

**End Point Assessment Plan**  
**Machinist - Advanced Manufacturing Engineering Standard**  
Published May 2016

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**Note.** Apart from Annex 4, 5 and 8 the other Annexes are currently in development. Once complete this Assessment Plan will be re issued along with supporting Annexes including URL links and made available to all relevant apprentices and stakeholders. For interim information, advice and guidance relating to the documentation in development and access to Annexes 5 and 8 please contact [Customer.Services@semta.org.uk](mailto:Customer.Services@semta.org.uk) quoting Trailblazer Assessment Plan documentation.

## Foreword

*The Machinist – Advanced Manufacturing Engineering assessment plan is delivered within the three phases of the Apprenticeship standard, these being the:*

- *Foundation Phase*
- *Development Phase*
- *End Point Assessment & Employer Endorsement Phase*

*Taken together the assessment approach we detail here is fundamentally different and represents a significant improvement on current assessment systems, namely:*

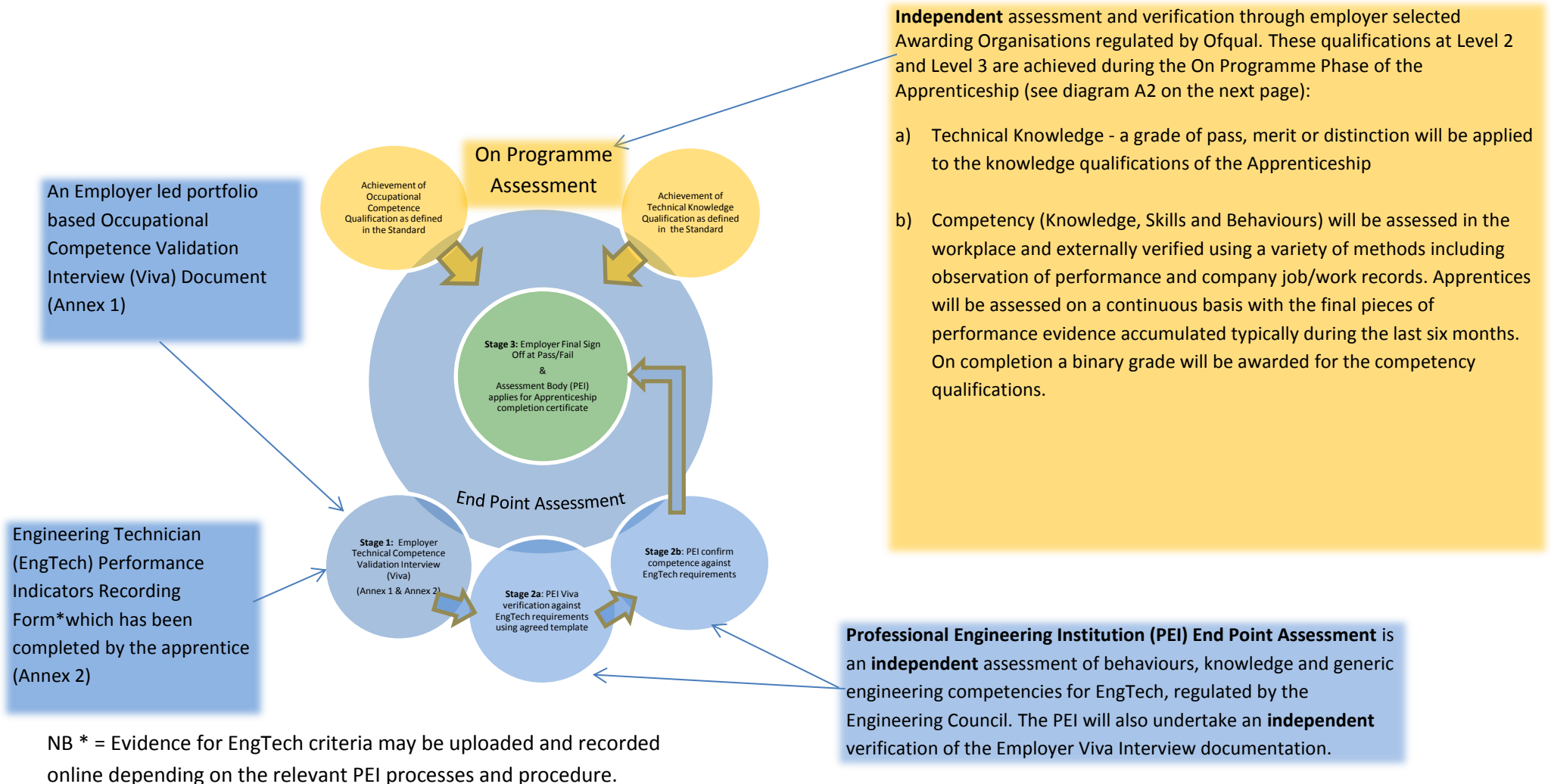
- 1) *We have introduced a formal gate review at the conclusion of the foundation stage. Apprentices will not progress beyond this without successful completion of this stage.*
- 2) *We have introduced a viva and formal overall assessment of competence as part of the end point assessment for the Advanced Manufacturing Engineering Sector. They will need to demonstrate skills, knowledge and behaviours developed across the Apprenticeship.*
- 3) *We have introduced an alignment of competence to ‘Engineering Technician’ requirements - the recognised generic professional industry standard for Engineering Technicians. This is totally new and is supported by all the relevant Professional Engineering Institutions. This provides an opportunity to establish future development activity for apprentices, linked to continued professional development.*

