

End-point assessment plan for Fire Safety Engineer (Degree) apprenticeship standard

Apprenticeship standard number	Apprenticeship standard level	Integrated end-point assessment
ST0859	6	Non-integrated degree

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Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the Fire Safety Engineer (Degree) apprenticeship standard. It is for end-point assessment organisations (EPAOs) who need to know how EPA for this apprenticeship must operate. It will also be of interest to Fire Safety Engineer (Degree) apprentices, their employers and training providers.

Full time apprentices will typically spend 60 months on-programme (before the gateway) working towards the occupational standard, with a minimum of 20% off-the-job training. All apprentices must spend a minimum of 12 months on-programme.

The EPA period should only start, and the EPA be arranged, once the employer is satisfied that the apprentice is deemed to be consistently working at or above the level set out in the occupational standard, all of the pre-requisite gateway requirements for EPA have been met and can be evidenced to an EPAO.

As a gateway requirement and prior to taking the EPA, apprentices must achieve all approved qualifications mandated in the Fire Safety Engineer (Degree) standard.

These are:

- Fire Safety Engineering degree (Bachelor of Engineering accredited by the Engineering Council)

For level 3 apprenticeships and above, apprentices without English and mathematics at level 2 must achieve level 2 prior to taking their EPA.

The EPA must be completed within an EPA period lasting typically 6 month(s), after the EPA gateway.

The EPA consists of 3 discrete assessment methods.

The individual assessment methods will have the following grades:

Assessment method 1: Technical Report

- Pass
- Fail

Assessment method 2: Professional Interview

- Pass
- Fail

Assessment method 3: Exam

- Pass
- Fail

Performance in the EPA will determine the overall apprenticeship standard grade of:

- Pass
- Fail

EPA summary table

On-programme (typically 60 months)	<p>Training to develop the occupation standard's knowledge, skills and behaviours (KSBs).</p> <p>Training towards English and mathematics Level 2, if required</p> <p>Compiling a professional review report (PRR)</p>
End-point assessment gateway	<ul style="list-style-type: none"> • Employer is satisfied the apprentice is consistently working at, or above, the level of the occupational standard. <p>Apprentices must achieve the following approved qualifications mandated in the occupational standard:</p> <ul style="list-style-type: none"> • Fire Safety Engineering degree (Bachelor of Engineering accredited by the Engineering Council) <p>Apprentices must:</p> <ul style="list-style-type: none"> • Submit a professional review report (PRR) to underpin the professional interview <p>The employer must agree the brief of the technical report with the EPAO</p>
End-point assessment (which will typically take 6 months)	<p>Assessment method 1: Technical Report</p> <p>With the following grades:</p> <ul style="list-style-type: none"> • Pass • Fail <p>Assessment method 2: Professional Interview</p> <p>With the following grades:</p> <ul style="list-style-type: none"> • Pass • Fail <p>Assessment method 3: Exam</p> <p>With the following grades:</p> <ul style="list-style-type: none"> • Pass • Fail
Professional recognition	<p>Aligns with recognition by:</p> <ul style="list-style-type: none"> • Associate/Member of Institution of Fire Engineers

Length of end-point assessment period

The EPA will be completed within an EPA period lasting typically of 6 month(s), after the EPA gateway. Any supporting material which underpins an EPA assessment method should be submitted at the EPA gateway period.

If an EPA assessment method is failed, it should be resat/retaken within the EPA period and in-line with the requirements set out in this assessment plan.

Order of assessment methods

The assessment methods can be delivered in any order.

Gateway

The EPA period should only start once the employer is satisfied that the apprentice is consistently working at or above the level set out in the occupational standard, that is to say they are deemed to have achieved occupational competence. 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.

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

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 achieve the following approved qualifications as mandated in the occupational standard:

- Fire Safety Engineering degree (Bachelor of Engineering accredited by the Engineering Council)

For the technical report: The employer must agree the brief of the technical report with the EPAO

For the professional interview: the apprentice will be required to submit a Professional Review Report (PRR) for which the requirements are as follows:

