

End-point assessment plan for Building Services Engineering Technician apprenticeship standard

Apprenticeship standard number	Level of this end point assessment (EPA)	Integrated
ST0063	3	No

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Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the building services engineering 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 32 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 as a minimum, one of the following:
 - Pearson BTEC Level 3 National Diploma in Building Services Engineering (603/1218/X),
or
 - Pearson BTEC Level 3 National Extended Diploma in Building Services Engineering (603/1219/1)
or
 - EAL Level 3 Electrotechnical Qualification (601/7345/2)
or
 - Pearson BTEC Level 3 Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge) (601/9053/X)
or
 - City and Guilds Level 3 Electrotechnical Qualification (601/6299/5)
- apprentices must have achieved English and mathematics at Level 2¹
- apprentices must indicate their preferred building services engineering project subject focus

which is relevant to their role and allows the EPAO to provide the most appropriate technical project brief to be issued at gateway

- apprentices must have compiled and submitted a portfolio of evidence to underpin the EPA professional discussion

The EPA must be completed within an EPA period lasting typically 4 months, beginning when the apprentice has met the EPA gateway requirements.

The EPA consists of 2 discrete assessment methods.

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

Assessment Method 1: Technical project with report and presentation with questioning

- fail
- pass
- distinction

Assessment Method 2: Professional discussion underpinned by portfolio

- fail
- pass
- distinction

Performance in the EPA will determine the overall apprenticeship grades of:

- fail
- pass
- distinction

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.

EPA summary table

On-programme (typically, 32 months)	<p>Training to develop the knowledge, skills and behaviour (KSBs) of the occupational standard.</p> <p>Training towards mandated qualifications, if required.</p> <p>Apprentices must work towards one of the following approved qualifications mandated in the standard prior to gateway application:</p> <ul style="list-style-type: none"> • Pearson BTEC Level 3 National Diploma in Building Services Engineering (603/1218/X) <p style="text-align: center;">or</p>
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	<ul style="list-style-type: none"> • Pearson BTEC Level 3 National Extended Diploma in Building Services Engineering (603/1219/1) <p>or</p> <ul style="list-style-type: none"> • EAL Level 3 Electrotechnical Qualification (601/7345/2) <p>or</p> <ul style="list-style-type: none"> • Pearson BTEC Level 3 Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge) (601/9053/X) <p>or</p> <ul style="list-style-type: none"> • City and Guilds Level 3 Electrotechnical Qualification (601/6299/5) <p>Training towards English and Mathematics Level 2, if required. Compiling a portfolio of evidence to underpin the professional discussion.</p>
<p>End-point assessment gateway</p>	<p>The employer must be content that the apprentice is working at or above the level of the occupational standard.</p> <p>Apprentices must have achieved English and Mathematics Level 2.</p> <p>Apprentices must demonstrate successful completion of one of the following mandatory qualifications:</p> <ul style="list-style-type: none"> • Pearson BTEC Level 3 National Diploma in Building Services Engineering (603/1218/X) <p>or</p> <ul style="list-style-type: none"> • Pearson BTEC Level 3 National Extended Diploma in Building Services Engineering (603/1219/1) <p>or</p> <ul style="list-style-type: none"> • EAL Level 3 Electrotechnical Qualification (601/7345/2)

	<p>or</p> <ul style="list-style-type: none"> • Pearson BTEC Level 3 Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge) (601/9053/X) <p>or</p> <ul style="list-style-type: none"> • City and Guilds Level 3 Electrotechnical Qualification (601/6299/5) <p>For the technical project with report and presentation with questioning:</p> <p>Apprentices must indicate their preferred building services engineering project subject focus which is relevant to their role and allows the EPAO to provide the most appropriate technical project brief to be issued at gateway.</p> <p>For the professional discussion underpinned by portfolio:</p> <p>Apprentices must have compiled and submit the portfolio of evidence.</p>
<p>End-point assessment (typically take 4 months)</p>	<p>Grades available for each assessment method</p> <p>End-point assessment method 1: Technical project with report and presentation with questions</p> <ul style="list-style-type: none"> • fail • pass • distinction <p>End-point assessment method 2: Professional discussion underpinned by a portfolio of evidence:</p> <ul style="list-style-type: none"> • fail • pass • distinction <p>Overall EPA/apprenticeship can be graded:</p> <ul style="list-style-type: none"> • fail • pass • distinction
<p>Professional recognition</p>	<p>This standard aligns with the following professional recognition:</p> <ul style="list-style-type: none"> • Engineering Council for Engineering Technician (EngTech)

Length of end-point assessment period

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

Order of assessment methods

The assessment methods can be delivered in any order.