*Due to the safety critical and complex nature of machining in the Advanced Manufacturing Sector much of the training and assessment needs to be carried out ‘on a continuous basis’ to ensure that the skills, knowledge and behaviours that relate to company processes and procedures are fully imbedded in the apprentice’s skill set. Because of the safety critical nature of the work roles and the risks to both the apprentice and the business any deficiencies or gaps in skills, knowledge and behaviours must be identified early and corrected rather than being allowed to proliferate, only then to be picked up at the end of training when it is too late. Moreover, employers in the Advanced Manufacturing and Engineering sector are responsible for the competence of their employees and nobody other than the employer will be able to confirm occupational competence. The assessment process we have adopted is more robust than ever before and comprises three distinct separate components: academic/technical competence confirmed through qualifications by Awarding Organisations, professional competence confirmed by the relevant Professional Engineering Institution and crucially occupational competence confirmed by the employer.*

*The assessment model, including end point, makes the Standard accessible and appropriate for employers, including SMEs. The mandatory requirements have been carefully selected to ensure that skills, knowledge and behaviours can be transferred across the Advanced Manufacturing and Engineering Sector.*

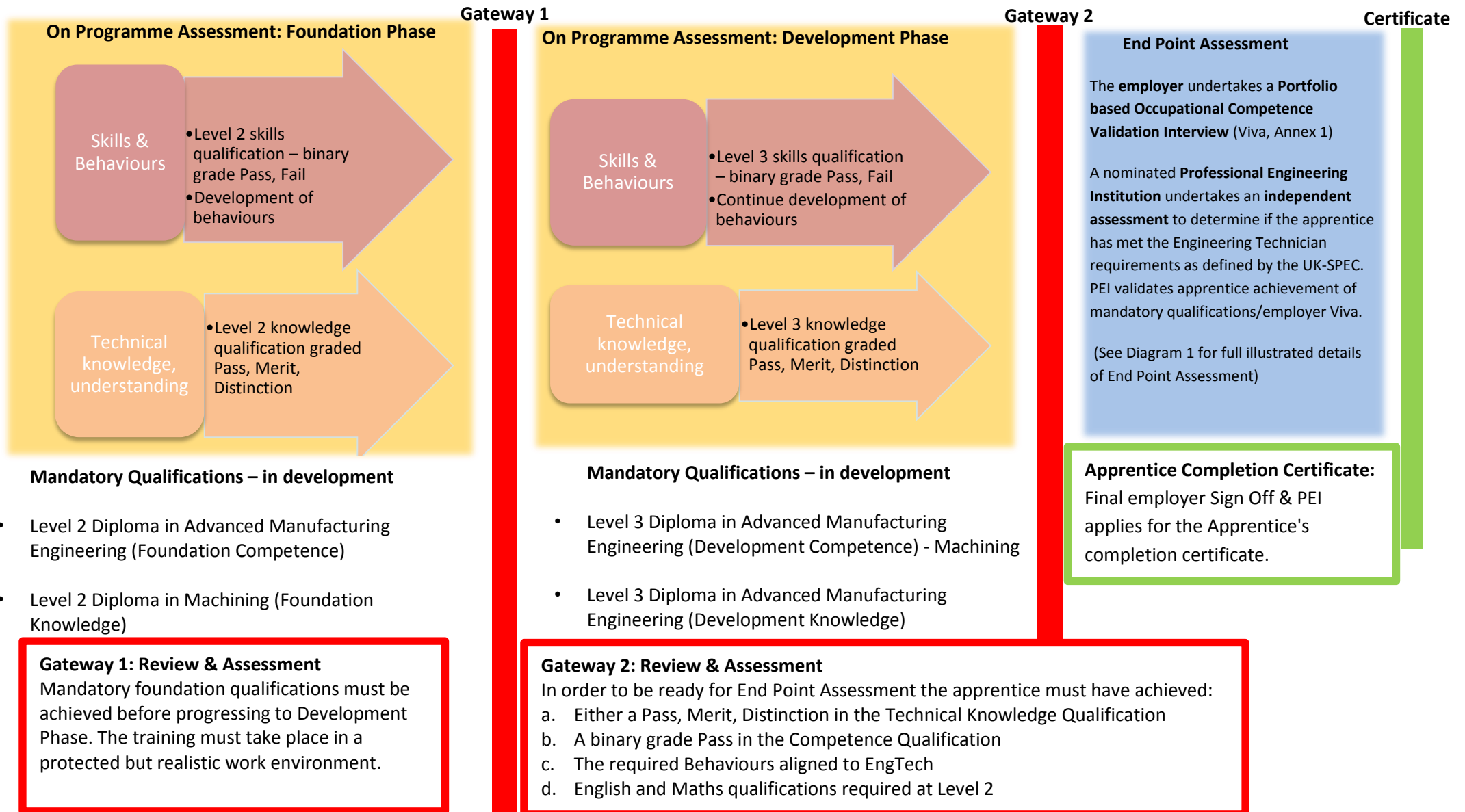
## Section A: Summary of End Point Assessment

A1 Diagram 1: End Point Assessment for a Machinist – Advanced Manufacturing Engineering Sector



In order for the PEI to apply for the apprenticeship completion certificate an apprentice will need to have achieved the on programme competency and a knowledge qualifications at Level 2 and Level 3 as specified on this Standard. The PEI will also be in receipt of and have verified the Employer Portfolio Based Occupational Competence Viva Interview document signed by the employer (Stages 1 and 2a); they will have confirmed that the apprentice has met Engineering Technician UKSPEC requirements (Stage 2b) and have received a **final** overall apprentice sign off from the employer. (Stage 3).

