

# End-point assessment plan for radiation protection practitioner apprenticeship standard

Apprenticeship standard number	Apprenticeship standard level	Integrated end-point assessment
ST0775	6	No

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## Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the radiation protection practitioner apprenticeship standard. It explains how EPA for this apprenticeship must operate.

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

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

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

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

- the employer must be content that the apprentice is working at or above the occupational standard
- apprentices must have achieved English and mathematics at Level 2<sup>1</sup>

The EPAO must confirm that all required gateway evidence has been provided and accepted as meeting the gateway requirements. The EPAO is responsible for confirming gateway eligibility. Once this has been confirmed, the EPA period starts.

This EPA should then be completed within an EPA period lasting typically for 6 months.

This EPA consists of 3 discrete assessment methods.

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

### Assessment method 1: Practical assessment with questioning

- fail
- pass
- distinction

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<sup>1</sup> 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.

**Assessment method 2: Project, report and presentation with questioning**

- fail
- pass
- distinction

**Assessment method 3: Professional discussion underpinned by a portfolio**

- fail
- pass

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

- fail
- pass
- merit
- distinction

## EPA summary table

<p><b>On-programme</b> (typically 48 months)</p>	<p>Training to develop the knowledge, skills and behaviours (KSBs) of the occupational standard.</p> <p>Training towards English and mathematics Level 2, if required.</p> <p>Compiling a portfolio of evidence.</p>
<p><b>End-point assessment gateway</b></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 at Level 2.</p> <p>Apprentices must submit a portfolio of evidence to underpin the professional discussion.</p> <p>The EPAO should sign off the project's title and scope to confirm its suitability at the gateway.</p>
<p><b>End-point assessment</b> (typically 6 months)</p>	<p>End-point assessment method 1: Practical assessment with questioning</p> <p>With the following grades:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> <li>• distinction</li> </ul> <p>End-point assessment method 2: Project, report and presentation with questioning</p> <p>With the following grades:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> <li>• distinction</li> </ul> <p>End-point assessment method 3: Professional discussion underpinned by a portfolio</p> <p>With the following grades:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> </ul>

	<p>Overall EPA/apprenticeship graded:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> <li>• merit</li> <li>• distinction</li> </ul>
<p><b>Professional recognition</b></p>	<p>Aligns with recognition by the: Society for Radiological Protection – Incorporated Radiation Professional (IRadP).</p>

## Length of EPA period

The EPA will be completed within an EPA period lasting typically for 6 months, starting when the EPAO has confirmed that all gateway requirements have been met.

## Order of end-point assessment methods

The assessment methods can be delivered in any order.

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

## EPA 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.

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

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

- achieved English and mathematics at Level 2<sup>1</sup>

For the project, report, and presentation with questioning, the EPAO should sign off the project's title and scope to confirm its suitability at the gateway.

The EPAO should provide a source of suggested project titles, such as:

- Introduction into use of a new source of radiation.
- Recommending improvements or modifications to a facility that uses radiation.
- Investigation of a radiation exposure incident (including a determination of any harm and recommendations to prevent reoccurrence).
- Closure/return of a facility that uses/used radiation (record keeping, survey/clearance, decontamination/disposal).

The EPAO should make relevant detailed specifications, to support suggested project titles, available to the apprentice and employer prior to the gateway. The apprentice and employer should select the most appropriate project title by reference to the work available to the apprentice during the EPA period.

For the professional discussion underpinned by a portfolio, the apprentice will be required to submit a portfolio of evidence.

For the practical assessment with questioning, there are no gateway requirements.

**Portfolio of evidence requirements:**

- apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship
  - the portfolio of evidence will typically contain 8 discrete pieces of evidence
  - evidence must be mapped against the KSBs assessed by the professional discussion
  - evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is suggested
  - evidence sources may include:
    - workplace documentation/records, for example workplace policies/procedures, records
    - witness statements
    - annotated photographs
    - video clips (maximum total duration 10 minutes); the apprentice must be in view and identifiable
- This is not a definitive list; other evidence sources are possible.
- it should not include reflective accounts or any methods of self-assessment
  - any employer contributions should focus on direct observation of performance (for example witness statements) rather than opinions
  - the evidence provided must be valid and attributable to the apprentice; the portfolio of evidence must contain a statement from the employer and apprentice confirming this
  - the portfolio of evidence must be submitted to the EPAO at the gateway

The portfolio of evidence is not directly assessed. It underpins the professional discussion and therefore should not be marked by the EPAO. Independent assessors should review the portfolio of examples in preparation for the professional discussion but are not required to provide feedback after their 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.

