# ENGINEERING CONSTRUCTION PIPEFITTER

## ASSESSMENT PLAN

## Contents

## 1. Summary of Assessment

The Pipefitter is a vital Engineering Construction role, working within strictly defined processes and procedures to exacting standards.

This often involves working on major infrastructure projects for example, power stations and oil and gas facilities both in the UK and overseas Engineering Construction Industry and can include working in environments with systems that may carry water, steam, food, pharmaceutical, chemicals, gas, hydrocarbons or fuel which may be used in cooling, heating, lubricating and other processes.

This Apprenticeship is designed to operate as the professional standard for people working as an Engineering Construction Pipefitter. Successful achievement of this Apprentice Standard enables the Apprentice to take the next steps in their career as it:

- Demonstrates that the Apprentices are able to competently work as an engineering construction pipefitter,
- Demonstrates to the relevant professional organisation that they have the knowledge and skills necessary to be awarded EngTech Status (if they wish to apply for this).

**Assessment over view**

**On programme content**
**Mandated**
- Skills
- Behaviours
- Knowledge
- Level 3 Diploma in Installing Engineering Construction Plant and Systems
- If not already achieved - English and Maths level 2 (or equivalent)

**Comments**
- Employer assessed, supported by training provider, optional support by awarding organisation.

Typically 0-36 months

**Gateway**
Readiness to enter end point assessment
**Mandated review elements**
- Review of completed portfolio of evidence
- Certified against the level 3 diploma in Installing Engineering Construction Plant and Systems
- Attained English and Maths Level 2 (or equivalent)

Pass/Fail/Resubmit

Typically At the 36 month point

**End Point Assessment**
- Element 1 Knowledge test
- Element 2 Practical test
- Element 3 Structured professional review
- Independent end-point assessment organisation assessed

Fail/Pass/Merit/Distinction

Typically 36-42 months

Once the Apprentice has successfully satisfied all the requirements of the final gateway review they will proceed to the end point assessment (EPA). The EPA will measure the knowledge; skills and behaviours detailed in the Engineering Construction Pipefitter (EC PF) Apprentice Standard and will usually occur in the final 6 months of their Apprentice programme between the 36 – 42 month point.

The EPA consists of 3 individual elements; successful completion of all 3 elements will ensure the Apprentice has attained the necessary knowledge, skills and behaviours to be deemed occupationally competent in the role of EC PF.

## 2. EPA elements

**a.** Knowledge Test – Multiple choice question paper (may be online).
**b.** Practical assessment - A skills based practical exercise.
**c.** Structured professional review – A review panel comprising of 2 assessors from the independent assessment organisation. The panel will be chaired by one of the assessors from the independent assessment organisation.

## 3. Assessment Overview

| Assessment Method | Area Assessed | Assessed by | Grading | Weighting |
|---|---|---|---|---|
| *Knowledge test (may be online)* | *Occupational knowledge as specified in the EC PF standard* | *Independent Assessment Organisation* | *Fail / Pass / Merit / Distinction* | *35%* |
| *Practical assessment* | • *Application of occupational knowledge*<br>• *Application of practical skills*<br>• *Demonstration of behaviours* | *Independent Assessment Organisation* | *Fail / Pass / Merit / Distinction* | *55%* |
| *Structured professional review* | • *Occupational knowledge*<br>• *Evidence of application of skills*<br>• *Evidence of application of behaviours* | *Independent Assessment Organisation* | *Fail / Pass / Merit / Distinction* | *10%* |

## 4. On-programme Assessment – pre gateway delivery requirements

### Mandated Requirements

The on programme assessment will include the following which **must be** completed before being reviewed at final gate way in order to enter EPA:

- Completion of a Level 3 Diploma in Installing Engineering Construction Plant and Systems
- If not already held, English and Maths at Level 2 (or equivalent).

Assessment Gateway

Once the Apprentice has made significant progress in terms of developing the knowledge, skills and behaviours specified in the standard then they are ready to enter the final gateway review. The Apprentice must then satisfy all requirements of the Final gateway review before entering EPA:

- Level 3 Diploma in Installing Engineering Construction Plant and Systems
- If not already achieved - English and Maths level 2 (or equivalent).

Qualifying statements

The judgement on whether the Apprentice progresses onto the EPA will be made by the employer who will be supported by the training provider with optional support from the awarding organisations for the Level 3 Diploma in Installing Engineering Construction Plant and Systems.

The employer must satisfy themselves that the Apprentice:

- Has developed and demonstrated the knowledge, skills and behaviours as specified in the EC PF standard.
- Can successfully demonstrate their ability to work safely and competently as an EC PF.

The Apprentice will progress to EPA once they can demonstrate they have satisfied the on programme requirements and are deemed ready to be presented for EPA.
It is down to the discretion of the employer how many times the Apprentice may be presented for gateway review as they will be privy to the circumstances and capabilities of the individual.