A2 Diagram 2: Summary approach to “On-Programme” and End Point Assessment, including interaction with mandatory qualifications



## Section B: Detailed explanation of the end point assessment

### B1 What skills, knowledge and behaviours are being assessed?

**B1.1 Occupational Competence.** Employers across the Advanced Manufacturing Engineer sector have worked collaboratively to produce a suite of Employer Units of Competence (EUCs). Each EUC sets out in detail the skills, knowledge and behaviours that the apprentice must achieve in order to demonstrate that they are occupationally competent in the specific job role and employers tailored requirements including areas such as products, processes, procedures, tools, equipment, materials, documentation and information systems.

This will allow each organisation to develop their own specific and tailored apprentice assessment structure whilst at the same time ensuring that the overall outcome delivers depth, breadth and stretch to enable progression and/or transferability to other employers by meeting the skills, knowledge and behaviours as defined in the Standard. The EUCs will form part of the Employer Occupational Brief (EOB) and can be sourced from Annex 3.

**B1.2 Professional Competence.** Employers in partnership with relevant PEIs will also assess the apprentices' competence against the internationally recognised professional standard for an Engineering Technician (EngTech). Apprentices will be assessed against the following criteria:

- 1) Use engineering knowledge and understanding to apply technical and practical skills.
- 2) Contribute to the design, development, manufacture, construction, commissioning, operation or maintenance of products, equipment, processes, systems or services.
- 3) Accept and exercise personal responsibility.
- 4) Use effective communication and interpersonal skills.
- 5) Make a personal commitment to an appropriate code of professional conduct, recognising obligations to society, the profession and the environment.