A technical expert maybe used to assist the EPAO and independent assessor with providing technical support, advice and guidance only. The roles and responsibilities section starting on page 22 outlines the caveats surrounding the use of a technical expert.

The independent assessor will make all grading decisions.

### End-point assessment method 1: Practical assessment with questions

#### Overview

This assessment method has one component.

A practical assessment with questions involves an independent assessor observing an apprentice undertaking a set task or a series of set tasks in a simulated environment and asking questions. The simulated environment must closely relate to the apprentice's natural working environment.

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

The rationale for this assessment method is:

- the practical assessment will facilitate a standardised range of scenarios that will enable the testing of ksbs that will not predictably arise in the workplace
- the scenarios will ensure that the practical assessment reflects the day-to-day work environment as far as is possible to enable the practical demonstration of key competences to be assessed in the most appropriate way
- the ksbs mapped to this assessment method are a key practical part of the job and it is essential that these aspects are seen to be done and not just reported as having been done
- there is no facility to carry out this assessment method remotely as the occupation does not work in that context and to be a true reflection of the occupational context it must be done in a face-to-face environment. this ensures that essential equipment and materials can be to hand to inform the assessment method delivery

#### Delivery

The practical assessment with questions takes 3.5 hours.

The practical assessment with questions may not be split into discrete sections and should therefore be conducted in a single working day.

The practical assessment with questions may not be split, other than to allow comfort breaks as necessary or to allow the apprentice to move from one location to another as required. Where breaks occur, they will not count towards the total assessment time.

EPAOs must manage invigilation of apprentices during breaks in order to maintain security of the assessment in line with their malpractice policy.

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

The independent assessor may observe only one apprentice during this assessment method to ensure quality and rigour.

Apprentices must be provided with information on the tasks they must complete, including the timescales they will be working to before the start of the practical assessment.

The following activities must be observed during the practical assessment, as a practical assessment without these activities would seriously hamper the opportunity for the apprentice to demonstrate occupational competence against the KSBs assigned to this assessment method:

- interpret the brief
- analyse risks
- conduct a testing activity
- report recommendations

During the practical assessment, the apprentice must have the opportunity to demonstrate their:

- equipment choices
- equipment uses
- safe working with respect to radiation and other hazards throughout
- quantification of radiation hazard
- recommendation of response

Ability to adapt to a change in circumstances (through questioning)

- use of documentation

The practical assessment should be conducted in the following way to take account of the occupational context. The EPAO must:

- design the practical assessment accommodating the role and responsibilities of the apprentice and the context in which they operate
- be conducted in a realistic environment appropriate to the scenario and reflective of the apprentice's workplace
- have the option to use radioactive materials in the practical assessment, as required, in line with regulatory constraints

The independent assessor must be unobtrusive whilst conducting the practical assessment.

Questions must be asked. The purpose of the questioning is to explore the underpinning rationale for the approach taken by the apprentice to the scenario tasks. The questioning will also test understanding and application of the KSBs.

The independent assessor must ask a minimum of 4 questions.

They may ask follow-up questions where clarification is required and include “what if” questions.

Those KSBs that the apprentice did not have the opportunity to demonstrate during the practical assessment can instead be covered by questioning, although these should be kept to a minimum.

The evidence observed and responses to questions will be assessed holistically.

The time for questions asked during the practical assessment is included in the overall assessment time.

The independent assessor must use the full time available for questioning to allow the apprentice the opportunity to evidence occupational competence at the highest level available.

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

The independent assessor will make all grading decisions.

### **Assessment location**

Practical assessments take place in a simulated environment under controlled conditions and must be conducted in one of the following locations:

- EPAO’s premises
- employer’s premises of choice

### **Question and resource development**

EPAOs will produce specifications to outline in detail how the practical assessment will operate, what it will cover and what should be assessed. It is recommended that this be done in consultation with employers. EPAOs should put in place measures and procedures to maintain the security and confidentiality of their specifications if employers are consulted. Specifications must be standardised by the EPAO.