## 5. On programme training and assessment (recommended method):

- During the on programme training and assessment phase it is imperative that the Apprentices development is regularly measured against the knowledge, skills and behaviours detailed within the standard. Apprentice progress should be determined through regular portfolio reviews which should, as a minimum be conducted annually by the employer, supported by the training provider and if required by the awarding organisations. (It is recommended that

informal portfolio reviews are carried out at regular intervals in between annual reviews as decided by the employer/provider).
- The Apprentice should receive formal feedback on their progress towards meeting the specification of the EC Pipefitter standard and being ready and equipped to enter final gateway review in a timely manner.
- The formal feedback should also enable them to recognise their progress and apply additional focus/effort where and when required.

## 6. End-point – Assessment

The EPA assesses the Apprentice's ability to apply the knowledge, skills and behaviours learnt in order to competently perform the role of EC PF. The skills, knowledge, and behaviours required are detailed in the Apprentice standard for EC PF. It is envisaged the EPA process will be undertaken over a 2 day period, the elements can be delivered in any order as long as element 3 (structured review) is delivered last.

Successful achievement of the EPA will lead to final certification of the Apprenticeship and demonstrate that the Apprentice is fully competent in their occupational job role. The EPA utilises the following elements as assessment tools.

Note: See Annex 3 for full breakdown of assessment methods during EPA elements to assess skill, knowledge and behaviours as specified in the Apprentice standard.

## Element 1 – Knowledge test

The purpose of this test is to ensure the Apprentice can demonstrate they have acquired the underpinning knowledge to enable them to perform their job role. To ensure objectivity, the knowledge test will be based on a stem and options approach (multi choice) and delivered in a strictly controlled environment by an assessor from the selected independent assessment organisation. For this element the Apprentice will be awarded a mark out of a 100, this mark will carry a weighting of 35% towards the final score. Further information on how the final score and grading is calculated can be found at figure 2.

The question paper will be in multi choice format and consist of 50 questions. Each question will present the candidate with 4 response answers from which they must select the correct one.

The paper can be delivered online and will be randomly drawn from a data bank consisting of at least 250 questions covering the full range of knowledge requirements in the EC PF standard. The maximum time permitted for the Apprentice to answer the questions is 90 minutes. The questions will be developed by an end point assessment organisation selected from the Register of End Point Assessment Organisations (RoEPAO). As a minimum the question bank will be reviewed annually.

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The knowledge test will allow the Apprentices to demonstrate their understanding of the knowledge requirements as specified in the Engineering Construction Pipefitter Apprentice standard.

## Element 2 - Practical assessment

The primary purpose of this element is to ensure the Apprentice can competently demonstrate the skills, required to perform their job role, however this element will also measure the underpinning knowledge and to a certain extent behaviours required to perform their job role. The practical observed assessment developed by the end point assessment organisation will be delivered in a strictly controlled environment by an assessor from the selected independent assessment organisation. The practical assessment will take 8 hours. The exact duration will be similar to the time expected for a competent pipefitter to complete a similar task. For this element the Apprentice will be awarded a mark out of a 100, this mark will carry a weighting of 55% towards the final score. Further information on how the final score and grading is calculated can be found at figure 2.

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The assessment shall be developed against 3 specifications of comparable complexity, one ofwhich can be selected for the test. The chosen assessment will allow the Apprentice to demonstrate the role skills as well as underpinning knowledge and behavioural requirements as specified in Annex 3.

How the assessment will work.

The assessment will be administered in a strictly controlled test environment and be invigilated by an assessor from the independent assessment organisation. The test will take the form of one holistic pipefitting task where the Apprentice must work to the tolerances and specifications stated in an engineering drawing to fabricate, assemble, install, test and then dismantle a piping assembly. During the test the assessor can question the Apprentice to ascertain the breadth and depth of their underpinning knowledge.

## Element 3 – Structured professional review

The face to face structured professional review takes place after successful completion of the knowledge and practical tests. This means that the review, as well evidencing the demonstration of the behaviours stated in the standard and satisfaction of Eng Tec requirements, can also be used to question the Apprentice on any specific areas that he or she may have failed to effectively demonstrate through either the knowledge or practical test. For this element the Apprentice will be awarded a mark out of a 100, this mark will carry a weighting of 10% towards the final score. Further information on how the final score and grading is calculated can be found at figure 2. This element will review the Apprentices evidence compiled from the work place and recorded in the template evidence report provided by the EPA organisation and ascertain readiness for Eng Tec as described in Annex 1.

Content

The structured professional review will allow the Apprentices to evidence where they have satisfied the requirements against the five UKSPEC areas of competence to register as Eng. Tec (Annex 1); however the focus will be on the role behavioural requirements.

How the structured professional review will work

The structured professional review will be administered in accordance with the assessment organisation's processes. The structured professional review is led by an independent assessor from the assessment organisation and there are a minimum of two independent assessors on the panel. Whilst meeting the general assessor criteria, at least one of the assessors should be occupationally competent to a minimum of level 3 in pipefitting or a related engineering discipline or be able to provide evidence of occupationally relevant experience. **The presence of a representative from the Apprentice's training provision organisation or their employer on the panel is not permitted.**

The structured professional review is designed to enable the Apprentice to demonstrate how they have, met UK Spec requirements for Eng Tec and combined their skills, technical knowledge and behaviours in order to carry out their occupational role effectively and safely. The Apprentice should expect to discuss evidence of their work as recorded in the evidence report (described in the following paragraph) compiled from job related tasks so the panel can ascertain the Apprentice's role in completing the work and what, if any barriers they overcame etc. It is a rigorous review and should assess the Apprentice's readiness to:

- Work as an Engineering Construction Pipefitter
- Submit for Professional Registration at Eng Tech level if they so desire.