To support the end point assessment, Employers and PEIs have developed an Engineering Technician Performance Indicators Recording Form (Annex 2). This will form part of the Employer Occupational Brief (EOB) and can be sourced from Annex 3.

### **B1.3 Continuous Professional Development (CPD)**

Refers to the process of tracking and documenting the skills, knowledge and experience that an individual gains both formally and informally. It's a record of what they experience, learn and then apply. If the apprentice does decide to apply for registration with a relevant Professional Engineering institution at EngTech and/or IEng they must be committed to maintaining and enhancing their competence. They will be required to show evidence that they have taken steps to ensure this, and that they intend to continue to do this in line with the CPD Code for Registrants

#### **What is it for?**

The CPD process helps the individual manage their own development on an ongoing basis. It's function is to help them record, review and reflect on what they learn

#### **The key features of the CPD process**

- be a documented process
- be self-directed: driven by the individual and not the employer
- focus on learning from experience, reflective learning and review
- help individuals to set development goals and objectives
- include both formal and informal learning.

#### **What are the benefits?**

It can help individuals to reflect, review and document their learning and to develop and update their professional knowledge and skills. It is also very useful to:

- provides an overview of their professional development to date
- reminds them of their achievements and how far they have progressed
- directs their career and helps them keep their eye on their career goals
- uncovers gaps in their skills, knowledge and behaviours
- demonstrates their professional standing to employers and/or clients
- helps with their career development



## B2 How will the “what” be assessed?

Typically, this assessment takes place in the final months of the Apprenticeship, using the following methods:

- An Occupational Competence Validation Interview (Viva) drawing from a portfolio of evidence of occupational competence
- Professional competence assessment undertaken by independent assessor(s) (PEI)
- Final employer endorsement of occupational and professional competence

### B2.1 Portfolio of Evidence

Before the Occupational Competence Validation Interview (Viva) each apprentice will prepare and submit a supporting portfolio of evidence to the employer which will be assessed during the interview. This portfolio will enable the apprentice to demonstrate to the employer the specific work related tasks that they have completed in order to demonstrate how they have achieved both occupational and professional competence set out in the Machinist – Advanced Manufacturing Engineering Standard and Employer Occupational Brief. The portfolio will also give the apprentice the opportunity to demonstrate to the employer that they understand the company in terms of their products, processes, procedures, tools, equipment, materials, documentation and information systems by showcasing what they have done, what they have learnt and how they have applied this knowledge and skills to real work tasks including solving engineering related problems.

The portfolio of evidence will show how the apprentice has demonstrated the knowledge, skills and behaviours required to be a competent Machinist – Advanced Manufacturing Engineering and professional competence at EngTech Level. The portfolio will include as a minimum:

#### **B2.1.1 Occupational Competence**

Three different examples of competent performance evidence that must include:

- Products of the apprentices work, such as items that have been produced or worked on, drawings, plans, production and/or quality records, reports, documents produced as part of a work activity, records or photographs of the completed activity

together with:

- Evidence of the way the apprentice carried out the activities to meet the requirements of Standard, such as assessor observations, supervisor/mentor references/ witness testimonies or authenticated apprentice reports of the activities undertaken.

### B2.1.2 Professional Competence (EngTech)

The apprentice's portfolio will also contain sufficient, valid and reliable evidence which is referenced to the **professional competence** requirements for an Engineering Technician (EngTech). The evidence will be cross referenced to the Engineering Technicians Performance Indicators form (Annex 2) and contain evidence where the apprentice has met the following criteria:

- 1) Use engineering knowledge and understanding to apply technical and practical skills.
- 2) Contribute to the design, development, manufacture, construction, commissioning, operation or maintenance of products, equipment, processes, systems or services.
- 3) Accept and exercise personal responsibility.
- 4) Use effective communication and interpersonal skills (behaviours)
- 5) Make a personal commitment to an appropriate code of professional conduct, recognising obligations to society, the profession and the environment.

Employer Assessors/mentors and/or their nominated Training Provider/Assessor should assist the apprentice in planning, creating and recording evidence to create the portfolio to ensure opportunities to obtain all the necessary competencies, skills and knowledge and behaviours are identified but it is the employer who determines whether the portfolio demonstrates the required standard for occupational competence, the portfolio will be submitted to the employer representative undertaking the Occupational Competence Validation Interview (Viva) (Annex 1).