EPAOs will create and set open questions to assess KSBs mapped to this assessment method. Each EPAO must develop a question bank of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure the questions they contain are fit for purpose. Independent assessors must use the question bank as a source for questioning and are expected to use their professional judgment to tailor those questions appropriately. Independent assessors are responsible for generating suitable follow-up questions in line with the EPAO’s training and standardisation process. The questions relating to underpinning KSBs must be varied yet allow assessment of the relevant KSBs.

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

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

- independent assessor training materials
- assessment specifications
- grading guidance
- a question bank
- assessment recording documentation

## End-point assessment method 2: Project, report and presentation with questioning

### Overview

A project involves the apprentice completing a significant and defined piece of work that has a real business benefit. The project must be undertaken after the apprentice has gone through the gateway.

The project should be designed to ensure that the apprentice's work meets the needs of the business, is relevant to their role and allows the relevant KSBs to be assessed for the EPA. The employer will ensure it has a real business application and 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 3 components:

- a project
- an outcome component in the form of a report
- presentation with question-and-answer component to ensure the apprentice is assessed against their evidence

The rationale for this assessment method is:

- Radiation protection practitioners are responsible for measuring, collating, analysing and presenting radiation data to a range of stakeholders. The project will address a radiation protection task tailored to the organisational requirements of the apprentice's employer which reflects the normal working practices within the role. As part of the role, they will be expected to complete project reports and the project will reflect the areas their report would cover within their industry. By using this assessment method, the apprentice will be able to demonstrate not only their analytical skills but also their use of varied methods of presenting radiation protection outputs and their ability to distil key radiation data and findings into a presentation.
- The questioning element allows the apprentice an opportunity to provide further detailed evidence to support their demonstration of the mapped KSBs to this method.
- It is a holistic assessment method, allowing the apprentice to demonstrate KSBs in an integrated way

The project will typically take 3 months to complete, and the report writing will typically take 4 weeks thereafter.

The evidence from the project, report and presentation with questions will be assessed holistically.

## Component 1 – Project

### Delivery

Apprentices will conduct a project.

The project may be based on any of the following:

- a specific problem
- a recurring issue
- an idea/opportunity

The EPAO should sign off the project's title and scope to confirm its suitability at the gateway.

The project starts after the apprentice has gone through the gateway. The typical duration of the project should be 3 months.

The employer should ensure the apprentice has sufficient time and the necessary resources, within this period, to plan and undertake the project.

Illustrative project examples are:

- introduction into use of a new source of radiation
- recommending improvements or modifications to a facility that uses radiation
- investigation of a radiation exposure incident (including a determination of any harm and recommendations to prevent reoccurrence)
- closure/return of a facility that uses/used radiation

The project must incorporate the following elements to evidence the mapped skills:

- analyse, interpret and evaluate information and concepts
- problem solve within a regulated area of work
- communication and collaboration with others including specialist and non-specialists
- identify training needs of others
- use IT systems and technologies

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

The independent assessor will review and assess the project holistically together with the other components of this assessment method.

The independent assessor will make all grading decisions.

## Component 2 – Report

### Delivery

The project outcome should be in the form of a report.

As a minimum, all reports must include:

- an introduction
- the scope of the project (including key performance indicators)
- how the outcomes were achieved
- a project plan
- research and findings
- project outcomes
- recommendations and conclusions
- references
- appendix containing mapping of KSBs to the report

The report has a word limit of 5,000. A tolerance of plus or minus 10% is allowed.

Appendices, references, diagrams etc. will not be included in this total. The report must map, in an appendix, how it evidences the relevant KSBs for this assessment method.

The apprentice will write their report and submit it to the EPAO after a maximum of 20 weeks from the gateway.

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

The independent assessor will review and assess the report holistically together with the other components of this assessment method.

## Component 3 – Presentation with questions

### Delivery

A presentation with questions involves an apprentice presenting to an independent assessor, focusing on their project and project report. It will be followed by questioning from the independent assessor.

Apprentices will prepare and deliver a presentation that appropriately covers the KSBs assigned to this method of assessment.

The presentation will focus on the radiation protection activities undertaken including risk mitigation and control measures.