In advance of the review the Apprentice will receive information about how the structured professional review will work and a template evidence report that they will be asked to complete and submit to the independent assessment organisation in advance of the review. The Apprentice will be given 2 months to complete the template evidence report. In this template evidence report it is expected that the Apprentice will identify and expand on examples of evidence of application of the skills, technical knowledge and behaviours (typically drawn from at least 3 examples of completed pipefitting tasks) in the workplace taking into account the content of the EC PF standard and the UK Spec for Eng Tec. The panel should have, either the results, or if this is not possible written feedback from the assessors relating to the Apprentice's performance during elements 1 & 2.

A copy of this template evidence report is retained by the review panel as evidence that the Apprentice:

- Understands the required standards of workplace performance and behaviours.
- Has reflected on his/her learning and can identify how their performance meets the standard.
- Has met the content of the UK Spec for Eng Tec.

The structured professional review is designed to allow the Apprentice to present evidence of their own competence in order to demonstrate their role related skills, knowledge and behaviours by discussing the evidence and showing how it relates in context to the requirements of the Standard i.e. how it relates to carrying out their occupational role effectively. The discussion based approach is important as it enables consideration of how the Apprentice has performed, and also their analytical reasoning and decision-making abilities.

The structured professional review would be expected to last 90 minutes and will consist of a professional discussion and behavioural questions which will be recorded on the associated review panel record. The records will be filled out during the review and then retained by the panel.

To ensure this assessment is consistent, the panel will be given the following panel templates developed by the independent assessment organisation:

1. An evidence record showing where the content of the Apprentice standard and UK Spec for Eng Tec has been met as well where the Apprentice has met the standards behavioural elements and the knowledge and skill elements.
2. Marking guide for the review.
3. A record showing which behavioural questions (Annex 2) were asked and the responses received.

The Independent assessment organisation should also develop a structure for how the grading will work along with related guidance on how the reviewers should assess the Apprentice during the review so that they are able to award a fail/pass/merit or distinction.

General guidance for all EPA elements

A candidate must pass all three elements in order to achieve their EC PF Apprenticeship. All EPA's must be carried out by an Assessment Organisation registered on the Education and Skills Funding Agency's Register of End Point Assessment Organisations (RoEPAO) in a suitable assessment centre environment. It is expected that all assessors will be occupationally competent to a minimum of level 3 in pipefitting or a related engineering discipline or be able to provide evidence of occupationally relevant experience. Assessor qualifications are desirable but as minimum assessors will have demonstrable experience of undertaking assessments. It is incumbent on the independent assessment organisation to ensure, where possible Apprentices requiring EPA are aggregated to ensure economies of scale are realised ensuring best value for money is achieved for employers and ensuring accessibility for all employers regardless of size. All of the EPA elements will be administered in accordance with the Assessment organisation's processes to ensure the assessments:

- Are objective – the same scores can be consistently awarded by different people administering the assessment.
- Are valid - the assessment measures what it is meant to measure due to its content and the method of assessment.
- Are reliable – the assessments can be administered by different assessors in different locations without losing any consistency either in learner experience or marking criteria.
- Allow for differentiation between candidates performance to enable accurate individual grades to be established.

It is recommended that the EPA cohort sizes be capped at 6-8, this will ensure the individually assessed elements are manageable allowing the correct assessor to delegate ratio.

Independent assessment organisations are required to develop an appropriate assessment model which is valid, reliable and objective. The criteria and exemplars for assessing pass, fail or distinction will be developed by independent assessment organisations. The independent assessment organisations will also develop appropriate marking schemes which enable effective grading and determines the difference in levels between fail, pass, merit or distinction using the recommended criteria, grades and weighting (figures 1& 2 refer) to work out the final grade mathematically. Whilst not mandated, working closely with employers during the development of assessment models is encouraged.

## 7. End-point – final judgement

The elements of the EPA can be delivered in any order as long as the structured professional review is delivered last. Should an Apprentice fail a specific element of the EPA they will not progress onto the next element and will be withdrawn from the EPA process. They will receive full and comprehensive feedback from the independent assessment organisation so a recovery plan can be agreed and implemented when they are back with their employer. The Apprentice will only have to retake the element of the EPA they failed, they may not retake the failed element before one calendar month has elapsed and regardless of the score attained will only be awarded a pass on successful completion of the retaken element.

The final decision on the grade awarded to the Apprentice is made by the independent assessment organisation. The decision will be based on the outcome of all 3 elements of the EPA. On completion of the last element of the EPA – the structured review, the panel Chair (from the independent assessment organisation) together with the other panel assessor will award the Apprentice with an overall grade using marks and grades obtained from the 3 elements of the EPA and applied against the relevant elements weighting score at figure 2.

If after the structured professional review, the review panel is divided in their opinion regarding whether or not an Apprentice has passed the final element of the EPA, the Chair of the panel will make the final decision. The overall decision must be conveyed verbally on the day to the Apprentice and if possible their employer, followed by formal notification as soon as possible. Should there be dispute between the Apprentice, and the EPA panel an appeal and complaints process can be executed accordingly.