- The format and structure of the PRR must be agreed between the employer and apprentice and will be presented electronically and submitted to the EPAO at the gateway
- Reflective accounts and self-evaluation cannot be included as evidence
- The PRR should contain written accounts of activities that have been completed and referenced against the knowledge, skills and behaviours mapped to this assessment method
- The PRR should typically cover at least 24 months (and at least 400 days of work experience) and the summary should be typically 4,500 words. A PRR should not be less than 3,000 words and not exceed 6,000. While reviewers do not check the word count, less than 3,000 words usually has insufficient evidence and 4,000 to 5,000 should be adequate to provide sufficient evidence.
- The PRR should include a CPD record of a typical minimum of 25 hours per year of the final two years of the apprenticeship.
- The content must be sufficient to evidence the apprentice can apply the knowledge, skills and behaviours required as mapped to assessment method 2 (professional interview).
- The evidence provided must be valid and attributable to the apprentice; the PRR must contain a statement from the employer confirming this.
- The PRR is not directly assessed. It underpins the professional interview and therefore should not be marked by the EPAO for the purpose of EPA. EPAOs should review the PRR of evidence in preparation for the interview but are not required to provide feedback after this review.

For the exam: no specific requirements

Assessment methods

Assessment method 1: Technical Report

Overview

The technical report is compiled after the apprentice has gone through the gateway. All work that the technical report is based on is completed after the apprentice has gone through the gateway.

The technical report should be selected to ensure that it is relevant to the apprentice's role and allows the relevant KSBs to be demonstrated for the EPA.

The rationale for this assessment method is:

The technical report is designed to demonstrate the application of knowledge and skills as would be required in the occupation. The technical report is a significant and complex undertaking and thoroughly tests knowledge and skills. The technical report replicates the approach adopted in the workplace as technical report writing would be used frequently by fire safety engineers. The knowledge and skills mapped to this assessment method would take too long for the end to end process to be observed.

Delivery

Apprentices must produce a technical report during the EPA period. The report must be produced and submitted to the EPAO within a timescale of 8 weeks from the start of the EPA period. The employer will ensure that the apprentice has sufficient time and necessary resources within this period to complete the report. Typically the apprentice will require 60 hours within the 8 week timeframe in which to complete this task.

The report will be produced in response to a brief set by the EPAO, which will be provided to the apprentice at gateway. The brief will consist of 4 questions covering the following areas:

- Fire safety engineering principles
- Risk assessment and safety
- Sound application of science and maths
- Validation of methods

Whilst the briefs should be varied to ensure they do not become predictable, they should have a typical word count of 500 words, and the combination of the four questions should provide the apprentice with the opportunity to demonstrate the following skills:

- The use of modelling software
- The illustration of fire safety engineering solutions to the appropriate level of detail
- Coordinate safety solutions with technical and non-technical people
- Demonstrate proposed solutions are safe

The brief must be selected by the EPAO in conjunction with the apprentice's employer to ensure that it is relevant to their role.

Additionally, the report content must:

- have a total word count of 12,000 words with a tolerance of +/- 10%
- include a validation statement from the employer confirming that it is the apprentice's own work

- include a validation statement confirming the accuracy of the report, signed by two referees (one can be the employer) with at least one registered with the Engineering Council: Eng Tech, IEng or CEng-affiliated. This is required for the professional recognition of the apprenticeship
- not include any self-reflective evidence

Marking

The independent assessor will review and mark the technical report against the KSBs assigned to this method in a timely manner, as determined by the EPAO, and without extending the EPA unnecessarily. Similarly, all quality control processes will also be conducted in a timely manner, as determined by the EPAO.

Supporting material

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

- Marking materials
- Example briefs
- Guidance to apprentices and employers

Assessment method 2: Professional Interview

Overview

This assessment will take the form of a professional interview which must be appropriately structured to draw out the best of the apprentice's competence and excellence and cover the KSBs assigned to this assessment method. Questioning should assess the KSBs assigned to this assessment method and the apprentice may use their PRR to support their responses.

The rationale for this assessment method is:

A professional interview allows for the 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, and is cost-effective. The professional interview also contributes to the application process to the Institution of Fire Engineers.

Delivery

Independent assessors must conduct and assess the interview on a one-to-one basis. The interview must be appropriately structured to allow the apprentice to have the opportunity to demonstrate coverage of the KSBs mapped to this assessment method.

Apprentices will be assessed against the KSBs assigned to this assessment method – as shown in mapping of KSBs.

EPAOs must make arrangements for the interview with the apprentice's employer. The EPAO will ensure the independent assessor has a minimum of 1 week to review the Professional Review Report (PRR) prior to the interview. The EPAO will ensure the apprentice has a minimum of 2 weeks' notice prior to the interview in order to prepare.

The interview must last for 75 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 independent assessor must ask a minimum of 6 open questions. Additional follow up questions are allowed, to seek clarification.

