Institute for Apprenticeships & Technical Education

End-point assessment plan for Engineering Manufacturing Technician apprenticeship standard

Apprenticeship standard reference number	Apprenticeship standard level	Integrated end-point assessment
ST0841	4	No

Contents

Introduction and overview

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

Full time apprentices will typically spend 42 months on-programme (before the gateway) working towards the occupational standard. All apprentices must spend a minimum of 12 months on-programme. All apprentices must complete the required amount of off-the-job training specified by the apprenticeship funding rules.

An approved EPAO must conduct the EPA for this apprenticeship. Employers must select an approved EPAO from the register of end-point assessment organisations (RoEPAO).

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

As a gateway requirement, all apprentices must achieve the following qualification:

- L4 HNC in Engineering or Manufacturing disciplines that fully align with the KSBs of the standard.

In addition Apprentices in the Aerospace sector must also achieve the following qualifications:

- EAL Level 2 Diploma in Aerospace and Aviation Engineering (Foundation Competence)
- EAL Level 4 Diploma in Engineering and Advanced Manufacturing (Development Competence)

The apprentice must have achieved English and maths qualifications in line with the apprenticeship funding rules. The EPA must be completed within an EPA period lasting typically three months, after the EPA gateway.

The EPA consists of two discrete assessment methods.

The individual assessment methods will have the following grades:

Assessment method 1: Observation with questioning

- fail
- pass

Assessment method 2: Professional discussion supported by a portfolio of evidence

- fail
- pass
- distinction

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

- fail
- pass
- distinction

EPA summary table

On-programme (typically 42 months)	Training to develop the occupation standard's knowledge, skills and behaviours (KSBs). The apprentice must complete training towards English and maths qualifications in line with the apprenticeship funding rules. Completion of appropriate qualification(s) relevant to the apprentice's sector mandated on the occupational standard. Preparation of the portfolio of evidence.
End-point assessment gateway	Employer is satisfied the apprentice is consistently working at, or above, the level of the occupational standard. The apprentice must have achieved English and maths qualifications in line with the apprenticeship funding rules. **All apprentices** must achieve the following qualifications mandated in the occupational standard: • L4 HNC in Engineering or Manufacturing disciplines that fully align with the KSBs of the standard (**note the Engineering Manufacturing Apprenticeship is available to all sectors within the Engineering and Manufacturing route and this is the only mandated qualification required for apprentices outside of the Aerospace sector)** **For the Aerospace sector only**, apprentices must also achieve the following qualifications mandated in the occupational standard: • EAL Level 2 Diploma in Aerospace and Aviation Engineering (Foundation Competence) • EAL Level 4 Diploma in Engineering and Advanced Manufacturing (Development Competence) All apprentices must prepare and submit a portfolio of evidence to support the professional discussion. Standard Operating Procedures (SOP's) must be provided, by the employer, to support the observation with questioning.
End-point assessment (which will typically take three months)	Assessment method 1: Observation with questioning With the following grades: • fail

	• pass Assessment method 2: Professional discussion supported by a portfolio of evidence With the following grades: • fail • pass • distinction Overall EPA and apprenticeship grade: • fail • pass • distinction
Professional recognition	Aligns with recognition as Engineering Technician (EngTech) by: • Institute of Engineering and Technology (IET) • Institute of Mechanical Engineers (IMechE) • Royal Aeronautical Society

Length of end-point assessment period

The EPA will be completed within an EPA period lasting typically three months, after the EPA gateway.

If an EPA assessment method is failed, it should be resat or retaken in-line with the requirements set out in this end-point assessment plan.

Order of assessment methods

The assessment methods can be delivered in any order. The result of one assessment method does not have to be known before an apprentice starts the next one.

Gateway

The EPA period should only start once the employer is satisfied that the apprentice is consistently working at or above the level set out in the occupational standard, that is to say they are deemed to have achieved occupational competence. In making this decision, the employer may take advice from the apprentice's training provider(s), but the decision must ultimately be made solely by the employer.

In addition, an apprentice must have completed the following gateway requirements prior to beginning EPA.