## 8. Independence

Objectivity and independence are crucial when using any test instruments. To ensure the EPA is fair, objective and independent to any of the training and assessments delivered on programme, the EPA will be administered and assessed by assessors from independent assessment organisations that are registered on the Education and Skills Funding Agency Register of End Point Assessment Organisations (RoEPAO). The End-point assessment organisation must, regardless of the type, size, location or nature of the Apprentices employer, ensure the EPA is valid, reliable, and objective and allows for differentiation between candidates performance when grading.

## 9. End-point – Summary of roles and responsibilities

| Assessor | Role |
|---|---|
| Employer | • Ensure the Apprentice is ready for EPA through dialogue with the Apprentice, their line manager and the training provider.<br>• Ensure the Apprentice can attend the EPA and is prepared for the structured professional review in terms of collating any required evidence.<br>• Provides support and guidance to the Apprentice before, during and if required after the EPA.<br>• Liaise with the independent assessment organisation in terms of Apprentice feedback and recovery plans if required. |
| Training Provider | • Ensure the Apprentice is ready for EPA through dialogue with the Apprentice and their line manager/mentor.<br>• Helps ensure the Apprentice is prepared for the professional structured review in terms of collating any required evidence.<br>• Provides support and guidance to the Apprentice before, and if required after the EPA.<br>• |
| Assessment Organisation | • Works with employers to ensure the EPA is available, accessible and cost effective.<br>• Are registered on the RoEPAO and meet the employer requirements<br>• Develops the tools required for each element of the EPA.<br>• Works with the employer user group to ensure the assessments tools for each of the 3 elements of the EPA are: reliable, valid, objective and allow for differentiation between candidates performance.<br>• Administer and the grade the EPA.<br>• Administer an EPA complaints, appeals and feedback for referrals procedure.<br>• If required, liaise with the training provider. |

## 10. Quality Assurance

### Quality Assurance Internal

To ensure internal quality assurance requirements are met independent assessment organisations must satisfy the following requirements:

1. Demonstrate the capability to identify, quality assure and use assessors that meet the requirements detailed in Annex 2.
2. Develop compensatory assessment for learners with special requirements to allow reasonable adjustments to be made to assess the knowledge, skills and competence of the apprentice through alternative assessment techniques. Whilst, these will remove barriers to participation, they must be designed to ensure judgements are not compromised to health and safety and legal requirements.
3. Develop the knowledge and practical assessments required to meet the needs of the role. Assessment organisations must consult with representative technical experts when developing the assessments and the tools necessary to deliver these assessments. Assessment organisations must ensure that there is consistency and comparability in terms of the breadth and depth of each knowledge assessment, to ensure assessments are reliable, robust and valid and ensure competency accord across the industry.
4. Develop the documentation required for the structured professional review.

5. Provide evidence of an internal quality management system and quality control procedures.
6. Develop an assessment strategy and range of assessment tools that permit valid, reliable and objective assessment and allow for the differentiation between candidates performance to enable accurate grading of Apprentices.
7. Provide systematic training for independent assessors on the content and delivery of all 3 elements of the EPA, applying the grading and how to report and communicate the final grading decisions.
8. Develop and manage an EPA complaints, appeals and feedback for referrals procedure.
9. Hold as minimum, bi-annual standardisation events for independent assessors, technical experts and panel members to ensure consistent application of the assessment guidance.
10. Ensure assessment organisation staff are trained in assessment and moderation processes and undertake regular continuing professional development.
11. Commit to resource, as a minimum an annual standardisation meeting for assessors including but not limited to sector experts.

The Independent Assessment Organisation must maintain a register of independent assessors for the End-point assessment and commit to ensuring that the independent assessors are competent to undertake the role they provide in the End-point assessment. The assessors must receive training to ensure they assess the Apprentices against the requirements of the Apprentice Standard in a consistent manner. The following recommendations are made as a basis for the selection of suitable independent assessors:

- Be independent from the Apprentice they are assessing i.e. not their trainer, assessor or line manager.
- Have played no direct part in the Apprentice's on programme training and assessment.
- Have relevant experience in teaching/training/reviewing, assessor qualifications are desirable but as minimum assessors will have demonstrable experience of undertaking assessments.
- Have good interpersonal skills.
- Have effective communication skills.
- Have a thorough technical knowledge of what constitutes effective performance and good working practices in the occupational context.
- Are technically knowledgeable in Engineering Construction Pipefitting, ideally with an appropriate technical qualification, relevant Vocational Qualification or industry accepted equivalent discipline qualification or equivalent technical experience.
- Understand and be familiar with the Engineering Technician UK spec and the evidence requirements to meet the EngTech (engineering technician (UK spec)) criteria.

**Quality Assurance - External**

External quality assurance for this apprenticeship standard will be managed by the Engineering Construction Industry Training Board.

## 11. End-point – Grading

The individual elements of the EPA are awarded a percentile mark out of 100; the marking guide (fig 1) represents the individual grade descriptors.