The presentation content will be completed and submitted after the gateway and will be presented to an independent assessor, either face-to-face or via online video conferencing.

To deliver the presentation, the apprentice must have access to audio-visual equipment (if required) that facilitates presentations. The apprentice needs to notify the EPAO at the submission of the presentation of any technical requirements for the presentation component. The apprentice must be given two weeks' notice of the presentation date and the independent assessor must have a minimum of 2 weeks to review the project and presentation prior to the presentation date. The presentation must be submitted alongside the project report.

The apprentice must be given the opportunity to prepare themselves prior to the start of the presentation (uploading presentation, etc.), before the assessment starts.

The presentation must focus on their project and cover:

- background
- summary of what they did
- how they achieved it
- what they concluded - transferable lessons

The presentation with questions will last for 40 minutes. Typically, the presentation will last for 20 minutes and typically the questioning will last for 20 minutes.

The independent assessor has the discretion to increase the time of the presentation with questions by up to 10% to allow the apprentice to complete their last point.

The independent assessor will ask a minimum of 6 open questions at the end of the presentation. They may ask follow-up questions where clarification is required.

The purpose of the questions will be:

- to seek clarification on the report or presentation
- to assess the depth and breadth of knowledge, skills and behaviours
- to assess those KSBs that the apprentice did not have the opportunity to demonstrate during the project, although these should be kept to a minimum

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

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

- IT kit suitable to deliver an electronic presentation
- Video conferencing
- Live streaming

KSBs met and answers to questions, must be recorded by the independent assessor for the quality assurance purposes of the EPAO.

The independent assessor will make all grading decisions.

The evidence from the project: report and presentation with questions will be assessed holistically.

The project, report and presentation with questions must be subject to the EPAO's moderation processes, therefore a moderator may be present during the presentation with questions.

### **Assessment location**

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

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

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

Only the independent assessor will observe the presentation. A representative from the EPAO may be present when necessary for moderation purposes.

### **Question and resource 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 maintain the security and confidentiality of their questions when consulting employers. EPAOs must develop test specifications and question banks of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the questions they contain, are fit for purpose. The specifications, including questions relating to underpinning KSBs, must be varied, yet allow assessment of the relevant KSBs.

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.

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

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

- question bank
- assessment specifications
- independent assessor training materials
- assessment recording documents
- grading guidance

## End-point assessment method 3: Professional discussion underpinned by a portfolio

### Overview

This assessment method has one component.

A professional discussion is a two-way discussion which involves both the independent assessor 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:

A professional discussion is not simply a question-and-answer session but a meaningful, in-depth two-way dialogue between the apprentice and the independent assessor. This provides an opportunity for the apprentice to discuss their reasoning for key decision-making points within their role and relate that experience to the KSBs. A radiation protection practitioner is expected to be able to communicate technical information effectively in a verbal context and so this assessment reflects the requirements of the occupation.

### Delivery

This assessment will take the form of a professional discussion which must be appropriately structured to draw out the best of the apprentice's competence and cover the KSBs assigned to this assessment method.

It will involve questions that will focus on:

- underpinning concepts
- technology and equipment
- legislation and safety principles
- communication and relationships

The independent assessor must ask a minimum of 5 open questions.

The purpose of the questions will be:

- to assess the depth and breadth of knowledge, skills and behaviours mapped to this assessment method

The independent assessors will conduct and assess the professional discussion.

The professional discussion must last for 60 minutes. The independent assessor has the discretion to increase the time of the professional discussion by up to 10% to allow the apprentice to complete their last answer.

The professional discussion will be conducted as follows:

The professional discussion must be appropriately structured to draw out the best of the apprentice's competence and excellence.

The apprentice and the independent assessor will have access to their own copies of the portfolio throughout the professional discussion and both can refer to it as needed; however the portfolio of evidence is not directly assessed.

Independent assessors must be developed and trained in the conduct of professional discussions, how to design their own questions from reviewing portfolio content, and in reaching consistent judgement by their EPAO.

The independent assessor will make notes of the apprentices' response to questions. The professional discussion should be graded fail or pass. The portfolio underpins the professional discussion and will not be assessed or graded. Independent assessors must allocate grades using the grading criteria.

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

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.

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

The independent assessor will make all grading decisions.