Achieved English and maths qualifications in line with the apprenticeship funding rules. All apprentices (from the Aerospace and non-Aerospace sectors) must achieve the following approved qualifications as mandated in the occupational standard:

- L4 HNC in Engineering or Manufacturing disciplines that fully align with the KSBs of the standard.

For the Aerospace sector only, apprentices must also achieve the following qualifications mandated in the occupational standard:

- EAL Level 2 Diploma in Aerospace and Aviation Engineering (Foundation Competence)
- EAL Level 4 Diploma in Engineering and Advanced Manufacturing (Development Competence)

For the observation with questioning: the employer must provide Standard Operating Procedures (SOP's).

For professional discussion, the apprentice will be required to prepare and submit a portfolio of evidence. The portfolio of evidence itself is not assessed, it is used to inform the questioning during the professional discussion. See requirements below.

Portfolio of evidence requirements:

- it must contain evidence of competence for the KSBs mapped to the professional discussion
- each piece of evidence may map to more than one KSB,
- it will typically contain 10 pieces of evidence
- the employer must sign off the portfolio of evidence, thereby authenticating the work it contains
- apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship
- employers and training providers are free to devise their own version of the portfolio of evidence, but the portfolio of evidence would typically contain the following information:
    - the name of the apprentice
    - details of the apprentice's workplace
- evidence can be provided through a range of sources; for example:

    - performance review documentation
    - witness statements
    - training records or certificates
    - work products such as risk assessments, reports, meeting records, plans etc.
- evidence cannot include self-assessment narrative
- feedback from line managers, customers, stakeholders etc. can be provided; any employer contributions should focus on direct observation of evidence (for example, witness statements) of competence rather than opinions

Assessment methods

Assessment method 1: Observation with questioning

Overview

Apprentices must be observed by an independent assessor completing work tasks in their normal workplace, in which they will demonstrate the KSBs assigned to this assessment method. The rationale for this assessment method is:

- this is a practical role, best demonstrated through observation
- observation allows for the assessment of work tasks in a normal place of work, using processes and equipment with which the apprentice is familiar, which is likely to enable the apprentice to perform at their best
- observation is a cost-effective assessment method, as it makes use of the employer's premises and resources
- the tasks chosen reflect something that would be completed by an Engineering Manufacturing Technician on a regular basis
- the questioning component enables the checking of underpinning knowledge, skills and behaviours

Delivery

The observation and questioning must assess the apprentice against the KSBs assigned to this assessment method.

The EPAO must arrange for the observation to take place, in consultation with the apprentice's employer. An independent assessor may observe up to a maximum of one apprentice at any one time, to allow for quality and rigour. Questioning must take place on a one-to-one basis.

The observation and questioning must take three hours. The observation and questioning may be split into discrete sections held over a maximum of one working day. The length of a working day is typically considered to be 7.5 hours. There may be breaks during the observation with questioning to allow the apprentice to move from one location to another as required and to take meal or comfort breaks. Such breaks will not contribute to the observation assessment time. The independent assessor has the discretion to increase the time of the observation and questioning by up to 10% to allow the apprentice to complete a task or answer a question at the end of the assessment period.

Immediately in advance of the observation and questioning, apprentices must be provided with verbal and written information on the format of the assessment, including timescales. This briefing time is exclusive of assessment period.

The following activities MUST be observed during the observation:

- Complying with Health and Safety requirement in their immediate working environment
- Demonstrating work task(s) being received, agreed and relevant information being extracted in order to complete the required activity

- Carrying out the required task(s) in line with organisation's standard operating procedures (SOPs)
- Completing, saving and storing task(s) outcomes in the appropriate format and location, for example using a PDF format on the organisation's secure computer system

Typically, the observation will be covered within one task but can be covered in two tasks if required to allow coverage of the KSBs. Examples could include raising quality notifications (QN's), producing production process changes, drawing modifications, carrying out quality investigations.

Observations should take place in an accessible area that does not require special clearance. The independent assessor must be unobtrusive and must not interrupt the candidate whilst conducting the observation.

Apprentices are expected to understand and use relevant occupational language that would be typical of an apprentice working at this level.