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

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 commence 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 requirement prior to starting EPA:

- achieved one of the following mandatory qualifications:
 - Pearson BTEC Level 3 National Diploma in Building Services Engineering (603/1218/X),
 - Pearson BTEC Level 3 National Extended Diploma in Building Services Engineering (603/1219/1)
 - EAL Level 3 Electrotechnical Qualification (601/7345/2), or
 - Pearson BTEC Level 3 Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge) (601/9053/X)
 - City and Guilds Level 3 Electrotechnical Qualification (601/6299/5)
- achieved English and Mathematics at level 2. For those with an education, health and care plan or a legacy statement the apprenticeships English and mathematics minimum requirement is Entry Level 3 and British Sign Language qualification are an alternative to English qualifications for whom this is their primary language.
- apprentices must indicate their preferred building services engineering project subject focus which is relevant to their role and allows the EPAO to provide the most appropriate technical project brief to be issued at gateway.
- for the technical project report with presentation and questioning:

a technical project brief will be designed by the EPAO and agreed in consultation with the employer, to ensure that the apprentice's work will meet the real building services engineering challenges that readily occur in business. The technical project should be relevant to the apprentice's role and must allow the relevant KSBs to be assessed for the EPA. The EPAO will ensure it meets the requirements of the EPA, including suitable coverage of the KSBs assigned to this assessment method as shown in the mapping of assessment methods. The EPAO must refer to the grading descriptors to ensure that technical projects are pitched appropriately.

- for the professional discussion, the apprentice must have compiled and submitted a portfolio of evidence – see requirements below

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 professional discussion
- the portfolio of evidence will typically contain ten to twelve individual pieces of evidence to demonstrate competence against one or more of the KSBs mapped to this assessment method (assessment method 2: professional discussion underpinned by portfolio).
- evidence must be mapped against the KSBs
- evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested.
- evidence must cover the following areas:
 - using technical software to present building services engineering information
 - contributing to building services engineering project management
 - health, safety and welfare
 - personal and professional practice
- evidence sources may include evidence of work undertaken which may be supported by:
 - building services engineering designs
 - technical drawings
 - briefs, specifications, standards, project plans, technical reports
 - CAD/BIM/Revit models
 - client or customer feedback
 - witness statements
 - employer/trainer feedback
 - initial and continuous professional development and training records
 - appraisal records
 - training course completion

This list is not definitive, other evidence sources are permissible however reflective accounts and self-evaluations are not allowed

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

End-point assessment methods

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: Technical project with report and presentation with questioning

This method has 2 components (both components are assessed holistically and must be passed).

Overview

A technical project involves the apprentice completing a significant and defined piece of building services engineering work that has a real relevance to industry. The project must be undertaken after the apprentice has gone through the gateway.

The technical project should be designed to ensure that the apprentice's work meets building services engineering challenges, is relevant to their role and allows the relevant KSBs to be assessed for the EPA. The EPAO will ensure it meets the requirements of the EPA, including suitable coverage of the KSBs assigned to this assessment method as shown in the mapping of assessment methods. The EPAO must refer to the grading descriptors to ensure that projects are pitched appropriately.

This assessment method includes two components:

- a technical project with report
- a presentation with questioning

The rationale for this assessment method is:

The technical project reflects employer's building services engineering challenges and is typical of the apprentice's everyday work, ensuring that they can demonstrate KSBs in practice. As part of a building services engineering technicians' role, they will be expected to carry out technical projects before relaying the findings back to various audiences through reports, presentations and discussions. Therefore, this method of assessment is deemed as the most appropriate for this occupation as it accurately reflects the environments and current workplace tasks of the apprentice. The technical project with report, presentation and questioning allow for effective assessment of the KSBs assigned to this assessment method.