### **Assessment location**

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

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

- employers' premises
- EPAO premises
- Online

### **Question and resource development**

Independent assessors are responsible for generating suitable questions in line with the EPAO's training and standardisation process. A question bank must be developed by EPAOs. 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. The question bank must be of sufficient size to prevent predictability and the EPAO must review it regularly (at least once a year) to ensure that it, and its content, are fit for purpose. The questions relating to the underpinning KSBs, must be varied yet allow assessment of the relevant KSBs.

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

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

- question bank
- structured specification

- independent assessor training materials
- assessment recording documents
- grading guidance

## Reasonable adjustments

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

## Weighting of assessment methods

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

## Overall EPA grading

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

Apprentices must gain a pass in 2 methods plus a distinction in the other method to gain a merit overall.

Apprentices must gain a distinction in assessment method one and 2 plus a pass in assessment method 3 to gain a distinction overall.

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 Practical assessment with questioning	Assessment method 2 Project, report and presentation with questioning	Assessment method 3 Professional discussion underpinned by a portfolio	Overall grading
Fail	Fail	Fail	Fail
Fail	Any grade	Any grade	Fail
Any grade	Fail	Any grade	Fail
Any grade	Any grade	Fail	Fail
Pass	Pass	Pass	Pass
Distinction	Pass	Pass	Merit
Pass	Distinction	Pass	Merit
Distinction	Distinction	Pass	Distinction

Any grade = fail, pass, or distinction

## 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.

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

Where assessment method 2 is failed the apprentice will be expected to rework their original project in line with the feedback given by the assessor. Where the rework is considered to be substantial such that more than 50 per cent of the KSBs have not been evidenced sufficiently then the apprentice will be expected to submit a new project.

All assessment methods must be taken within a 6-month period, otherwise the entire EPA will need to be re-sat or re-taken.

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

The overall grade awarded for this apprenticeship standard is not capped, meaning that an apprentice can achieve a maximum EPA grade of distinction if any assessment method needs to be re-sat or re-taken.

## Roles and responsibilities

Role	Responsibility
Apprentice	<p>As a minimum, apprentices should:</p> <ul style="list-style-type: none"> <li>• participate in and complete on-programme training to meet the KSBs as outlined in the occupational standard for a minimum of 12 months</li> <li>• undertake 20% off-the-job training as arranged by the employer and training provider</li> <li>• understand the purpose and importance of EPA</li> <li>• undertake the EPA including meeting all gateway requirements</li> </ul>
Employer	<p>As a minimum, employers should:</p> <ul style="list-style-type: none"> <li>• work with the training provider (where applicable) to support the apprentice in the workplace to provide the opportunities for the apprentice to develop the KSBs</li> <li>• arrange and support a minimum of 20% off-the-job training to be undertaken by the apprentice</li> <li>• decide when the apprentice is working at or above the occupational standard and so is ready for EPA</li> <li>• select the EPAO</li> <li>• ensure that all supporting evidence required at the gateway is submitted in accordance with this EPA plan</li> <li>• remain independent from the delivery of the EPA</li> <li>• 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)</li> <li>• ensure that the EPA is scheduled with the EPAO for a date and time which allow appropriate opportunity for the KSBs to be met</li> <li>• ensure the apprentice is well prepared for the EPA</li> <li>• 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</li> <li>• where the apprentice is assessed in the workplace, ensure that the apprentice has access to the resources used daily</li> </ul>