Questions must be asked after the observation is complete. The maximum time allowed for questioning is 30 minutes. All questioning must be completed within the three hours total time period allowed for the observation with questioning.

The independent assessor must ask a minimum of six open questions. They may ask follow up questions where clarification is required. The purpose of the questioning is assess underpinning knowledge, skills and behaviours. EPAOs must provide independent assessors with sample questions; however, they can be adapted based on what they have observed.

KSBs observed, and answers to questions, must be documented by the independent assessor using their EPAO's documentation and procedures.

The independent assessor must make all grading decisions.

Venue

The observation can take place in:

- employer's premises
- workplace other than the employer's own premises, for example premises of a client

The questioning must take place in a quiet area, free from distraction and influence.

Support material

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

- observation specifications
- sample question bank
- assessment recording documentation
- guidance for apprentices and employers

Question development

The EPAO must produce a bank of sample questions to help the independent assessor, but these are for illustration only and the independent assessor may use their professional judgement to adapt their questions in-line with the assessor's training and the EPAO's standardisation process.

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.

Assessment method 2: Professional discussion supported by a portfolio of evidence

Overview

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 excellence and cover the KSBs assigned to this assessment method.

The rationale for this assessment method is:

- it allows a wider breadth of knowledge and understanding than can be covered in a single observation
- it allows the KSBs, which may not naturally occur in every workplace or may take too long to observe, to be assessed

The supporting portfolio of evidence allows the apprentice to refer to real work examples and doesn't rely on memory. The portfolio of evidence is not assessed.

Delivery

An independent assessor must conduct and assess the professional discussion on a one-to-one basis.

It will involve the questions that will focus on coverage of prior learning or activity.

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 independent assessor must ask a minimum of ten open competence-based questions. Additional follow up questions are allowed, to seek clarification.

The EPAO must produce a bank of sample questions to help the independent assessor, but these are for illustration only and the independent assessor may use their professional judgement to adapt their questions following a review of their portfolio of evidence, in-line with the assessor's training and the EPAO's standardisation process.

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

Apprentices are expected to understand and use relevant occupational language that would be typical of an apprentice working at the level of this occupation.

The professional discussion must cover the following themes in line with specified Knowledge Skills and Behaviours (KSB's):

- Problem Solving & Communication (K1 K2 K3 S3 S7)
- Project, Time Management & Quality Standards (K12 K20 K23 S2)
- Manufacturing Principles, Methods & Applications (K6 K9 K18 K19)
- Commercial Considerations (K4 K17 K21 S9)
- Behavioural Expectations (B1 B3 B4 B5 B6 K13)

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

The independent assessor will make all grading decisions.

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

Independent assessors must be developed and trained by the EPAO in the conduct of professional discussion and reaching consistent judgement.

Venue

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

Video conferencing can be used to conduct the professional discussion, but the EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided in some way.

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

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

Support material

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

- assessment recording documentation
- guidance for apprentices and employers

Question development

It is recommended that sample questions are developed in consultation with employers of this occupation. EPAOs must maintain the security and confidentiality of their specifications when consulting with employers.

The 'question bank' must be of sufficient size to prevent predictability and the EPAO must reviewed 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.