For the avoidance of doubt the following terms used in grading descriptors refer to the following:

**Apprentice standard** – this is the 2 page Engineering Construction Pipefitter standard which articulates the high order occupational skills, knowledge and behaviours required in an occupationally competent pipefitter and which must be demonstrated during EPA.

**Specified** – in the context of the grading descriptors, this term refers to working to specified levels of tolerance/dimensional accuracy as laid down in engineering specifications the Apprentices will be working against.

| Fig 1: Assessment Grading Statements | | | |
|---|---|---|---|
| Knowledge assessment. 50 question paper. Delegates awarded a percentile mark. | **Distinction - 85% and above** | | |
| | **Merit 70% - 84%** | | |
| | **Pass 60% - 69%** | | |
| | **Fail Less Than 60%** | | |
| Practical Observation | | | |
| **Fail - Fails to satisfy the content of the Engineering Construction Pipefitter standard.** | **Pass - The pipefitter satisfies the content of the Apprentice standard.** | **Merit - builds upon the requirements of the pass criteria and in addition:** | **Distinction - builds upon the requirements of the pass and merit criteria and in addition:** |
| Fails to satisfy the content of the Engineering Construction Pipefitter standard. | • Satisfies the health and safety requirements during the planning, execution and recovery of any allocated tasks.<br>• Applies pipefitting skills, knowledge and behaviours in the workplace to the specified standard.<br>• Is able to meet the required levels of accuracy whilst working against engineering specifications, able to select appropriate tools and techniques to execute given Pipefitting tasks in accordance with stated | • Occasionally exceeds requirements, will endeavour to identify and proffer improvement suggestions.<br>• Occasionally exceeds standards, able to identify issues and resolve them as and when they occur.<br>• Consistently meets and occasionally exceeds the required levels of accuracy, may offer suggestions for continuous improvement when prompted. | • Goes above and beyond the requirements and consistently identifies and proffers improvement suggestions.<br>• Consistently exceeds the required standard, identifies issues and resolves them before they occur.<br>• Consistently exceeds the specified levels of accuracy. Will consistently seek to continuously improve methods and means of executing given pipefitting tasks. |

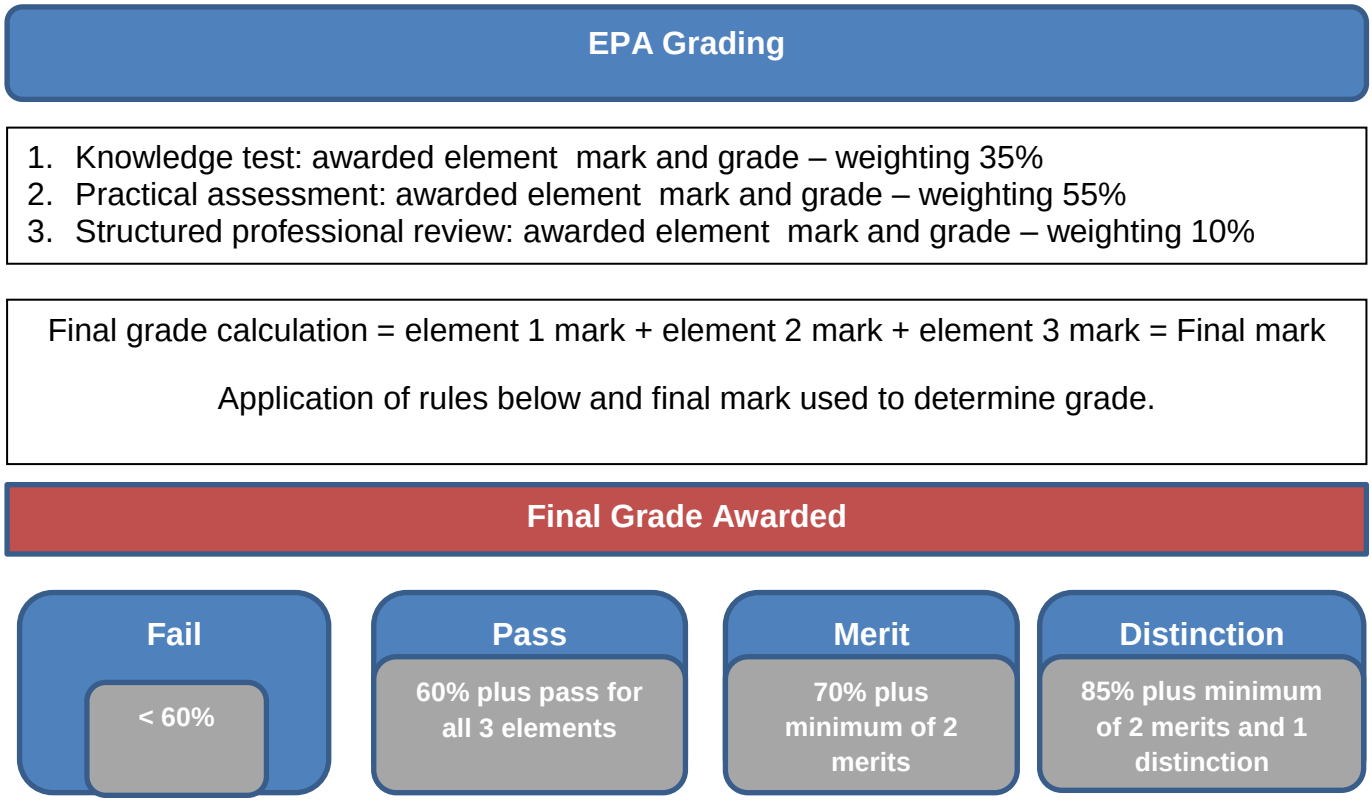
| | | | |
|---|---|---|---|
| | tolerances and to stated specifications.<br><br>• Understanding and practical application of Pipefitting and related engineering first principles meets the standard.<br><br>• Is able to work well within teams.<br><br>• Requires minimum supervision with practical tasks and meets the requirements of the standard. | • Displays comprehensive command across the full range of role knowledge requirements, when prompted applies this to problem solve and improve quality of own work.<br><br>• Through comprehensive communication skills, positive team working, accurate reporting and application of initiative able to align with the team dynamics and help support improvement of workplace efficiency.<br><br>• Works unsupervised, seeks more responsibility when prompted and sometimes finds time to help and assist others. Shows some of the attributes required for progression into higher and more technically demanding roles once more experienced. | • Full command of first principles autonomously applies this in order to problem solve and improve quality of own work and overall process.<br><br>• Supports productivity through encouraging conflict free and fully aligned teams. Seen as a source of advice and guidance by peers.<br><br>• Consistently seeks more responsibility and consistently helps and assist others. Already shows potential for progression. |
| Structured Professional Review | | | |
| **Fail - Fails to satisfy the content of the Engineering Construction Pipefitter standard.** | **Pass - The pipefitter satisfies the content of the Apprentice standard.** | **Merit - builds upon the requirements of the pass criteria and in addition:** | **Distinction - builds upon the requirements of the pass and merit criteria and in addition:** |