EPAO	<p>As a minimum, EPAOs should:</p> <ul style="list-style-type: none"> <li>• make all necessary contractual arrangements, including agreeing the price of the EPA</li> <li>• understand the occupational standard</li> <li>• appoint administrators (and invigilators where required) to administer the EPA as appropriate</li> <li>• provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading</li> <li>• provide adequate information, advice and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA</li> <li>• arrange for the EPA to take place, in consultation with the employer</li> <li>• conform to the requirements of this EPA plan and deliver its requirements in a timely manner</li> <li>• 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</li> <li>• 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</li> <li>• 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</li> <li>• conform to the requirements of the nominated external quality assurance provider (EQAP)</li> <li>• conform to the requirements of the Register of End-Point Assessment Organisations (RoEPAO)</li> <li>• deliver induction training for independent assessors, and for invigilators and markers where used</li> <li>• 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)</li> <li>• manage invigilation of apprentices to maintain security of the assessment in line with their malpractice policy</li> <li>• verify the identity of the apprentice being assessed</li> <li>• use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard</li> <li>• request certification via the Apprenticeship Service upon successful achievement of the EPA</li> </ul>
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	<ul style="list-style-type: none"> <li>• develop and produce assessment materials including specifications and marking materials (for example mark schemes, practice materials, training material)</li> <li>• appoint suitably qualified and competent independent assessors</li> <li>• provide details of the independent assessor's name and contact details to the employer</li> <li>• have and apply appropriately an EPA appeals process</li> </ul>
Independent assessor	<p>As a minimum, independent assessors should:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• understand the occupational standard and the requirements of this EPA</li> <li>• have, maintain and be able to evidence up to date knowledge and expertise of the subject matter</li> <li>• deliver the end-point assessment in-line with the EPA plan</li> <li>• comply with the IQA requirements of the EPAO</li> <li>• 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)</li> <li>• attend induction training</li> <li>• 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</li> <li>• assess each assessment method, as determined by the EPA plan, and without extending the EPA unnecessarily.</li> <li>• 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</li> <li>• make all grading decisions</li> <li>• record and report all assessment outcome decisions, for each apprentice, following instructions and using recording documentation provided by the EPAO, in a timely manner.</li> <li>• use language in the development and delivery of the EPA that is appropriate to the level of the occupational standard</li> </ul>
Training provider	<p>As a minimum, training providers should:</p> <ul style="list-style-type: none"> <li>• work with the employer and support the apprentice during the off-the-job training to provide the opportunities to</li> </ul>

	<p>develop the knowledge, skills and behaviours as listed in the occupational standard</p> <ul style="list-style-type: none"> <li>• conduct training covering any knowledge, skill or behaviour requirement agreed as part of the Commitment Statement (often known as the Individual Learning Plan)</li> <li>• monitor the apprentice's progress during any training provider led on-programme learning</li> <li>• advise the employer, upon request, on the apprentice's readiness for EPA</li> <li>• 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</li> </ul>
Technical expert	<p>As a minimum, technical experts should:</p> <ul style="list-style-type: none"> <li>• 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)</li> <li>• provide technical support, advice and guidance such as confirming company policies, procedures, processes, providing context on technical information or on emerging technologies</li> <li>• provide information only at the request of the end-point assessor who has the final say over the assessment and grade awarded not provide information on behalf of the apprentice, ask the apprentice questions or influence the apprentice or the assessment judgement in any way</li> <li>• not amplify or clarify points made by the apprentice</li> </ul>

## 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 recent relevant experience of the occupation/sector gained in the last 5 years or significant experience of the occupation/sector
- appoint independent assessors who are at least full members of relevant professional bodies for example Society of Radiological Protection
- appoint independent assessors who are competent to deliver the endpoint assessment
- operate induction training for independent assessors, markers and invigilators
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- where appropriate:
  - provide ongoing training for markers
  - provide ongoing training for invigilators
- 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

## Value for money

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

- use of technology – for example video conferencing where applicable.
- location – for example use of employer premises.
- making maximum use of each typical 7.5 hour working day
- observation of naturally occurring evidence in the workplace.

## Professional body recognition

This apprenticeship standard is designed to prepare successful apprentices to meet the requirements for registration with the Society for Radiological Protection as an Incorporated Radiation Protection Professional (IRadP).

The experience gained and responsibility held by the apprentice on completion of the apprenticeship standard will either wholly or partially satisfy the requirements for registration with the professional body. For more details on the requirements and application process, please contact the professional body directly.

## Mapping of knowledge, skills and behaviours (KSBs)

Please note, due to the use of skill statement S1 within this occupation, it is mapped to, and must be assessed, in both assessment method 1 and 2.

### Assessment method 1: Practical demonstration with questioning

Knowledge	
K10	Principles of radiation detection and measurement including personal dosimetry and area monitoring.
K11	Principles and methods for the assessment of external and internal radiation exposure.