Reasonable adjustments

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

Weighting of assessment methods

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

Grading

Assessment method 1: Observation with questioning

KSBs grouped by theme	Pass Apprentice must demonstrate all the following:
Health and Safety Compliance (K11)	Complies with statutory and organisational health and safety regulations and policies and follows procedures including risk assessments.
Work tasks received, agreed and relevant information extracted (K5, K7, K14, K15, K16, S1, S4)	Adheres to the organisations quality management system, outlines its purpose, internal governance arrangements to ensure compliance and identifies where the documentation is located. Prioritises what task related documentation is received, understands where it has come from and how work plans are confirmed. Reads, extracts and analyses relevant engineering and manufacturing related data and information in order to draw accurate conclusions and make informed decisions on the task(s) to be completed, completing any necessary documentation as required.
Carrying out of required task(s) (K8, K10, K22, S6, S10, B2)	Identifies how departmental and/or cross function teams work collaboratively to meet organisational targets and objectives, and how any conflicts would be managed in line with relevant policies and procedures. Uses and follows the organisation's approved Standard Operating Procedures (SOP's) and documentation recording systems and explains the potential implications to quality and delivery if they are not adhered to. Uses relevant computer based software system/packages and explains the application and any limitations for each. Uses the approved process and quality compliance procedure to create or amend engineering and/or manufacturing documentation in a systematic, proactive and transparent way. Examples include creation/ amendments to drawings, bill of materials, quality reports.
Document control and communication (S5, S8, B7)	Communicates effectively to stakeholders relating to the completion of the task being observed. Examples include electronic (email, video conferencing and messaging platforms) verbal, presentation. Applies documentation control processes and procedures in line with organisational requirements. Acts professionally with a positive and respectful attitude. Examples include how they communicate with colleagues such as by using the correct technical language either by email or face to face, their approach when dealing with problems and their understanding of the escalation process within their organisation.
Fail: apprentices will fail if they do not meet all the pass criteria.	

Assessment method 2: Professional Discussion supported by a portfolio of evidence

KSBs grouped by theme	Pass Apprentice must demonstrate all the following:	Distinction Apprentice must demonstrate all the Pass criteria and fully achieve at least 8 from the 11 Distinction criteria (each statement is a separate grading descriptor and there may be more than one statement contained in the separate boxes in the table below)
Problem Solving and Communication (K1, K2, K3, S3, S7)	Explains when they have used effective communication techniques, including: listening, questioning and support of others. Identifies when they have used team integration techniques, including: conflict resolution and managing difficult conversations (team working). Demonstrates how they have supported problem solving activities utilising tools, such as: Root Cause Analysis (RCA) Process Failure Modes Effects Analysis (PFMEA), Fishbone, Practical Problem Solving (PPS) and Advanced Product Quality Planning (APQP). Demonstrates how they have used lean tools and techniques, such as: Six Sigma, 8 Wastes, 5S's, Kaizen and Poka-Yoke (Error proofing) and explain the benefits of using them.	1. Critically evaluates why the specific continuous improvement tools and techniques were used, describes the limitations of those tools and justifies this by the impact achieved. 2. Critically evaluates the effective team integration techniques used, outlines the limitations of those tools and justifies the positive impact on the team.
Project Management and Quality Standards (K12, K20, K23, S2)	Demonstrates how they have used project management techniques, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles. Demonstrated how they have utilised management tools/techniques to ensure that personal team and organisational objectives are achieved (such as Gannt charts, task	3. Outlines the different quality processes and project management techniques that could be justifiably used for the relevant manufacturing activities including their relevant strengths and weaknesses. 4. Critically evaluates the quality processes used with a justified impact on the business strategy or project, outlining the limitations and suggesting

	management software/applications, project management software/applications). Explains how they have used an array of methods, tools to check quality in manufacturing and engineering including measurements (such as: dimensions, weight, signal, temperature, time) and testing (such as: non-destructive and destructive). Demonstrates when they have taken into account the impact of sustainability and environmental efficiency, outlining how such factors have influenced their decisions.	possible improvement to these processes. 5. Critically evaluates the project management techniques currently used with a justified impact on the business strategy or project and outlines the limitations of the management techniques.
Manufacturing Principles, Methods and Applications (K6, K9, K18, K19)	Explains when they have used a range of manufacturing applications (such as: machining, joining, forming, assembling, shaping, processing, printing, moulding, extruding and casting) on common metallic and non-metallic material types. Explains when they have used different production methods and their applications (such as: single, batch, flow and mass). Explains how they have applied core engineering principles (such as: mathematical, science, mechanical, electric/electronic applications) to an activity.	6. Critically compares the different manufacturing applications and materials used to determine the most cost effective or efficient process. 7. Differentiates the different production methods used, outlines their limitations and justifies the reason of choice. 8. Applies complex engineering principles such as mathematical, science, mechanical, electric or electronic applications. Examples include calculus, statistics and probability, needs analysis, systems engineering.
Commercial Considerations (K4, K17, K21, S9)	Explains how Industry 4.0 could impact organisations, including the integration of automation, digital systems and manufacturing engineering systems. Explains how their business manages and monitors internal and or supplier performance to ensure that cost, quality, delivery and sustainability objectives are being delivered and their responsibility towards that. Explains how their department applies financial planning, recording and review processes, such as departmental budgets, estimating, cost control, cost forecasting, and	9. Critically evaluates how Industry 4.0 will impact the business, innovation, people and company culture with the integration of digital, automation, manufacturing and engineering systems to promote and maximise continuous improvements within an organisation. 10. Evaluates how organisations react to internal and external processes which can influence business objectives such as: cost, delivery, quality and sustainability**.** Examples include:- changes in customer demand, quality escapes, supplier shortages, regulation changes.