| | | | |
|---|---|---|---|
| Fails to satisfy the content of the Engineering Construction Pipefitter standard. | • Recognises the importance of, and can explain the reasons why health, safety, environmental and pipefitting related rules, legislation and regulations are vital.<br><br>• Can evidence where engineering first principles and techniques required for pipefitting have been practically applied in the work place to successfully complete allocated pipefitting tasks.<br><br>• Aware of the importance of own work and, when questioned can articulate where their work contributes to the objectives of their employer.<br><br>• Provides correct information when questioned on a range of common fault diagnosis techniques related to pipefitting tasks.<br><br>• Provides evidence demonstrating where the Pipefitting skills, knowledge and behaviours as described in the standard have been practically applied to identify and rectify faults. | • Can explain instances where they have raised concerns and can describe their subsequent actions.<br><br>• Can explain the engineering first principles and techniques. Can explain the roles and responsibilities of allied trades and explains where the work of these trades will impact upon their tasks.<br><br>• Able to articulate where their work contributes to the overall commercial aims and objectives of the customer.<br>• Can describe a range of common fault diagnosis techniques and recognises where these are best applied.<br><br>• Can justify why the specific techniques was selected to identify and rectify faults.<br><br>• Provides evidence of instances where they may have been exposed | • Able to show instances where they have been able to proffer or implement improvements to work place safety and explain why these improvements have been successful.<br><br>• Can explain in detail the technical specialisms of allied trades and explain where the work of these trades will impact upon their tasks and what steps need to be taken to ensure de-confliction.<br><br>• Recognises the overall impact of them not working to the standard.<br><br>• Contrasts the strengths and weaknesses of common fault diagnosis techniques.<br><br>• Explains their actions and describes what other options may have been available and why these were not deemed suitable or pursued. |

| | | | |
|---|---|---|---|
| | • Able to explain the importance of conforming to the work place behaviours articulated in the standard. Fully aware of the implications of deviating from these behaviours.<br><br>• Fully understands the content of engineering specifications used in their work based activities and how they are applied.<br><br>• Can explain the importance of productive team working. | to unsafe/undesirable behaviours and how they dealt with these occurrences.<br><br>• Can explain in detail why engineering specifications are required and how they are applied to work based activities.<br><br>• Can explain in detail and can demonstrate where they have acted as an effective team member. | Recognises the impact of non-conformance on workplace behaviours and organisational culture.<br>• Able evidence where they have offered suggestions regarding how the specified engineering specifications could have been modified to improve the work process and quality of the end product.<br><br>• Can explain how they can personally contribute to the productivity and dynamics of the team. |

Once each elements score out of 100 has been established the formula in figure 2 will applied to determine each elements final mark and grade and the final overall EPA mark and grade.

**Fig 2**




Each EPA element is marked separately and awarded either a, fail/pass/merit or distinction based on the percentage score achieved. The final overall grade for the Apprenticeship is obtained by taking the percentile score awarded to each element and multiplying it by the elements weighting and adding together these scores. This final percentage mark is then used to identify and award a suitable grade using the criteria above.

## 12. Implementation

Affordability - The employer group have developed the content of the EPA to ensure the balance between accessibility, affordability and validity is maintained and SME's are not disadvantaged. Due to the seasonal nature of the Engineering Construction Industry is it is imperative that the EPAs are planned and delivered in a coordinated manner increasing the importance of collaboration and communication between all parties involved in the EPA process. The content of the EPA is deemed to be comprehensive and offers the best approach to measuring the Apprentice against the standard. The EPA approach mandated by the group should be relatively easy to manage and constitute around 10% of the allocated funding (band 13: £21,000).