Skills	
S1	Analyse, interpret and evaluate radiation related information and concepts such as radiation exposure, risks and responses and underpinning data.
S5	Select and use radiation detection and monitoring equipment in line with relevant work instructions.
S6	Obtain and use the relevant sources of data and guidance to support working practices for example, source terms, survey results and manufacturing data.
S7	Evaluate radiation detection and monitoring equipment characteristics to justify its selection for use.

Behaviours	
B5	Adapts and responds to change, adjusting to different conditions, situations or environments for example, emergency or routine situations.

## Assessment method 2: Project with presentation and questioning

Knowledge	
K4	The principles of hazard and risk assessment and the principles of As Low As Reasonably Practicable (ALARP).
K5	Approaches to risk mitigation. For example: engineering controls, administrative procedures, Personal Protective Equipment, training.
K8	Radiation protection quantities and units including application.
K9	Underpinning mathematics such as scientific notation, use of exponentials, unit conversion, use of graphs.
K14	Principles of control of radioactive materials and radiation generators relating to work with radiation including security, storage, movement and accountancy.
K18	Control measures required for the restriction of exposure to radiation.
K19	The application, implementation and security of digital technology within the radiation protection environment.
K20	Communication strategies within a radiation context, including conflict management techniques, and the need to provide individuals with appropriate information.

Skills	
S1	Analyse, interpret and evaluate radiation related information and concepts such as radiation exposure, risks and responses and underpinning data.
S2	Communicate verbally and in writing with specialists and non-specialists at all levels of their organisation.
S3	Interpret, evaluate and comply with regulatory requirements.
S4	Identify adequacy or otherwise of radiation control measures and propose solutions if found to be inadequate.
S8	Identify the radiation training needs of others based on use of radiation in the workplace and according to the context.

S10	Use IT applications and digital technologies for example, to analyse and present data accurately.
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Behaviours	
B1	Develop relationships with clients and other stakeholders. Selecting the right person whom to direct enquires or request support.
B3	Collaborate with others, such as, those working with sources of radiation, project managers and third-party contractors.

### Assessment method 3: Professional discussion underpinned by portfolio

Knowledge	
K1	Underpinning concepts of radiation science. For example: types of electro-magnetic fields, radioactive decay, half-life, the effects of time, distance and shielding.
K2	Underpinning concepts of biology relevant to radiation protection, including the interaction of radiation with matter and the effects of radiation on cells and tissues.
K3	Sources of radiation and their operational use. For example: sealed and unsealed sources; X-ray generators; Lasers, Magnetrons.
K6	Basis of radiation protection standards and principles. For example: epidemiology; justification for use of radiation, optimisation and limitation of radiation exposures.
K7	The UK regulatory framework specific to radiation protection and other relevant health and safety, transportation and environmental protection legislation by reference to occupational, medical and public exposures.
K12	Concepts of radiation emergency planning and emergency response, including Emergency Reference Levels, emergency exposures and countermeasures.
K13	Principles of safety culture and the role of human behaviour including lessons learned from previous radiation incidents both local, national and international.
K15	The role of health and safety advisors employed to advise on radiation protection including those with recognised expert status for example Radiation Protection Advisor and Laser Protection Advisor.

K16	Principles of radioactive waste management and disposal. For example: characterisation and classification of radioactive waste.
K17	Requirements for transportation of radioactive materials.

<b>Skills</b>	
S9	Conduct radiation protection related investigations and audits in line with organisational policy.

<b>Behaviours</b>	
B2	Invests in their own professional and personal development, demonstrating a commitment to continued learning and self-improvement.
B4	Demonstrate proactive approach to safety, instilling safety culture in others and raising concerns at an appropriate level.

## Grading Descriptors

### Assessment method 1: Practical Demonstration with questioning

KSBs	Pass To achieve a pass all pass criteria must be met	Distinction To achieve a distinction all pass and all distinction criteria must be met
<b>Testing</b> K10, K11, S1, S5, S6, S7, B5	<p>Evaluates and interprets given information to determine their approach to the task. Obtains, analyses, and processes data to inform their recommendations. K10, S1, S6</p> <p>Selects equipment and conducts their testing in-line with their organisation's process and procedures. Justifies their choices of equipment and explains how they adapt by responding to change and adjusting to different situations or environments. K11, S5, S7, B5</p>	<p>Critically evaluates the limitations of equipment/work instructions including circumstances that would lead to an alternative choice or method. K10 S5</p> <p>Critically evaluates a range of data sources to determine and explain their relevance in relation to the practical demonstration scenario. S6</p> <p>Critically evaluates their equipment choices, explaining the limitations of that equipment taking consideration of wider competing factors such as quality, cost and the environment. S7</p>
<b>Fail: apprentices will fail where they do not meet the pass criteria</b>		