If the review and assessment of the portfolio of evidence, in its entirety **does not** contain sufficient evidence to meet the standard then it will be deemed not yet ready to submit for Occupational Competence Validation Interview (Viva) (Annex 1). The apprentice will be advised about the shortfalls in evidence and how this can be addressed.

## B2.2 Occupational Competence Validation Interview (Viva)

The Occupational Competence Validation Interview (Annex 1) is an interactive interview focused on all the components of the Apprenticeship Standard, which will enable the employer to validate the apprentices' **occupational competence**. It is a structured and formal discussion between the apprentice and their employer, drawing upon a portfolio of evidence, and records of how the apprentice has performed during the Apprenticeship. It covers both what tasks the apprentice has completed in the workplace, the standard of their work, and the behaviours they have demonstrated throughout, such as, being a team player, having a positive attitude, a strong work ethic, being responsible employee, self-motivated and a proven commitment to the organisation. This enables the end point assessment to cover a broad range of knowledge and understanding, skills and behaviours, such as:

- the methods, techniques tools and equipment used to machine precision components
- company quality processes and procedures and documentation
- the technical knowledge required in order to machine precision components safely and effectively
- being proactive in finding solutions to problems and identifying areas for improving the business.
- demonstrate effective interpersonal skills (behaviours)
- complying with statutory, organisational and health and safety regulations while carrying out manufacturing techniques

It will also be an opportunity for the employer to:

- clarify any points and/or probe the apprentice on the evidence they have presented in their portfolio
- confirm and validate that the portfolio of evidence is the apprentices own work
- confirm and validate the judgements about the quality of the work the apprentice has completed
- explore particular areas of work presented in the portfolio, how it was carried out, any problems that they encountered and how these were resolved.
- validate the apprentices skills and knowledge and understanding of the company in terms of their products, processes, procedures, tools, equipment, materials, documentation and information systems.

The Occupational Competence Validation Interview will also elicit the apprentice's depth and breadth of understanding of the **professional competence** requirements for an Engineering Technician (EngTech). These will be evidenced in the apprentice's Engineering Technicians Performance Indicators form (Annex 2).

To ensure a consistency of approach, a guidance document on how to conduct a robust Occupational Competence Validation Interview (Viva) (Annex 1) will be published and available (Annex 7).

**Note:** Before the Occupational Competence Validation Interview (Viva) (Annex 1) can take place, the employer **must have evidence** that the apprentice has completed and will be awarded the mandatory vocational qualifications required for this Standard - completed during the “On Programme” phase of the Apprenticeship i.e. in this case:

- Level 2 Diploma in Advanced Manufacturing Engineering (Foundation Competence)
- Level 2 Diploma in Machining (Foundation Knowledge)
- Level 3 Diploma in Advanced Manufacturing Engineering (Development Competence) - Machining
- Level 3 Diploma in Advanced Manufacturing Engineering (Development Knowledge)
- Level 2 English
- Level 2 Maths

(NB: working titles for qualifications currently in development will all be ready for delivery from September 2017)

On completion of the Occupational Competence Validation Interview (Viva) (Annex 1) the apprentice will be awarded a grade of Pass or Fail. i.e. Competent or not yet Competent.

### **Professional Engineering Institution (PEI) EngTech Independent Assessment and Viva Verification**

On successful completion of the Occupational Competence Validation Interview (Viva) (Annex 1) i.e. achieving a pass grade, the completed Engineering Technicians Performance Indicators Form (Annex 2) and any supporting evidence will be sent to the employer designated Professional Engineering Institution (PEI) to assess the apprentice’s readiness for professional recognition at EngTech Level.

On completion of the EngTech assessment and Viva verification the Professional Engineering Institution will notify the employer and/or their nominated training provider by letter if the apprentice has been successful or not. If not, the apprentice will be advised of the shortfall in evidence and given advice and guidance on the type and level of evidence that will be required to meet the required professional standard.