## 13. Professional Body recognition

The employer group has designed the standard to meet the requirements of the Engineering Council's UK-SPEC for professional registration at Engineering Technician (EngTech). Once the full content of the Apprenticeship has been developed, a full review against these requirements will be undertaken by the Institution for Mechanical Engineers (IMechE). By the time the Apprentice has successfully completed the EPA they should have undergone sufficient training

and obtained sufficient occupational experience to be in a position to apply for EngTech with the IMechE should they wish.

## 14. Consistency

The independent assessment organisation(s) should work with the employers to ensure the individual elements of EPA assess the knowledge, skills and behaviour in the standard to ensure:

- The specified high level knowledge, skills and behaviours in the standard are accurately measured and assessed during the EPA process.
- The EPA meets the IMechE Engineering Technician requirements.

## 15. Volumes

Initially it is anticipated there will be in the region of 75-100 starts per annum which will likely rise year on year.

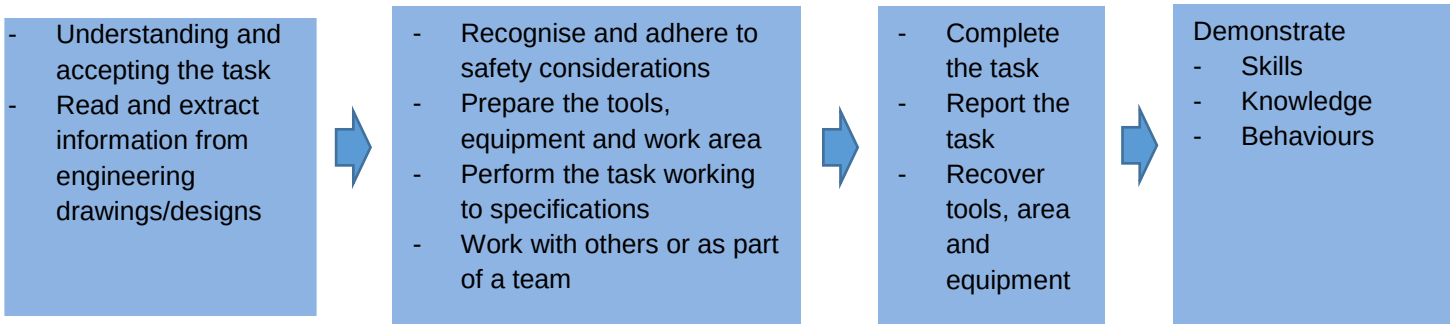
## 16. Annexes:

1. Professional Structured Review
2. Example Behaviour Questions
3. Knowledge, Skills and Behaviours measured during EPA elements

## Annex 1: Structured Review – Professional Discussion Guidance Note.

Conduct of the structured professional review to be recorded on the review record.

From the start the review panel should lead with initial introductions and exploratory questions. The aim is to gather context about each candidate's role, workplace and responsibilities and to encourage the candidate to participate by discussing familiar aspects of their Apprenticeship programme. The candidate should then be asked to discuss their first selected example of evidence (as below), with questions guiding the discussion to cover phases of a typical pipefitting based activity.




The role of the assessment panel is to guide the discussion through the use of open questions and active listening, using their detailed knowledge of the EC PF standard to maintain focus. It can be helpful for one panel member to lead the discussion, with other members contributing either to probe evidence or to focus on particular aspects of the standard.

Discussion of subsequent examples of evidence can be progressed in the same way, with focus being directed towards the template evidence report submitted by the Apprentice in advance of the review and specific aspects of the standards where further evidence is needed.

There are 2 skill requirements which may need further assessment during the structured professional review:

- Work with others and contribute to effective working relationships within an Engineering Construction environment,
- Communicate by keeping others informed about work plans or activities which may affect them and seek assistance from others without causing undue disruption to normal work activities.

**Evidence to support "Eng Tech" Professional Registration.**

The Engineering Construction Pipefitter Apprenticeship Standard has been designed to align with the requirements of the Engineering Council's Professional Standards, as detailed in the United Kingdom Specification of Professional Engineering Competence (UKSPEC) at Engineering Technician (EngTech) level. This has been confirmed by a Professional Engineering Institution.

In the process of meeting the Apprenticeship Standard, the Apprentice should generate sufficient evidence and demonstrate that he/she meets the professional standard.

The structured review is an opportunity for candidates to draw together and to present their evidence as a cohesive whole, referencing to the five UKSPEC areas of competence.

At EngTec level these are:

**A** Use engineering knowledge and understanding to apply technical and practical skills
**B** Contribute to the design, development, manufacture, construction, commissioning, operation or maintenance of products, equipment, processes, systems or services.
**C** Accept and exercise personal responsibility.
**D** Use effective communication and interpersonal skills.
**E** Make a personal commitment to an appropriate code of professional conduct, recognising obligations to society, the profession and the environment.

More detailed information on the Eng Tec requirements can be found at:
http://www.engc.org.uk/standards-guidance/standards/uk-spec/

**Records of the Structured Review.**

Each panel member should annotate a copy of a standard discussion record (to be provided by the Assessment Organisation), indicating where standards have been evidenced through the discussion.