The technical project with report, presentation and questioning will be assessed holistically.

Component 1: Technical project with report

Apprentices will undertake a technical project after they have passed the gateway, which would typically take up to 30 hours over a period of 6 working weeks and produce a report that appropriately covers all of the KSBs assigned to this method of assessment.

The EPAO will issue the Technical Project Brief to the apprentice at gateway.

The technical project brief will reflect a real work-based building services engineering challenge in a subject area, providing a focus on an area such as:

- mechanical engineering
- electrical engineering
- mechanical and electrical engineering (M&E)
- public health engineering
- energy and building management systems
- environmental and sustainability building services engineering
- facilities management
- building services engineering contracting
- building services engineering manufacturing

This is not an exhaustive list, other projects that provide coverage of the KSBs are allowed. For example, project titles could include:

- carry out a feasibility study to address the mechanical engineering systems that will be installed for the refurbishment for a Further Education College
- produce a schematic design for the installation of an appropriate electrical distribution system supporting a new hotel project.

The purpose of the technical project is to set the apprentice a project which will assess their ability to integrate the range of knowledge, skills and behaviours (assigned to Assessment Method 1) they have acquired during their apprenticeship.

The technical project brief, designed and issued by the EPAO, will be typically 500 words in length. The EPAO will design and issue guidance with the technical project brief, stating that the completion of the technical project is designed to take up to 30 hours for the apprentice to complete over a maximum period of 6 working weeks.

As a minimum, all technical project reports must include:

- an introduction
- the scope of the project (including key performance indicators)
- a project plan and methodology
- research and findings:
 - data collection, analysis and evaluation appropriate to the technical project and level of apprenticeship
- reference to:
 - relevant scientific and engineering principles,
 - relevant methods and techniques used,

- data and/or calculations used,
- relevant industry standards, policies, regulations, and legislations,
- any environmental and sustainability concerns
- project outcomes
- conclusions

The apprentice must prepare a technical project report with appendices of supporting evidence relating to the technical project. The technical project report and all appendices of supporting evidence directly demonstrating performance of KSBs must be attributable to the apprentice in full. Evidence must be accompanied by a witness statement outlining the apprentice's contribution, signed by the apprentice and their employer thereby authenticating it.

Example appendices of supporting evidence may include:

- plans
- diagrams
- calculations
- designs
- feedback
- video clips

This list is not definitive and other evidence sources apart from self-reflection are permissible.

Delivery

Apprentices must submit a technical project report to their EPAO within 6 working weeks of the technical project brief being issued by the EPAO at Gateway.

The technical project report must be 2,500 words +/-10%. Appendices, references, diagrams etc will not be included in this total. The project must map, in an appendix, how it evidences the relevant KSBs for this assessment method.

The apprentice should complete their technical project report unaided. When the technical project report is submitted, the apprentice and their employer must verify that the submitted project is the apprentice's own work.

The technical project report will be reviewed and assessed by two independent assessors.

Two independent assessors must holistically assess all components of the technical project, in-line with the independent assessor requirements set out in this plan. They will have equal responsibility in grading the assessment. The use of two independent assessors will enable the provision of balance to assessment, to bring in greater breadth and depth of technical expertise to questioning and discussion with the apprentice, elucidating more accurate grading decisions. The use of two assessors will also allow the apprentice to apply for professional registration on completion of the apprenticeship.

In the event that the two independent assessors cannot agree on whether to grade the technical project report and presentation with a pass, fail or distinction, the EPAO is required to moderate in accordance with their moderation procedures. The EPAO will then make the final decision on the grade to award based on the assessment evidence presented.

This process must adhere to all the parameters defined within the roles/responsibilities and IQA section of this assessment plan, particularly with regard to the independence and occupational competence requirements of anyone making assessment judgements. Outcomes from this process will inform future standardisation activity.