	investment appraisal and how they contribute.	
Behavioural Expectations **(**B1, B3, B4, B5, B6, K13)	Demonstrates how they assume responsibility for the importance of adherence to the organisations Environmental, Health and Safety management systems - actively displays and promotes a safety first culture within the organisation and the impact of that. Demonstrates how they actively promote innovation for emerging and advanced engineering and manufacturing technologies to optimise performance. Demonstrates how they assume full responsibility for their own professional development, seeking opportunities to enhance knowledge, skills and experience. Demonstrates how they keep abreast of developments in engineering processes manufacturing and emerging technologies. Demonstrates how they create and maintain positive, professional, trusting and ethical working relationships with their team and the wider range of internal, external and connected stakeholders. Demonstrates when they have accepted responsibility for their workload with a responsible approach to risk, demonstrating a high level of motivation and resilience when facing a challenge. Explains how human factors (organisational, environment and job factors) can influence and impact individual characteristics, performance and behaviours in the workplace.	11. Demonstrates how they have offered advice and guidance to others to overcome problems, implement improvements or assist them with their personal development
Fail: apprentices will fail if they do not meet all the pass criteria.		

Overall EPA grading

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

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

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

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

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

In order to achieve an overall 'distinction' apprentices must achieve a distinction in the professional discussion and a 'pass' in the observation with questioning.

There are restrictions on grading where apprentices re-sit or re-take an assessment method – see the re-sits and re-takes section.

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

Assessment method 1: observation with questioning	Assessment method 2: professional discussion supported by a portfolio of evidence	Overall grading
Fail	Any grade	Fail
Any grade	Fail	Fail
Pass	Pass	Pass
Pass	Distinction	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. A re-sit does not require further learning, whereas a re-take does.

Apprentices should have a supportive action plan to prepare for the re-sit or a re-take. The apprentice's employer will need to agree that either a re-sit or re-take is an appropriate course of action.

An apprentice who fails an assessment method, and therefore the EPA in the first instance, will be required to re-sit or re-take any failed assessment methods only.

The timescales for a resit/retake is agreed between the employer and EPAO. A resit is typically taken within 3 months of the EPA outcome notification. The timescale for a retake is dependent on how much re-training is required and is typically taken within 3 months of the EPA outcome notification. All assessment methods must be taken within a 6 month period, otherwise the entire EPA will need to be resat/retaken. (Exceptions could be made due to circumstances deemed by the EPAO as being beyond the control of the apprentice or their employer).

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

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

Roles and responsibilities

Role	Responsibility
Apprentice	• complete the required amount of off-the-job training specified by the apprenticeship funding rules and as arranged by the employer and training provider • participate in development opportunities to improve their knowledge skills and behaviours as outlined in the occupational standard • meet all gateway requirements when advised by the employer • understand the purpose and importance of EPA and undertake EPA
Employer	• support the apprentice to achieve the KSBs outlined in the occupational standard to their best ability • determines when the apprentice is working at or above the level outlined in the standard and is ready for EPA • select the EPAO • confirm all EPA gateway requirements have been met • confirm arrangements with EPAO for the EPA (who, when, where) in a timely manner • ensure apprentice is well prepared for the EPA

