S4 S5	<p>Selects hand tools, specialist tools and instruments including electrical safety test equipment appropriate for the task.</p> <p>Uses hand tools, specialist tools and instruments in line with employer's/manufacturers' instructions. (S4)</p> <p>Checks tools and equipment are safe for use.</p> <p>Completes maintenance of tools and equipment including checking calibration records and calibration where required. (S3)</p> <p>Stores tools and equipment safely on completion of work. (S5)</p> <p>(K19)</p>	Explains the importance of undertaking pre-checks of operating tools and equipment in line with manufacturers' and employer's requirements. (K19)
Communication K11 S14 S16 B3	<p>Uses communication techniques suitable for the task with colleagues and stakeholders - verbal, written or electronic, using sector/industry terminology accurately and appropriately. (K11, S14)</p> <p>Identifies and reports on progress and issues or concerns where applicable in line with company procedures. (S16)</p> <p>Represents the employer in a professional manner, taking account of equality and diversity considerations. (B3)</p>	Explains the importance of adapting their communication method to different audiences identified by the independent assessor. (K11)
Documentation K14 K15	Collects and records data and completes electronic and paper documentation	Explains the importance of protecting data in line with legal and employer requirements.

<p>S13 S20</p>	<p>required for the work activity accurately, legibly and in full. (K14, S13, S20)</p> <p>Complies with general data protection regulations (GDPR).</p> <p>Explains the process for the removal of patient identifiable data. (K15)</p>	<p>(K15)</p> <p>Analyses the data collected identifying any trends or issues. (S13)</p>
<p>Task instructions/procedures</p> <p>K20 K22 K24 K36</p> <p>S10 S11 S12</p> <p>B4</p>	<p>Reads and interprets information required to complete the activity – including engineering representations, drawings and graphical information and calibration requirements/certificates. (K20, K24, S12)</p> <p>Complies work in line with manufacturers' instructions/warranty requirements, standard operating procedures as appropriate and quality assurance principles and practice. (K22, K36, S10, S11)</p> <p>Takes responsibility to complete work with minimal supervision within limits of authority, asking for help where needed. (B4)</p>	<p>Explains the importance of completing tasks in line with manufacturers' instructions, warranty requirements and standard operating procedures. (K20, K22, S10)</p> <p>Identifies and explains the potential issues that could arise and how they mitigate against them. (S12, B4)</p>
<p>Maintenance and equipment checks</p> <p>K33</p> <p>S21 S25 S26 S29</p>	<p>Assesses condition of components and equipment identifying action required. (S25)</p> <p>Applies maintenance practices and techniques to address required action. (K33, S26)</p> <p>Locks off and isolates equipment/systems safely. (S21)</p> <p>Tests and checks equipment or system against quality and/or operational parameters.</p>	<p>Analyses and evaluates alternative maintenance practices/techniques. (K33)</p> <p>Identifies ideas for preventative maintenance. (S25)</p>

	S29)	
Infection prevention and biohazard control K5 S30	Uses washer disinfectors, steam sterilisers or alternatives appropriate to the task/environment to decontaminate healthcare equipment and maintenance tools and equipment in line with medical protocols. (K5, S30)	Analyses and explains the importance of following medical protocols for infection prevention and biohazard control. (K5)
Fail: apprentices will fail if they do not demonstrate all the pass descriptors		

End-point assessment method 2: Interview underpinned by a portfolio of evidence

Theme/KSBs	Pass descriptors In order to achieve a pass, apprentices must demonstrate all of the pass descriptors
Working in a healthcare setting K1 K3	<p>Explains the engineering function in their healthcare setting and within the wider sector, identifying:</p> <ul style="list-style-type: none"> • the type of employers • supply chain • stakeholder requirements and priorities including the importance of continuity of service <p>Outlines the principles of clinical governance, explaining its benefits for patients and staff. (K1)</p> <p>Explains factors that need to be considered when working in a clinical environment including:</p> <ul style="list-style-type: none"> • the patient's journey • patient contact protocols • patient safety, dignity, respect, confidentiality • Caldicott requirements (K3)
Organising healthcare engineering specialist work K10 K13ii S1 S15 B1 B6	<p>Describes how they plan and schedule own and others' work using appropriate techniques, work management systems and documentation. (K10, K13ii, S1)</p> <p>Describes how they negotiate with stakeholders such as clinical team or authorised person. (S15)</p> <p>Describes how they adapt to meet patients' and stakeholders' needs for example, work priority, continuity of service, minimal disruption. (B1, B6)</p>
Arranging stock/supplies K21 S2	<p>Outlines how they monitor, obtain and check stock/supplies and complete returns.</p> <p>Identifies the factors they need to consider during this process including the salvageability of parts. (K21, S2)</p>
Fault-finding and taking action K34 K35 S27 S28	<p>Explains how they apply fault finding and problem-solving techniques to identify faults. (K34, S27)</p> <p>Describes how they apply practices and techniques to replace/fit and repair components to rectify faults. (K35, S28)</p>
Contributing to continuous improvement	<p>Describes how they apply continuous improvement techniques and devised suggestions for improvement for the benefit of the organisation, patient, client and/or work process. (K37, S32)</p>

K37 S32 B7	Outlines plans for CPD, explaining how they keep up to date with industry developments. (B7)
Completing written reports K12 K13i S18 S19	Discusses their use of information technology to write reports for example adverse incident reports, technical investigations, equipment appraisals. (K12, K13i, S18, S19)
Team working K16 K17 S17 B5	Outlines how they provide information, guidance, or training to colleagues and/or stakeholders. (K17, S17) Outlines how they take account of equality, diversity and inclusion considerations to benefit team working and work activity. (K16, B5)
Installing and decommissioning healthcare specialist equipment K32 S22 S23 S24	Describes how they apply practices and techniques to assemble, position and fix equipment and/or components and commission healthcare specialist equipment. (K32i, S22, S23) Outlines how they apply practices and techniques to disconnect and remove equipment or components. Completes storage measures to prevent deterioration where required. Categorises equipment/components for reuse, disposal, or recycling. (K32ii, S24)
Option 1. Healthcare devices technician Calibrate healthcare equipment S33	Explains the process they take when calibrating healthcare equipment in line with operational requirements. (S33)
Option 2. Healthcare estates technician Manufacture basic parts, spares, or components for healthcare estates S34	Justifies the manufacture of bespoke component or spare part. Explains when and how consent is achieved. Describes how they have used a range of processes to produce basic parts, spares or components. (S34)
Fail: apprentices will fail if they do not demonstrate all the pass descriptors	

End-point assessment method 3: Multiple-choice test

KSBs	
<p>Core</p> <p>K2 K4 K6 K7 K9 K18 K23 K25 K26 K27 K28 K29 K30 K31</p>	<p>Test mark will determine whether apprentice achieved fail, pass or distinction</p>
<p>Option 1. Healthcare medical devices technician</p> <p>K38 K39 K40 K41 K42</p>	
<p>Option 2. Healthcare estates technician</p> <p>K43 K44 K45 K46</p>	