Following submission of the technical project report, the EPAO will inform and confirm with the apprentice the date for the formal presentation with questioning. Independent assessors will be given sufficient time after submission to review the technical project report prior to the presentation with questioning. The formal presentation with questioning will be carried out within 6 working weeks from the date the technical project report is submitted to the EPAO.

Method 1 Component 2: Presentation and questioning

Overview

Apprentices will prepare and deliver a presentation based on the technical project report that appropriately covers the KSBs assigned to assessment method 1. The presentation will be created and submitted by the apprentice alongside the technical project report.

The presentation will cover the following as a minimum:

- a summary of the technical project report
- an explanation of how and why specific techniques and criteria have been selected and applied
- conclusions

The independent assessors will then draw out any further information using questions. EPAOs must develop a question bank of sufficient size to prevent predictability and review them regularly (at least once a year) to ensure the questions they contain are fit for purpose.

Independent assessors must use the question bank as a source for questioning and are expected to use their professional judgement to tailor those questions appropriately. Independent assessors are responsible for generating suitable follow-up questions in line with the EPAO's training and standardisation process. The questions relating to the underpinning KSBs must be varied yet allow assessment of the relevant KSBs.

The presentation will be presented to the independent assessors, either face-to-face or via online video conferencing. If using an online platform, EPAOs must ensure appropriate measures are in place to prevent misrepresentation and ensure the apprentice is not being aided in some way.

The presentation materials must be submitted at the same time as the technical project report to allow the assessors time to review it, saving assessor time in reviewing multiple documents and will allow the generation and collation of questions from both the report and presentation.

Delivery

The presentation with questioning will last for 30 minutes. The assessors have the discretion to increase this time by up to 10% to allow the apprentice to complete their last point.

The presentation will be conducted as follows:

The presentation will typically last 10 minutes and the questioning 20 minutes.

To deliver the presentation, the apprentice can have access to:

- commonly used presentation software
- flip chart
- work products
- videos or other media clips
- interactive demonstrations
- notes
- computer

The above list is not exhaustive and other presentation methods may be permissible where appropriate. Where specialist presentation or technical software is needed by the apprentice, for example, CAD, Revit, or specific engineering analysis software, it is the apprentice's responsibility to specify their chosen equipment and resources for the presentation. The EPAO will check this at the time of submission of the presentation and make arrangements with the apprentice and employer to ensure these are in place for the presentation.

The independent assessors will ask a minimum of 5 questions in total between them at the end of the presentation to ensure KSBs assigned to assessment method 1 are covered in sufficient depth and to allow for relevant grading criteria to be drawn out by the independent assessors. The independent assessors may ask additional follow-up questions to seek clarification where required. Assessment must take place against the knowledge, skills and behaviours listed in the mapping section of this document.

The independent assessors must:

- plan the assessment prior to it taking place
- ensure that the location for the assessment is appropriate
- ensure the presentation and questions take place in a room free from distractions with no other people present except those with prior approval from the EPAO
- ensure any reasonable adjustments are taken into consideration in-line with the EPAO's Reasonable Adjustments Policy
- ensure that the apprentice understands the assessment process, the possible outcomes and how it is graded
- take steps to assist the apprentice to be at ease
- ensure that the grading criteria and relevant documentation are to hand before commencing
- capture an audio record of the presentation and questions
- document the outcomes using the EPAO's standard documentation
- collect any additional presentation materials from the apprentice
- ensure the apprentice is not informed of the outcome of the assessment at this stage
- record the outcome of the assessment and grade before confirming this to the EPAO
- send documentation to the EPAO within the agreed time

The independent assessors will each make a grading decision and then share this with each other. The agreed overall outcome of the grading decision from the technical project report with presentation and

questioning will be reported to the EPAO. The grade will be based on a holistic view of the report, presentation and questioning and calculated using the grading criteria.

In the event that the two independent assessors do not agree on the apprentice's performance and grading, then all assessment evidence must be submitted to the EPAO to moderate. The EPAO will make the final decision on the grade to award. This process must adhere to all the parameters defined within the Roles and Responsibilities, and IQA, sections of this assessment plan, particularly with regard to the independence and occupational competence requirements of anyone making assessment judgements. Outcomes from this process will inform future standardisation activity.