## Assessment method 2: Project, report with presentation and questioning

KSBs	Pass To achieve a pass all pass criteria must be met	Distinction To achieve a distinction all pass and all distinction criteria must be met
<b>Data</b> K8, K9, K19 S1, S10	Analyses, interprets and evaluates radiation related information, concepts and underpinning data to inform decisions. K8, K9, S1  Uses IT applications and digital technologies for example, to analyse and present data accurately. K19, S10	Validates information using multiple sources. S1  Critically evaluates their approach to the use of digital technologies within the project setting out lessons learned and ideas for improvement.S10
<b>Legislation and safety principles</b> K14 S3	Interprets, evaluates and complies with regulatory requirements and applies principles for safe reliable use, security, storage and movement of radioactive materials and radiation generators. K14, S3	
<b>Communication and Relationships</b> K20 S2, S8 B1	Communicates verbally and in writing with specialist and non-specialists at all levels of their organisation.  Describes how they develop positive relationships with clients and other stakeholders successfully meeting the needs of the project brief. Manages enquiries in-line with organisation's process. Requests support when an enquiry or issue is beyond their role or responsibility. Engages with and communicates using a range of techniques and tools. Pitches	Compares and contrasts alternative approaches to communicating radiation information with specialists and non-specialists within the project. S2

	communications suitable to their audience. K20, S2, B1  Identifies the radiation training needs of others as part of their overall recommendations. S8	Justifies their recommendation of training needs of others, explaining the consequences of not fulfilling those needs. S8
<b>Risk and Mitigation</b> K4, K5, K18 S4 B3	Recommends radiation control measures and proposes solutions to fulfill the project objectives. Collaborates with other stakeholders to ensure wider implications of the project are considered. K4, K5, K18, S4, B3	Critically evaluates their approach to risk mitigation and evaluates potential alternative approaches. Provides reasoned arguments for the approach taken. K5, S4
<b>Fail: apprentices will fail where they do not meet the pass criteria</b>		

### Assessment method 3: Professional discussion underpinned by portfolio

KSBs	Pass To achieve a pass all pass criteria must be met
<b>Underpinning concepts</b> K1, K2  <b>Technology and equipment</b> K3  <b>Legislation and safety principles</b> K6, K7, K12, K13, K15, K16, K17 S9 B4	Evaluates how they conduct radiation protection related investigations explaining: <ul style="list-style-type: none"> <li>• the considerations made with regards to the operating environment</li> <li>• the technical knowledge that underpins their investigative skills for a given scenario</li> <li>• how they adhere to organisational policy</li> <li>• how they determine their recommendations</li> <li>• and how they comply to the UK regulatory framework</li> </ul> K1, K2, K3, K7, S9  Explains the basis of radiation protection standards and principles. For example: epidemiology; justification for use of radiation, optimisation and limitation of radiation exposures. K6  Explains the concepts of radiation emergency planning and emergency response, including Emergency Reference Levels, emergency exposures and countermeasures required for a given scenario. K12

<p><b>Professional Development</b> B2</p>	<p>Explains and evaluates the principles of safety culture and the role of human behaviour including lessons learned from previous radiation incidents both local, national and international. Describes how they demonstrate a proactive approach to safety, instilling safety culture in others and raising concerns at an appropriate level. K13, B4</p> <p>Justifies the importance of the role of health and safety advisors employed to advise on radiation protection including those with recognised expert status for example Radiation Protection Advisor and Laser Protection Advisor. K15</p> <p>Explains the principles of radioactive waste management and disposal. For example: characterisation and classification of radioactive waste. K16</p> <p>Describes the requirements for the transportation of radioactive materials. K17</p> <p>Evaluates how they invest in their own professional and personal development, demonstrating a commitment to continued learning and self-improvement including how their CPD activities have impacted on their practice. B2</p>
<p><b>Fail: apprentices will fail where they do not meet the pass criteria</b></p>	