The EPAO must produce a bank of sample questions to assist the independent assessor, but these are for illustration only and the independent assessor should adapt their questions to the apprentice's individual circumstances following a review of their PRR.

Apprentices can refer to and illustrate their answers with evidence from their PRR, however the PRR 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.

The independent assessor must use the assessment tools and procedures that are set by the EPAO to record the interview.

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

Independent assessors will make all grading decisions.

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 interviews and reaching consistent judgement.

Venue

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

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 or another employer's premises

Video conferencing can 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 in some way for example, by using a 360-degree camera.

Support material

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

- guidance for apprentices, employers and training providers that outlines in detail how the interview will operate
- interview question bank. The interview question bank must be of sufficient size to prevent predictability and reviewed regularly (and at least once a year) to ensure that it, and its content, are fit for purpose. It is recommended that questions are developed in consultation with employers of this occupation. EPAOs must maintain the security and confidentiality of their questions when consulting employers
- assessment recording documentation

Assessment method 3: Exam

Overview

An exam is an assessment that consists of a series of questions in which apprentices are asked to provide a response. This assessment will consist of both multiple choice and open response questions.

The rationale for this assessment method is:

The exam allows for the efficient testing of a large amount of knowledge. It allows for flexibility in terms of when, where and how it is taken and does not require independent assessor time, so it reduces cost. It enables the assessment of larger volumes of apprentices to be assessed at the same time.

Delivery

The exam can be:

- computer based
- paper based

It will be split into two separate papers:

- 30 multiple-choice questions covering the knowledge mapped to this assessment method (1 hour)
- 4 open-response questions to enable the demonstration of the skills mapped to this assessment method (2 hours)

The 4 open-response questions will each cover one of the following themes:

- Reviewing and interpreting fire-related information
- Developing fire engineering solutions
- Evaluating fire engineering design options
- Construction fundamentals

The exam papers can be taken in any order. They do not have to be delivered consecutively or on the same day, to provide flexibility to the EPAO. The 30 multiple choice questions are closed book which means that the apprentice cannot refer to reference books or materials.

The 4 open-response questions are open book, with the apprentice allowed to use the materials provided by the EPAO. The EPAO will provide any technical reference documentation required with the paper.

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

The apprentice will be given 10 days' notice from the EPAO of the exam date to provide time to prepare.

Apprentices must take the exam in a suitably controlled environment that is a quiet space, free of distractions and influence, in the presence of an invigilator. The invigilator may be the independent assessor or another external person employed by the EPAO or specialised (proctor) software, if the exam can be taken on-line. The EPAO is required to have an invigilation policy that will set out how the exam 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 exam.

The EPAO is responsible for ensuring the security of testing they administer to ensure the exam remains valid and reliable (this includes any arrangements made using online tools). The EPAO is responsible for verifying the validity of the identity of the person taking the exam.

The EPAO must verify the suitability of the venue for taking the exam and the identity of the person taking the exam.

Marking

Exams 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 question types allow this.

In the multiple choice part of the test, correct answers must be awarded 1 mark. Any incorrect or missing answers must be assigned 0 marks.

In the open response part of the test, candidates must demonstrate meeting the pass requirements detailed within the grading section of this plan.

Question and resources development

Questions must be written by EPAOs and must be relevant to the occupation and employer settings. It is recommended that this be done in consultation with employers of this occupation. EPAOs should also maintain the security and confidentiality of their questions when consulting employers. EPAOs must develop an exam specification and question bank 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.

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

Required supporting material

As a minimum, EPAOs will produce the following material to support this method:

- An exam specification
- question bank
- sample exams and mark schemes
- live exams and mark schemes
- analysis reports which show areas of weakness for completed exams and an invigilation policy
- list of typical technical reference documentation permitted with the open-response questions

Reasonable adjustments

The EPAO must have in place clear and fair arrangements for making reasonable adjustments 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 assessment plan.