	• should not be involved in the delivery of the EPA
EPAO	As a minimum EPAOs should: • understand the occupational role • appoint administrators (and invigilators or markers where required) to administer the EPA • provide training and CPD to the independent assessors they employ to undertake the EPA • provide adequate information, advice and guidance documentation to enable apprentices, employers and providers to prepare for the EPA • deliver the end-point assessment outlined in this EPA plan in a timely manner • prepare and provide all required material and resources required for delivery of the EPA in-line with best practices • use appropriate assessment recording documentation to ensure a clear and auditable mechanism for providing assessment decision feedback to the apprentice • have no direct connection with the apprentice, their employer or training provider i.e. there must be no conflict of interest • maintain robust internal quality assurance (IQA) procedures and processes, and conducts these on a regular basis • conform to the requirements of the nominated external quality assurance body • organise standardisation events and activities in accordance with this plan's IQA section • organise and conduct moderation of independent assessors' marking in accordance with this plan • have, and operate, an appeals process • arrange for certification with the relevant training provider
Independent assessor	As a minimum an independent assessor should: • understand the occupational standard and assessment plan • deliver the end-point assessment in-line with the EPA plan • comply to the IQA requirements of the EPAO • be independent of the apprentice, their employer and training provider(s) i.e. there must be no conflict of interest • satisfy the criteria outlined in this EPA plan

	• hold or be working towards an independent assessor qualification e.g. A1 and have had training from their EPAO in terms of good assessment practice, operating the assessment tools and grading • have the capability to assess the apprentice at this level • attend the required number of EPAOs standardisation and training events per year (as defined in the IQA section)
Training provider	As a minimum the training provider should: • work with the employer to ensure that the apprentice is given the opportunities to develop the KSBs outlined in the standard and monitor their progress during the on-programme period • advise the employer, upon request, on the apprentice's readiness for EPA prior to the gateway • plays no part in the EPA itself

Internal Quality Assurance (IQA)

Internal quality assurance refers to the requirements that EPA organisations must have in place to ensure consistent (reliable) and accurate (valid) assessment decisions. EPA organisations for this EPA must:

- appoint independent assessors who have recent relevant experience of the occupation/sector gained in the last two years or significant experience of the occupation/sector. This should be at least at the same level as the apprenticeship standard.
- appoint independent assessors who are competent to deliver the end-point assessment and these assessors will hold or be working towards an independent assessor qualification, for example TAQA (Training and Quality Assessment)
- provide training for independent assessors in terms of good assessment practice, operating the assessment tools and grading
- have robust quality assurance systems and procedures that support fair, reliable and consistent assessment across the organisation and over time
- operate induction training and standardisation events for independent assessors when they begin working for the EPAO on this standard and before they deliver an updated assessment method for the first time
- ensure independent assessors attend standardisation events on an ongoing basis and at least once per year

Affordability

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

- use of employers premises and resources for the observation and questioning
- using an employer's premises for the professional discussion
- remote assessment for the professional discussion is permissible, reducing travel costs, for example video conferencing
- potentially completing the observation and questioning and professional discussion on the same day

Professional body recognition

This apprenticeship is designed to prepare successful apprentices to meet the requirements for registration as Engineering Technician (EngTech) with:

- Institute of Engineering and Technology (IET)
- Institute of Mechanical Engineers (IMechE)
- Royal Aeronautical Society

Mapping of knowledge, skills and behaviours (KSBs)

Assessment method 1: Observation with questioning

Knowledge
K5 Quality management systems used such as ISO9001, AS9100, ISO 14001 and TS16949, its purpose and internal governance arrangements to ensure compliance.
K7 Principles of quality control and quality assurance in a manufacturing and engineering environment.
K8 Team integration techniques, including conflict resolution and managing difficult conversations (team working).
K10 Importance for individuals to use and follow the organisations approved Standard Operating Procedures (SOP's) and documentation recording systems and the potential implications on safety, quality and delivery if they are not adhered to.
K11 Statutory and organisation health and safety policies, procedures and regulations that must be adhered to in a manufacturing and engineering environment including the risk assessment process, procedures and documentation used within the work area.
K14 Engineering and manufacturing related documentation used such as job cards / build records, 2D & 3D drawing/models, Bill of Materials (BOM), Cost Analysis Reports, Compliance Report, Standard Operating Instructions (SOI's), Standard Process Instructions (POI's), Engineering Query Notifications (EQN's) and Drawing Query Notifications (DQN's).
K15 Prioritisation of workload/time management techniques to ensure that personal and team objectives are achieved effectively.
K16 Engineering and manufacturing data collection systems used, their format and content.
K22 The different applications and limitations of computer based software system/packages used such as Computer Aided Design (CAD), Data Analytics and Databases.