Venue

EPAOs must ensure that the technical project report and presentation and questioning elements are conducted in a suitable controlled environment in any of the following:

- employer's premises
- other suitable venue selected by the EPAO (e.g., a professional institution or training provider)

The venue should be a quiet room, free from distraction and external influence.

Support material

Support materials must be produced to ensure the report and presentation is assessed consistently and accurately.

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

- standard documentation for recording of assessment results
- marking materials
- question bank
- example questions and guidance documents to facilitate independent assessors to prepare for and carry out their questions.

EPAOs must ensure any reasonable presentation requirements are in place e.g., IT with presentation facilities.

Independent assessors must be developed and trained in the conduct of questioning and answers, and reaching consistent judgement, by their EPAO. The independent assessors must use the assessment tools and procedures that are set by the EPAO to record the presentation with questioning.

Apprentices may not need to complete a different project where a re-sit/re-take is required but may need to either re-work their project report and/or presentation. Apprentices must be asked different questions in the case of a re-sit or re-take.

Assessment Method 2: Professional discussion underpinned by portfolio

This assessment method has 1 component.

Overview

A professional discussion is a two-way discussion which involves both the independent assessors and the apprentice actively listening and participating in a formal conversation. It gives the apprentice the opportunity to make detailed and proactive contributions to confirm their competency across the KSBs mapped to this method.

The rationale for this assessment method is:

The professional discussion is a valid method to assess those KSBs that are not likely to occur in the technical project report. Building services engineering technicians will be expected to be able to discuss their portfolio, where evidence and results of work-based tasks or projects carried out as part of their apprenticeship, can be used to underpin assessment in a formal setting and where apprentices' will be able to explain in detail their work.

The professional discussion will be underpinned by the portfolio submitted at gateway. EPAOs will receive a copy of the portfolio at the gateway to provide sufficient time for the independent assessors to review its content. The independent assessors must have a minimum of 3 working weeks from the date of submission to review the portfolio in advance of the professional discussion in order to prepare appropriate questions.

Delivery

Two independent assessors will conduct and assess the professional discussion.

Two independent assessors must holistically assess all components of the professional discussion, in-line with the independent assessor requirements set out in this plan. They will have equal responsibility in grading the assessment. The use of two independent assessors will enable the provision of balance to assessment, to bring in greater breadth and depth of technical expertise to questioning and discussion with the apprentice, elucidating more accurate grading decisions. The use of two assessors will also allow the apprentice to apply for professional registration on completion of the apprenticeship.

In the event that the two independent assessors do not agree on whether to grade the professional discussion with a pass, fail or distinction, the EPAO is required to moderate. The EPAO will then make the final decision on the grade to award.

The professional discussion must last for 40 minutes. The independent assessors have the discretion to increase the time of the professional discussion by up to 10% to allow the apprentice to complete their last answer. Further time may be granted for apprentices with appropriate needs, in-line with the EPAO's reasonable adjustments policy.

During the professional discussion, the 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 in line with the EPAO's training and standardisation process.

The independent assessors will ask a minimum of 4 open questions between them during the professional discussion and may ask follow-up questions to seek clarification where required.

Assessment must take place against the knowledge, skills and behaviours assigned to this assessment method, which are listed in the mapping section of this document.

The purpose of the professional discussion is to:

- clarify any questions the independent assessors have from their review of the portfolio
- explore aspects of the work, including how it was carried out, in more detail
- require the apprentice to draw on their portfolio evidence to demonstrate the KSBs

Requirements:

- apprentices must receive appropriate notice of their professional discussion time. There should be a minimum of 3 working-weeks' notice of the time, date and venue.
- EPAOs must structure their discussion around the following four areas, covering the KSBs to be tested as detailed in the KSB mapping section of this document. These areas are:
 - using technical software to present building services engineering information
 - contributing to building services engineering project management
 - health, safety and welfare
 - personal and professional practice
- independent assessors must assess the professional discussion using the grading descriptors in this document
- video conferencing can be used to conduct the professional discussion, but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided in some way
- apprentices may refer to their portfolio when answering the questions.

The assessors must use the assessment tools and procedures that are set by the EPAO to record the professional discussion.