## Annex 2: Structured review: example behavioural questions

If required, at the end of the Professional Discussion phase of the structured review, the Apprentice should be advised that they will now proceed into a direct question and answer session using a standard set of questions. The Apprentice should be advised that he/she can ask for the question to be repeated, and that he/she will then need to provide their answer drawing upon their Apprenticeship training and experience, including from personal experience from outside of the workplace, if appropriate. A record of the questions asked and responses provided should be made and retained by the review panel.

Example questions, Apprentice to demonstrate where they have had to:

1. Work with others to effectively and efficiently complete the allocated tasks.
2. Solve problems within their area of responsibility by applying technical skills and knowledge to define, identify, evaluate and select alternative solutions if required.
3. Take responsibility as an individual and team member for the quality of the work.
4. Support their own learning and development and that of others through activities such as mentoring and sharing of expertise and knowledge.
5. Act ethically, displaying maturity, honesty, integrity and responsibility.
6. Work safely in accordance with health, safety and environmental legislation, regulations and company-specific requirements,
7. Maintain a safe, clean and tidy work area.
8. Check for and identify potential hazards in the workplace and take collective responsibility to maintain a safe working environment.
9. Question unsafe behaviours and incorrect work practises and procedures.

## Annex 3: Knowledge, Skills and Behaviours Measured during EPA Elements

Annex 3: Knowledge, Skills and Behaviours measured during EPA elements
Multiple assessment methods indicate a holistic approach is used.

| Key | Assessment Method |
|---|---|
| KT | Knowledge Test |
| PA | Practical Assessment |
| SPR | Structured Professional Review |

| Role Knowledge | Assessment Method | | |
|---|---|---|---|
| Relevant health, safety and environmental legislation, regulations and company-specific requirements for safe working practises and procedures, | KT | | SPR |
| Importance and benefits of recognised Industry safety passport schemes, | KT | | SPR |
| How to work safely, personal site safety responsibilities and how to respond to and provide solutions to problems and emergencies | KT | | SPR |
| Engineering practices and principles including reading engineering drawings and marking out techniques, | KT | PA | |
| Mathematical techniques and formula related to the fabrication, development and installation of pipework systems, | KT | PA | |
| How to correctly select and safely use hand tools, mechanical tools and equipment in differing environments for the fabrication, repair, installation and decommissioning of pipework systems, | KT | PA | |
| Common and specialist pipe materials such as ferrous, non-ferrous and non-metallic including fittings associated with the pipework components and systems, | KT | PA | |
| Pipework preparation, fabrication, installation, maintenance, testing and decommissioning techniques commonly used throughout the Engineering Construction industry, | KT | PA | |
| Appropriate codes, practices and industry standards and their application to ensure quality requirements are met. | KT | PA | |
| **Role Skills** | **Assessment Method** | | |
| Comply with appropriate health and safety, risk and quality requirements, | | PA | SPR |
| Correctly select and safely use tools and equipment for the fabrication, assembly, installation and decommissioning of pipework components and systems, | | PA | SPR |
| Plan, organise and undertake the fabrication, assembly, installation, maintenance and decommissioning of pipework components and systems, | | PA | SPR |
| Read, interpret and apply engineering drawing information, | KT | PA | SPR |
| Shape pipework components using hand and power tools to cut, drill, shape and finish components to the required tolerance, specification and standard, | | PA | SPR |

| | | | |
|---|---|---|---|
| Assemble and install pipework using the appropriate methods, techniques and equipment in accordance with the specification including welded, threaded, bolted and clamped jointing solutions, | | PA | SPR |
| Ensure the integrity of joints in accordance with specifications, in line with specified quality procedures and to precise tolerances, | | PA | SPR |
| Undertake the testing and inspection of the fabricated and/or installed pipework using the appropriate techniques, | | PA | SPR |
| Work with others and contribute to effective working relationships within an Engineering Construction environment, | | | SPR |
| Apply techniques for the temporary or permanent removal of an engineering construction piping related system or component, | | PA | SPR |
| Communicate by keeping others informed about work plans or activities which may affect them and seek assistance from others without causing undue disruption to normal work activities. | | | SPR |
| Role Behavioural Requirements | Assessment Method | | |
| Work with others to effectively and efficiently complete the allocated tasks, | | | SPR |
| Solve problems within their area of responsibility by applying technical skills and knowledge to define, identify, evaluate and select alternative solutions if required, | | PA | SPR |
| Take responsibility as an individual and team member for the quality of the work, | | PA | SPR |
| Support their own learning and development and that of others through activities such as mentoring and sharing of expertise and knowledge, | | | SPR |
| Act ethically, displaying maturity, honesty, integrity and responsibility, | | | SPR |
| Work safely in accordance with health, safety and environmental legislation, regulations and company-specific requirements, | | PA | SPR |
| Maintain a safe, clean and tidy work area, | KT | PA | SPR |
| Check for and identify potential hazards in the workplace and take collective responsibility to maintain a safe working environment, | | PA | SPR |
| Question unsafe behaviours and incorrect work practises and procedures. | | | SPR |