Skills
S1 Read and extract relevant engineering and manufacturing related data and information (such as work plans/project plans, schedules, drawings, specifications, production data, quality reports, costing data, statistical information) drawing accurate conclusions and making informed decisions.
S4 Analyse and interpret data and information in order to generate manufacturing engineering documentation such as Parts Per Million (PPM) quality adherence, cost analysis and test data.
S5 Communicate using the appropriate method for the audience such as, formal and informal presentations, written reports, verbal, electronic, social media and incorporating relevant and appropriate data and/or metrics.
S6 Use the approved process and quality compliance procedure to create or amend engineering and/or manufacturing documentation.

S8 Apply documentation control processes and procedures such as format, location, access, authorisation.
S10 Use computer based software system/packages such as Computer Aided Design (CAD), Data Analytics and Databases.

Behaviours
B2 Operates in a systematic, proactive and transparent way.
B7 Acts professionally with a positive and respectful attitude.

Assessment method 2: Professional discussion supported by a portfolio of evidence

Knowledge
K1 Problem solving tools/techniques. Such as practical problem solving (PPS), root cause analysis (RCA) and process failure mode effects analysis (PFMEA).
K2 Effective communication techniques including listening, questioning and support of others.
K3 Use, benefits and applications of lean methods and tools used in manufacturing and engineering (such as Kaizen, Six Sigma and 8 wastes).
K4 How Industry 4.0 will impact organisations including the integration of automation, digital systems and manufacturing engineering systems.
K6 Different manufacturing methods used, their applications, such as machining, joining, forming, assembling, shaping, processing, printing, moulding, extruding and casting).
K9 Core engineering principles such as mathematics, science, mechanical and electrical/electronic applications relevant to manufacturing and engineering activity undertaken.
K12 Project management techniques, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles.
K13 How human factors (organisational, environment and job factors) can influence and impact individual characteristics, performance and behaviours in the workplace.
K17 How organisations manage and monitor internal and or supplier performance to ensure that cost, quality, delivery and sustainability objectives are being delivered.
K18 Use and applications of common metallic and non – metallic materials used in manufacturing and engineering.
K19 Different production methods used and their applications such as single, batch, flow and mass.
K20 Different methods, tools and frequency used to check quality in manufacturing and engineering including measurements such as (dimensions, weight, signal, temperature, time,) and testing (such as non-destructive and destructive).
K21 Departmental process used to create, record and review financial data and information.

K23 The impact of sustainability and environmental efficiency and how such matters influence manufacturing decisions.

Skills
S2 Use project management tools, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles.
S3 Use problem solving tools such as Root Cause Analysis (RCA) Process Failure Modes Effects Analysis (PFMEA), Fishbone, Practical Problem Solving (PPS) and Advanced Product Quality Planning (APQP).
S7 Use lean tools and techniques, such as Six Sigma, 8 Wastes, Workplace organisation such as 5S's (sort, set in order, shine, standardise and sustain), Kaizen and Poka-Yoke (Error proofing).
S9 Use financial planning, recording and review processes and documentation such as departmental budgets, estimating, cost control, cost forecasting, and investment appraisal.

Behaviours
B1 Champions the importance of adherence to the organisations Environmental, Health and Safety management systems:- actively displays and promotes a safety first culture within the organisation.
B3 Actively promotes the case for the adoption of emerging and advanced engineering and manufacturing technologies to optimise performance.
B4 Takes full responsibility for own professional development, seeking opportunities to enhance knowledge, skills and experience. Keeping abreast of developments in engineering processes manufacturing and emerging technologies.
B5 Complies with statutory and organisational health & safety regulations and policies at all times. Accepts responsibility for their workload with a responsible approach to risk. Demonstrates a high level of motivation and resilience when facing challenge.
B6 Creates and maintains positive, professional, trusting and ethical working relationships with their team and the wider range of internal, external and connected stakeholders.