If the two independent assessors do not agree on an assessment decision, then all assessment evidence must be submitted to the EPAO for a final decision. This process must adhere to all the parameters defined within the Roles/responsibilities and IQA section of this assessment plan, particularly with regard to the independence and occupational competence requirements of anyone making assessment judgements. Outcomes from this process will inform future standardisation activity.

The grading decision for assessment method two will be reported to the EPAO. The grade will be based on a holistic view of the professional discussion and calculated using the grading descriptors.

Venue

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

The professional discussion can take place in any of the following:

- employer's premises
- a suitable venue selected by the EPAO (e.g., a professional institution or a training provider's premises).

Other relevant information

A structured question bank must be developed by EPAOs. The question bank must be of sufficient size to prevent predictability and reviewed regularly (at least once a year) to ensure that it, and its content,

are fit for purpose. The questions relating to the underpinning knowledge, skills and behaviours, 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. Independent assessors must be developed and trained by the EPAO in the conduct of professional discussions and reaching consistent judgement.

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

- standard documentation for recording of assessment results
- sample questions for assessors
- question bank

Weighting of assessment methods

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

Reasonable adjustments

The EPAO must have in place clear and fair arrangements for making reasonable adjustments to the assessment methods for this apprenticeship standard. This should include how an apprentice qualifies for reasonable adjustment 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.

Grading descriptors

Assessment method 1: Technical project with report and presentation with questioning

KSBs	Fail	Pass– all pass criteria must be met	Distinction (in addition to the pass criteria / all distinction statements must also be met)
Use of building services engineering technical knowledge and techniques (K1, K2, S1)	Does not meet pass criteria	Applies appropriate principles, technical knowledge and techniques to the problem outlined in the technical project brief. (K1, K2, S1)	Evaluates the methods and techniques used in the technical project based upon the principles and regulations that underpin them. (K2, S1)
Data collection and analysis (K3, S2, B3)	Does not meet pass criteria	Collects and analyses data accurately using appropriate techniques and methods and presents a valid interpretation of the analysis. (S2, K3, B3)	Validates the evidence and assumptions underpinning the data analysis used in the technical project. (S2)

Industry standards, policies, and regulatory requirements (K6, K7, K8, S5, S6, S8)	Does not meet pass criteria	<p>Applies relevant statutory and regulatory requirements, industry standards, policies, guidance, procedures and legislation to the technical project solution presented. (K6, S5)</p> <p>Consider equality, diversity, and inclusion in the delivery of building services engineering projects (K8, S8)</p> <p>Apply principles of sustainable development, environmental policies and legislations in building services engineering projects, recognising the need to reduce carbon use, lower emissions, and plan for wider sustainability (K7, S6)</p>	Evaluates the industry standards or guidance related to their project solution. (S5, S6, S8)
Communication (K10, S10)	Does not meet pass criteria	Uses appropriate communication techniques and methods for all project outcomes, incorporating relevant and appropriate terminology accurately (K10, S10)	

Assessment method 2: Professional discussion (underpinned by portfolio)

KSBs	Fail	Pass– all pass criteria must be met	Distinction (in addition to the pass criteria / all distinction statements must also be met)
Using technical software to present building services engineering information (K4, S3)	Does not meet pass criteria	Explains how they effectively use technical software to produce and present building services engineering solutions. (K4, S3)	Evaluates the suitability of different software options and their use in building services engineering solutions. (S3)
Contributing to Project Management	Does not meet pass criteria	Explains how they effectively manage their own work within project parameters, including the application of quality and	Evaluates how their application of quality assurance techniques contributes to continuous improvements. (S7, S9)

(K9, S7, S9, B2)		information management and assurance processes and document control. (K9, S7, S9, B2)	
Health, Safety and Welfare (K5, S4, B1)	Does not meet pass criteria	Describes how they comply with health, safety and welfare policies, procedures and regulations, and how they use risk management, in relation to building services engineering project delivery. (K5, S4, B1)	
Personal and Professional Practice (K11, K12, S11, S12, B4, B5, B6)	Does not meet pass criteria	<p>Describes the principles, values and standards of a professional engineering technician and explains how they plan, undertake and review their own professional competence to improve performance and maintain working relationships. (K12, S12, B5, B6)</p> <p>Explains how they are motivated when collaborating in teams, offering sensible challenge, reflects on and provides constructive feedback and contributes to discussions (B4)</p> <p>Explains how they apply ethical principles to building services engineering projects, including the secure use of data and information (K11, S11)</p>	Analyses how they use their own performance to inform and improve their own or others' practices. (K12, S12, B5, B6)

Overall EPA grading

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, or distinction.