Weighting of assessment methods

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

Grading

Assessment method 1: Technical Report

KSBs	Fail	Pass
K1 K2 K8 K17 S1 S4 S5 S6 S13	Does not meet the pass criteria	<p>Uses and evaluates modelling software, including smoke and evacuation models, to present a fire safety engineering solution for concept design and detailed design, demonstrating an understanding of the first principles of fire engineering. (K2, S1, S5)</p> <p>Uses mathematical, scientific and engineering principles, methods and modelling in the critical analysis of fire safety recommendations, identifying issues, hazards and offering alternative solutions, demonstrating proposed solutions are safe. (K1, S4, S13)</p> <p>Demonstrates coordinating fire safety solutions with technical and non-technical people, and how they have adapted technical details to explain concepts and principles without the use of jargon and acronyms. (S6)</p> <p>Analyses the principles of both active and passive groups of fire protection systems and the individual systems within those groups during and after construction. (K8)</p> <p>Evaluates the capabilities and limitations of the fire service and firefighting objectives that may need to be considered during an operational incident, and how building design can facilitate safe and effective fire service intervention and prevention. (K17)</p>

Assessment method 2: Professional Interview

KSBs	Fail	Pass
K11 K13 K14 S2 S3 S8 S11 S12 B1 B2 B3 B4	Does not meet the pass criteria	<p>Explains how they adhere to the UK Engineering Council's code of conduct and ethical principles. (B1)</p> <p>Explains how they manage their own professional development both proactively and in response to feedback, in the development and maintenance of knowledge and competence as a fire safety engineer. (B4, S8)</p> <p>Evaluates how they apply, share and promote good or best practice in the development and/or review of safe, technical solutions to fire safety engineering problems, referencing research techniques used, use and validation of software and data, current and emerging technologies, products and innovations (K11, S2, B3)</p>

		<p>Critically evaluates project management and change management principles, techniques and tools, and how they apply them when contributing to the management of a fire engineering project, including budgeting and organisation of tasks, people and resources, working to agreed quality standards, project programme and budget, within legal, contractual and statutory requirements. (K14, S11)</p> <p>Explains how they communicate articulately and professionally and provides a range of examples of different communication methods and guidance, including how they have effectively adapted the message to suit the intended audience, both inside and outside of the industry. (S3)</p> <p>Explains how they create, maintain and enhance productive internal working relationships, including a contribution to the development of staff including reviewing and appraising performance, in order to meet changing technical and managerial needs within the delivery of fire engineering projects. (K13, S12, B2)</p>
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Assessment method 3: Exam

KSBs	Fail	Pass
K3 K4 K5 K7 K9 K10 K12 K15 K16 K18	Does not meet the pass criteria	In the multiple-choice element of this exam, apprentices must correctly answer a minimum of 25 questions of the 30 available.
K6 S7 S9 S10	Does not meet the pass criteria	<p>In the open-response element of the exam, apprentices must meet all of the following criteria:</p> <p>Identifies the common fire hazards and defects that arise in different methods of construction making specific reference to the construction fundamentals associated with that method. (K6)</p> <p>Reviews and interprets fire-related information by producing a fire safety analysis derived from a range of information sources, such as product certification and test reports, cause and effect information and design detail drawings. (S7)</p> <p>Interprets and applies design and quality standards, including codes of practice and legal and regulatory frameworks, in the development of a fire engineering solution. (S9)</p> <p>Considers various design options, evaluating the impact of fire safety engineering on society and the environment, and in their construction, management and use. Differentiates between varying user needs and requirements. (S10)</p>

Overall EPA grading

All EPA methods must be passed for the EPA to be passed overall.

Performance in the EPA will determine the apprenticeship grade of fail or pass.

There is a grading exemption in place for this apprenticeship, so no grade above pass is available.

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 all the assessment methods.

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

1 – Technical Report	2 – Professional Interview	3 - Exam	Overall grading
Pass	Pass	Pass	Pass
Pass	Pass	Fail	Fail
Pass	Fail	Pass	Fail
Fail	Pass	Pass	Fail

Re-sits and re-takes

Apprentices who fail one or more assessment method 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.

An apprentice who fails one or more assessment methods, and therefore the EPA in the first instance, will be required to re-sit or re-take the failed assessment method(s) only.

If an apprentice fails the technical report they will be required to amend the report in line with the independent assessor's feedback. This feedback will involve listing KSBs not met within the report. The apprentice will then be able to resubmit an amended technical report and an independent assessor will then review the failed KSBs. A maximum of two resubmissions of the technical report are permitted, following which the EPA will be marked as failed. If the apprentice fails the professional interview, they will not have to resubmit a new Professional Review Report. If an apprentice fails one of the test papers in the exam, they will be required to retake/resit the failed test paper only (in line with the requirement to

have a different set of questions). If they fail both test papers in the exam, they will need to retake/resit both test papers (in line with the requirement to have a different set of questions).

The timescales for a re-sit/re-take is agreed between the employer and EPAO. A re-sit is typically taken within four 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 six months of the EPA outcome notification.