### **Final Sign Off – Employer Endorsement & Application for Apprenticeship Completion Certificate**

If successful, i.e. the employer is in receipt of the letter from the selected Professional Engineering Institution stating that the apprentice is EngTech ready, the employer will undertake the Final Sign Off of the Apprenticeship by signing the last section on the Occupational Competence Validation Interview (Viva) (Annex 1) document along with the apprentice. The relevant Professional Engineering Institution on the Register of Apprentice Assessment Organisations then applies for the apprenticeship completion certificate.

## B3) Who will do the assessment?

The end point assessment will be undertaken by a range of parties depending upon the nature of what is being assessed. For final judgements to be made the following is required:

- 1) The employer will have final judgement on the Occupational Competence of the apprentice. **Note:** Prior to the end point assessment the employer will already have received confirmation from the relevant Awarding Organisation(s) that the required mandatory vocational qualifications have been achieved, as part of the “on-programme” assessment. This will be recorded on the Occupational Competence Validation Interview (Viva) Annex 1.
- 2) The Independent Assessor(s) from the relevant Professional Engineering Institution will have final judgement on the Professional Competence of the apprentice by reviewing, assessing and verifying the evidence and any supporting documentation contained in the following:
  - Occupational Competence Validation Interview (Viva) (Annex 1)
  - Engineering Technicians Performance Indicators Form (Annex 2)

### B3.1 The Employer

#### The employer

- The employer will conduct the Occupational Competence Validation Interview (Viva) (Annex 1) to judge Occupational Competence. The employer is best placed to determine whether an apprentice has the required knowledge, skills and behaviours to fulfil the designated role, a support guide will be produced and available to assist the employer during the interview (Annex 7). The employer will have understanding and expertise in the area in which the apprentice works and will know what questions to ask the apprentice in order to ascertain their level of competency. This will be particularly important due to the health and safety critical nature of the sector. During this Viva the apprentice will need to demonstrate competence of the appropriate knowledge, skills and behaviours to the employer, drawing from real work based tasks accomplished, presenting not only what they have done, but how they have done it and why. The apprentice’s use of a Portfolio of Evidence is important here so that the employer can see tangible evidence. (Occupational Competence Validation Interview (Viva) (Annex 1).
- The employer will also review the Professional Competence Performance Indicators Form (Annex 2) in preparation for submission to the relevant PEI for a final independent judgement to be made.

- For the avoidance of doubt the PEI has the overall say on Professional Competence, the apprentice completion certificate cannot be issued without it.

### **B3.2 Independent Assessor(s) from the relevant Professional Engineering Institution (PEI)**

- Independent assessor(s) will validate the initial judgement made by the employer recorded on the EngTech Performance Indicators Form (Annex 2). In terms of making their final independent judgement of Professional Competence this will be based on EngTech requirements as defined in the Engineering Council's UKSPEC. The independent assessor(s) must be affiliated to the PEI with which the employer initially confirmed to undertake end point assessment. Engineering Technicians Performance Indicators Form (Annex 2)
- Independent assessor(s) from the PEI will also examine the Viva documentation, signed by the employer and used as evidence to judge Occupational Competence, this enabling a validation of the Viva process and documentation. However, it is the employer who will make the final judgement of an apprentice's Occupational Competence.
- The PEI will be the body that is on the Register of Apprentice Assessment Organisations.

### **B3.3 Final Sign Off – Employer Endorsement & Application for Apprenticeship Completion Certificate**

If successful, **the employer** will undertake the Final Sign Off / Employer Endorsement stage of the Apprenticeship by:

- accepting the assessment of the PEI
- signing the by signing the last section on the Occupational Competence Validation Interview (Viva) (Annex 1) document along with the apprentice
- The relevant Professional Engineering Institution on the Register of Apprentice Assessment Organisations then applies for the apprenticeship completion certificate.

## B4 How will assessments be quality assured?

### B4.1 Internal Quality Assurance

#### B4.1a) Internal QA - Occupational Competence – Viva (employer)

- The employer should hold moderation meetings at appropriate intervals in line with their apprentice recruitment timelines and cohort numbers to review the quality of the viva process and make sure that consistent and reliable judgement on occupational competence is made within the company. For SMEs, if necessary, the expectation should be to collaborate with other employers to ensure consistency (See Employer Occupational Brief Annex 3 for further guidance).