Independent assessors must individually grade each assessment method, according to the requirements set out in this plan.

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'.

In order to gain an overall EPA 'pass', apprentices must achieve a pass in both assessment methods.

In order to achieve an overall EPA 'distinction', apprentices must achieve a distinction in both assessment methods.

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 – Technical project with report and presentation with questioning	Assessment method 2 – Professional discussion underpinned by portfolio	Overall grading
Fail	Fail	Fail
Pass	Fail	Fail
Fail	Pass	Fail
Fail	Distinction	Fail
Distinction	Fail	Fail
Pass	Pass	Pass
Pass	Distinction	Pass
Distinction	Pass	Pass
Distinction	Distinction	Distinction

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 20% off-the-job training as arranged by the employer and training provider 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

	<ul style="list-style-type: none"> • 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
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., Further or Higher Education Institution), there must be no conflict of interest

	<ul style="list-style-type: none"> • 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) • 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 EPA 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
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

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 have knowledge of the following occupational areas: Building services engineering
- appoint independent assessors who have recent relevant experience of the occupation/sector at least one level above the apprentice gained in the last two years or significant experience of the occupation/sector.
- appoint two independent assessors who are professionally registered members of relevant professional engineering institutions (PEIs) per apprentice candidate
- appoint independent assessors who are competent to deliver the end-point assessment
- Independent assessors will be required to:
 - be an Engineering Council registered member of a relevant professional engineering institution (PEI)
 - be professionally active and maintain their CPD record annually
 - complete an EPAO induction to demonstrate working knowledge of the apprenticeship standard and assessment methodology
 - have had training from their EPAO in terms of good assessment practice, operating the assessment tools and grading
- operate induction training for independent assessors
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading

- 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
 - 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

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 timescales for either a re-sit or re-take is agreed between the employer and EPAO. A re-sit is typically taken within 4 months of the EPA outcome notification. The timescale for a re-take is dependent on how much further learning is required and is typically taken within 7 months of the EPA outcome notification.

All assessment methods must be taken within a 11-month period, otherwise the entire EPA will need to be re-sat/re-taken (i.e., 4 months typical EPA period plus 4 or 7 months for a re-sit or re-take respectively).

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.

Value for money

Value for money of the EPA will be aided by using at least some of the following practice:

- using an employer's, professional institution's or training provider's premises
- carrying out the presentation with questioning and the professional discussion on the same day
- using IT software and systems that can allow remote assessment

Professional body recognition

This standard aligns with the following professional recognition:

- Engineering Council for Engineering Technician (EngTech)

Mapping of knowledge, skills and behaviours (KSBs)

KSB code	KSB statement	Methods mapped against
Knowledge		
K1	Appropriate engineering principles, underpinned by relevant mathematical, scientific, and technical knowledge and understanding, relating to building services engineering and the construction or manufacturing process	AM 1 / Technical Project
K2	Appropriate building services engineering techniques and methods used to design, install, commission, maintain or operate buildings and infrastructure, the standards, contracts, and specifications used, and their impact on the construction or manufacturing process	AM 1 / Technical Project
K3	Key principles, techniques and methods of data and technical information collection, analysis and evaluation used in delivering building services engineering models (such as Building Information Modelling), designs, and technical solutions	AM 1 / Technical Project
K4	Technical drawings, designs, and Building Information Models, using computer-based software packages, such as Computer Aided Design (CAD) or modelling software (Revit), and their use in the sector	AM 2 / Professional Discussion
K5	Statutory health, safety and welfare policies, procedures, and regulations, including risk management, in relation to building services engineering project delivery	AM 2 / Professional Discussion
K6	Industry policies, standards, regulations and legislations (such as Building Safety legislation), and codes of practice (such as Common Safety Method (CSM) and Construction Design and Management (CDM)), that must be adhered to in the building services engineering environment	AM 1 / Technical Project
K7	Principles of sustainable development, including those relating to United Nations Sustainable Development Goals (UNSDG) and net-zero carbon emissions, environmental policies and legislations, the climate change act, and their impact on the design, delivery, and maintenance of building services engineering projects	AM 1 / Technical Project
K8	Understanding of equality, diversity and inclusion, and its impact on building services engineering solutions	AM 1 / Technical Project
K9	Project management, including quality and information management and assurance systems and continuous improvement processes, as applied to building services engineering	AM 2 / Professional Discussion