All assessment methods must be taken within a six month period, otherwise the entire EPA will need to be re-sat/re-taken.

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"> • work with the training provider (where applicable) to support the apprentice in the workplace to provide the opportunities 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 • select the EPAO • 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 documentations 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

	<ul style="list-style-type: none"> • ensure the apprentice is given sufficient time away from regular duties to prepare for and complete any 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
EPAO	<p>As a minimum, EPAOs should:</p> <ul style="list-style-type: none"> • agree the EPA price • understand the occupational standard • 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 • deliver the EPA as outlined in this EPA plan in a timely manner • where the apprentice is not assessed in the workplace, ensure that the apprentice has access to required resources and liaise with the employer to agree this if necessary • use 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 • conform to the requirements of the nominated external quality assurance provider (EQAP) • conform to the requirements of the Register of End-Point Assessment Organisations (RoEPAO) • deliver induction training for independent assessors, and for invigilators and 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 their 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

	<ul style="list-style-type: none"> request certification via the Apprenticeship Service upon successful achievement of the EPA
Independent assessor	<p>As a minimum, an independent assessor 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 assessment recording documentation provided by the EPAO in a timely manner 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, the training provider 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 apprentices progress during any training provider led on-programme learning advise the employer, upon request, on the apprentice's readiness for EPA

	<ul style="list-style-type: none"> • remain independent from delivery of the EPA. Where the training provider is the EPA (i.e. HEI) there must be procedures in place to mitigate against any conflict of interest
Marker	<p>As a minimum, the marker 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
Invigilators	<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 requirements that EPA organisations must have in place to ensure consistent (reliable) and accurate (valid) assessment decisions. EPA organisations for this EPA must:

- appoint independent assessors who are competent to deliver the end-point assessment and who meet the following minimum requirements:
 - IEng or CEng-registered (fire engineering)
 - Successfully completed an IFE assessor training module
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- have robust quality assurance systems and procedures that support fair, reliable and consistent assessment across the organisation and over time
- operate induction training and standardisation events for independent assessors when they begin working for the EPAO on this standard and before they deliver an updated assessment method for the first time
- ensure independent assessors attend standardisation events on an ongoing basis and at least once per year

Affordability

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

- The option of using an employer's venue for the professional interview and exam
- The use of the employer's venue for the technical report
- The option of using video conferencing for the professional interview
- The possibility of scheduling multiple assessment methods on the same day
- The use of an exam as an assessment method, to assess multiple apprentices at the same time

Professional body recognition

This apprenticeship is designed to prepare successful apprentices to meet the requirements for registration with the Institution of Fire Engineers as Associate/Member (depending on experience).

Mapping of knowledge, skills and behaviours (KSBs)

Assessment method 1: Technical Report

Knowledge
K1 The mathematical, scientific and engineering principles, methods and modelling that contribute and help to develop the design and construction to create a fire safe and sustainable built and natural environment. The analysis and understanding of fire growth and smoke movement, determining the behaviour of materials in fire, the behaviour of structure and people's reaction to fire, as well as limitations that come with different analytical approaches.
K2 Understanding of the first principles of fire engineering including: fire dynamics, smoke dynamics, heat transfer, human behaviour, psychological impact of fire on humans, physiological impacts of fire (tenability), combustion process, products of combustion, structural response.
K8 Principles of both active and passive groups of fire protection systems and the individual systems within both groups. Understanding of the principles to include function and application, cause and effect matrices, cost benefit analysis, interaction between systems, limitations, design freedoms and compensations, their design and use during and after construction.
K17 The capabilities and limitations of the fire service and how building design can facilitate safe and effective fire service intervention. Firefighting objectives that may need to be considered during an operational incident include: firefighter safety; life safety of building users; loss control; business continuity; property and environmental protection.

Skills
S1 Use and evaluate modelling software including smoke and evacuation models.
S4 Demonstrate solutions proposed are safe and the level of safety they provide. Critically analyse prescriptive recommendations and alternative solutions, the use of bench-marking, cost/benefit and sensitivity analysis.
S5 Illustrate/present Fire Safety Engineering solutions to the appropriate level of detail for concept design and detailed design.
S6 Coordinate fire safety solutions with technical and non-technical people.
S13 Apply acquired knowledge to develop and or review fire safety solutions and be able to objectively review, identify issues or offer alternative solutions/opinions including, fire engineered analysis, means of escape calculations, smoke ventilation calculations, heat transfer calculations and hazard identification and fire risk assessments.