#### B4.1b) Internal QA – Professional Competence – EngTech (PEI)

- The PEIs practice on-going moderation of EngTech registration applications. In the first instance all applications are reviewed by a minimum of 2 trained assessors against the Engineering Council UKSPEC requirements, who make a recommendation to the broader committee who also review the information and consider the recommendation. Thus all applications are benchmarked against the wider standard and the performance of assessors is continuously monitored. In addition, all PEIs are required by the Engineering Council to conduct internal audit reviews of the process, on a sampling basis.
- All those involved in the assessment process, at every stage, are required to undertake initial and on-going training. This includes updating on UK-SPEC requirements, good practice in assessing, process and quality issues raised by assessors.
- As the licencing body for the professional engineering institutions, the UK Engineering Council sets and upholds the standards for professional registration against which all assessments are made in all PEIs – UK-SPEC. The Engineering Council undertakes regular monitoring of the PEIs, including a full audit every 5 years, with an interim review audit in between.

### B4.2 External Quality Assurance

We are investigating options for External Quality Assurance with the Engineering Council and the Assessment Plan will be updated once those arrangements are confirmed.

## SECTION C – Grading

### C1 How will grading be applied?

The following grading will apply for the End Point Assessment:

- For the Occupational Competence Validation Interview (viva) (Annex 1) this will be a binary pass /fail grade
- For the Professional Competence this will be Pass/ Fail i.e. a pass will mean they have met the requirements for EngTech. Therefore should they wish to apply for professional registration they are deemed as EngTech ready.

Due to the complex and safety critical nature of the industry a grading exemption note has been granted.

## SECTION D - Implementation

### D1 Affordability

The costs allocated to end point assessment equates to no more than 5% of the overall costing for the delivery and assessment requirements for the Apprenticeship. The cost for end point assessment includes the following

- Occupational Competence Validation Portfolio Collation
- Occupational Competence Validation Interview (Viva)
- Professional Engineering Institution Validation Costs (EngTech). PEIs are a not for profit organisations and therefore the fee incurred for undertaking the End Point Independent Assessment is for cost recovery purposes only
- Employer "Final sign off"
- Apprenticeship Certificate

### D2 Capacity planning for End Point Independent Assessment volumes

Employers and the relevant Professional Engineering Institutions (PEIs) have conducted a feasibility analysis to ensure that there will be sufficient capacity within the selected PEI to meet the number of apprentices requiring End Point Independent Assessment including when, during the



calendar year that the assessment is likely to be required. We are planning to start with low volumes in order to test the process and this will allow us to fully understand the challenge and plan accordingly to meet future needs.

**Annexes** (NB Link to be created to each of these documents in the interim contact [Customer.Services@semta.org.uk](mailto:Customer.Services@semta.org.uk))

Annex 1 [Occupational Competence Validation Interview \(Viva\)](#)

Annex 2 [Engineering Technician \(EngTech\) Performance Indicators Recording Form](#)

Annex 3 [Employer Occupational Brief](#)

The Employer Occupation Brief is an all-embracing term being used by employers and will contain a number of separate documents.

<b>Employer Occupational Brief</b>
Foundation Phase - Employer Units of Competence
Foundation Phase - Qualification Structure(s)
Development Phase - Employer Units of Competence
Development Phase - Qualification Structure(s)
Qualification Assessment Strategy for Foundation & Development Phase
Employer Approved Awarding Organisation Qualifications Document

**Note:** In order to articulate the specific level of skills, knowledge and behaviours required to be achieved and assessed to demonstrate full occupational competence in the foundation and development phase of the Apprenticeship. The employers on the Trailblazer group have developed a more detailed **Employer Occupational Brief (EOB)**.

The brief will inform the awarding organisations of the required elements of both knowledge and vocational skills within this Apprenticeship Standard. It will also provide a clear basis for the development of the assessment of this Apprenticeship and will enable the sector to maintain world class levels of quality and ensure that the credibility and consistency of Apprenticeship outcome is maintained.

Annex 4 - [The journey to End Point Assessment](#)

Annex 5 - [Letters of Endorsement](#)

Annex 6 - [Occupational Architecture](#)

Annex 7 - [Employer's Guide and Illustrative Flow to End Point Assessment](#)

Annex 8 - [Grading Exemption Note](#)