K10	Methods of communication and when to use them, including how to write technical reports and present technical information, using appropriate engineering terminology and conventions	AM 1 / Technical Project
K11	Ethical principles as applied to building services engineering and the security of data and information	AM 2 / Professional Discussion
K12	The values and standards by which they maintain their personal, professional, and technical knowledge and skills through initial professional development (IPD) and continuing professional development (CPD)	AM 2 / Professional Discussion
Skills		
S1	Apply appropriate building services engineering principles, techniques, and methods, including mathematical, scientific, and technical know-how, to building services engineering and the construction or manufacturing process	AM 1 / Technical Project
S2	Apply key principles, techniques and methods of data and technical information collection, analysis and evaluation to support the delivery of building services engineering models (such as Building Information Modelling), designs, and technical solutions	AM 1 / Technical Project
S3	Operate computer-based software packages, such as Computer Aided Design (CAD) or modelling software (Revit) to produce and present technical information and documentation with relevant conventions and engineering terminology	AM 2 / Professional Discussion
S4	Apply statutory health, safety and welfare policies, procedures, and regulations in the building services engineering environment, using risk management processes, procedures, and documentation	AM 2 / Professional Discussion
S5	Support and contribute to the production or modification of building services engineering technical solutions in accordance with relevant industry standards, procedures, codes of practice, regulations, and legislation, such as the Building Safety legislation.	AM 1 / Technical Project
S6	Apply principles of sustainable development, including those relating to United Nations Sustainable Development Goals (UNSDG), environmental policies and legislations in building services engineering projects, recognising the need to reduce carbon use, lower emissions, and wider sustainability	AM 1 / Technical Project
S7	Plan, carry out and manage own work in line with quality assurance systems and processes, recognising the wider implications to customer needs, and within cost and resource limitations	AM 2 / Professional Discussion
S8	Consider equality, diversity, and inclusion in the delivery of building services engineering projects	AM 1 / Technical Project

S9	Apply document control processes and procedures using the approved processes, maintaining quality compliance when creating or amending engineering documentation	AM 2 / Professional Discussion
S10	Communicate using appropriate methods for the audience, and incorporate relevant and appropriate terms, standards, and data	AM 1 / Technical Project
S11	Apply ethical principles to building services engineering projects, including the secure use of data and information	AM 2 / Professional Discussion
S12	Plan, undertake and review their own professional competence, regularly updating and reviewing their CPD to improve performance	AM 2 / Professional Discussion
Behaviours		
B1	Complies with health, safety and welfare requirements, industry standards, statutory regulation and legislation, policies, and codes of practice	AM 2 / Professional Discussion
B2	Works independently, operating in a systematic, proactive, and transparent way, using resources effectively to complete tasks, knowing their limitations and when to ask for support or escalate	AM 2 / Professional Discussion
B3	Applies a structured approach to problem solving with attention to detail, accuracy, and diligence	AM 1 / Technical Project
B4	Is motivated when collaborating in teams, offering sensible challenge, reflects on and provides constructive feedback and contributes to discussions	AM 2 / Professional Discussion
B5	Maintains professional and ethical working relationships with internal, external, and connected stakeholders	AM 2 / Professional Discussion
B6	Takes responsibility for their own professional development, seeking opportunities to enhance their knowledge, skills, and experience	AM 2 / Professional Discussion