Assessment method 2: Professional Interview

Knowledge

K11 A range of research techniques used to develop acceptable and safe solutions to fire engineering problems and the use of current and emerging technologies, products and fire safety data and research. Understanding of the use and validation of software, codes and data gathering to model, evaluate, test, build and manage fire safe buildings with an awareness of limitation of software and data.

K13 Managing teams and developing staff to meet changing technical and managerial needs including reviewing and appraising performance in relation to delivery of fire engineering projects.

K14 The principles and techniques of effective project management to time cost and quality. Utilising change-management techniques and impacts on project design and delivery. Understanding the design and construction stages RIBA, BIM and other PM tools.

Skills

S2 Develop and or review, safe, technical solutions to fire safety engineering problems through the use of research techniques, current and emerging technologies, products and innovations as well as best practice. Examples include: ability to use a range of research methods to collect and analyse data to draw well-founded practical conclusions for implementation, applicable research strategy and methodology, literature searches.

S3 Communicate effectively and provide guidance to others using appropriate language to suit the audience through varying methods: design models, calculations, reports, drawings, specifications, presentations, digital media and discussions with those both inside and outside the industry.

S8 Carry out and record the continuing professional development necessary to maintain and enhance knowledge and competence as a fire safety engineer.

S11 Contribute to the management of the planning, budgeting and organisation of tasks, people and resources for a project, working to agreed quality standards, project programme and budget, within legal, contractual and statutory requirements.

S12 Contribute to effective team working and developing staff to meet changing technical and managerial needs.

Behaviours

B1 Adhere to the UK Engineering Council's code of conduct and ethical principles.

B2 Be conscious of the need to create, maintain and enhance productive working relationships.

B3 Shares good practices/best practice and actively promotes their use.

B4 Take responsibility for personal development, demonstrating commitment to learning and self-improvement and be open to feedback.

Assessment method 3: Exam

Knowledge

K3 Legal and regulatory frameworks, that govern the life cycle of the built environment such as Building Regulations, Construction (Design and Management) Regulations, Regulatory Reform Fire Safety Order.
K4 The differences between regulation, statutory guidance, British and European Standard guidance, and guidance produced by others, e.g. trade bodies.
K5 The application of the regulatory framework affecting the life cycle of the building i.e. from concept design through to occupation and beyond.
K6 Construction fundamentals including what makes a structure, construction methods and construction types. What designers are involved in the design of a structure (e.g. structures and their component parts), how they fundamentally work together as a system, and key design decision drivers (i.e. sustainability, energy, natural lighting etc.). The different fire hazards that arise from different construction methods (modular, mass timber, timber frame, etc). An understanding of common fire safety defects.
K7 Fire performance and material classifications (including reaction to fire, fire resistance and surface spread of flame), the test procedures associated with these and the certification process. Limitations of the tests and the applicability and suitability of the tests for the proposed purpose or function. This will include the difference between direct field of application and extended field of applications and limitation of such assessments.
K9 The principles, techniques and methodologies of risk assessment used to evaluate the impact of fire safety on life, property and environment in the built environment. This includes the importance and limitations of tools used to measure, enhance or protect welfare, health and safety and sustainability.
K10 Management and maintenance requirements for different fire safety strategies, systems and the impact these may have on owners / tenants during the life cycle of the building.
K12 Building life cycle management, using acquired knowledge to understand the impact of their design from a commercial and practical viability viewpoint and demonstrate an awareness of fire safety beyond design into construction and occupation. This includes how fire safety measures are specified, constructed and maintained by others.
K15 Safe systems of work, their management and application.
K16 UK Engineering Council's and other relevant codes of conduct and ethical principles.
K18 The key topics related to sustainable development and how fire safety design methods can impact on these, and where challenges can arise with competing design requirements. Examples include the significance of carbon and climate change; building energy use; material selection; responsible procurement and efficient use of resources during construction; life cycle costing.

Skills

S7 Review and interpret fire related information such as product certification and test reports, cause and effect information and design detail drawings.

S9 Interpret and apply design and quality standards including codes of practice, legal and regulatory frameworks, in the development of fire engineering solutions, Examples include: planning, designing, construction and maintenance of buildings and infrastructure in compliance with current codes, standards and legislation, industry regulations.

S10 When considering design options, evaluate the impact of fire safety engineering on society and the environment taking account of business, client and end user needs in its construction, management and use.