

# Assessment Plan

## Apprenticeship Standard

## Multi-Positional Welder (Arc Processes)

## Level 3

**18 September 2015, revised 14 January 2016 based on BIS email letter of 26 October 2015 and revised again on 25 March 2016 based on the BIS email letter of 21 March 2016**

## Introduction

Welding is a difficult skill to teach and to assess both in terms of technical knowledge and practical skills. As a result, special controls are required to ensure that the Apprenticeship Standard, to which this plan refers, is implemented in such a way that the end result, the successful apprentice, is what employers expect, regardless of where in England the programme is offered. If such controls are not in place, there will be no uniformity in the standard of the apprentices that complete the programme and there is a danger that the standard will fall well short of what employers expect.

Fortunately there are international industry standards and specifications (References 1, 2, 3, 4 and 5) that provide best practice guidance on the requirements and controls for training, examination and qualification of welders.

A unique feature of welding world-wide is that, in order to be employed, welders must prove their practical skill via a qualification test in accordance with a recognised specification (References 2, 3, 4 and 5). This also involves periodic re-testing (or 'prolongation') in order to ensure on-going competence. In some sectors of manufacturing (pressure equipment, construction products and railway vehicles) these qualification tests are a legal requirement arising from EU directives and the involvement of BEIS Notified Bodies (or BEIS Recognised Third Party Organisations) is mandatory.

These tools will be fully deployed in the end-point assessment of the welding apprenticeship programme to give employers the confidence that welders, when completing their apprenticeship, have the required competencies regardless of where they were trained and by whom they were assessed.

The international standards include requirements for Training Bodies, including teachers and instructors, and for Assessment Organisations, including examiners. These internationally agreed requirements have been included in this plan.

In order to be involved in the delivery of the Welding Apprenticeship Standard, Training Bodies will be expected to satisfy the criteria set out in the Employer Occupational Brief (Reference 6). Assessment Organisations will be required to satisfy the criteria set out in Appendix 1.

All available guidance on international best practice has been included in this plan as a minimum. This not only gives assurance that the required competencies in welding will be reliably and consistently achieved but also that the standard will be at a level that is comparable to the rest of the world.

Details of the training curriculum (Reference 1), published by the International Authorisation Board of the International Institute of Welding is provided in the Employer Occupational Brief, (Reference 6).

## Definitions

*Training Body* – a competent organisation for the training of welding apprentices in accordance with the requirements of this plan. Training Bodies must be listed on the Register of Apprenticeship Training Providers (RoATP).

*Assessment Organisation* - a competent organisation for the theoretical and practical testing of welding apprentices in accordance with the requirements of this plan, with particular reference to Appendix 1. Assessment Organisations must be listed on the Register of Apprentice Assessment Organisations (RoAAO).

*Skill/knowledge modules* – different combinations of welding processes, parent materials and welding positions.

*Authorised Examiner* – a competent person, appointed by the Assessment Organisation, to conduct the end-point assessment in accordance with this plan.

## Summary of assessment

The aim of the end-point assessment is to fully establish if the apprentice has achieved the knowledge, skills and behaviours listed in the Apprenticeship Standard. Each part of the end-point assessment covers the different part(s) of the Standard so that, in aggregate, the end-point assessment in its entirety, delivers the synoptic assessment required.

Apprentices will be required to successfully achieve qualifications at Level 2, in English and Mathematics within the period of apprenticeship if not already achieved.

In welding, there is a wide range of possible combinations of welding process, parent material and welding position. Even in a comprehensive apprenticeship programme it will only be possible for an apprentice to gain competence in a small number of these combinations.

The employer will be required to select skill/knowledge modules (from Table 1) that are the most relevant to the employing organisation. The employer will notify the Training Body and the Assessment Organisation of the modules selected.

The apprenticeship programme is expected to have an overall duration of 38 months (but no shorter than 32 months). Prior to undertaking the end-point assessment, apprentices will be required to undergo a sustained period of on- and/or off-the-job training (covering the modules selected from Table 1) provided by a Training Body that meets the recommendations set out in Reference 6.

There will be a mandatory three-part holistic end-point assessment starting no earlier than three months before the planned end of programme.

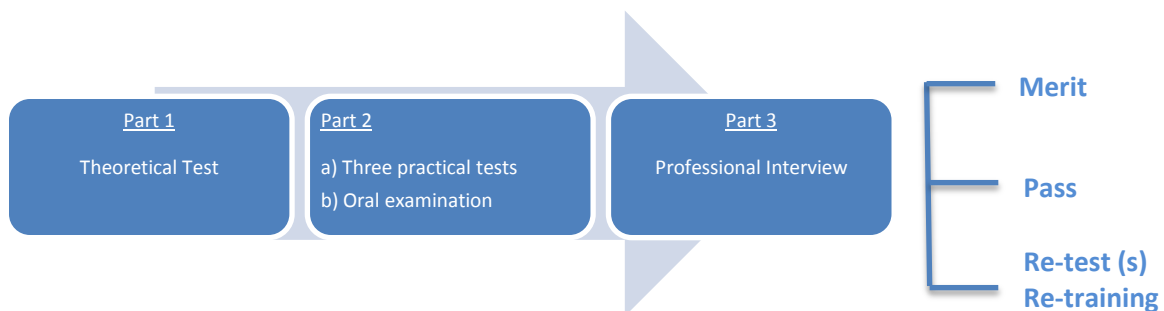
The three parts of the end-point assessment are as follows:

1. **A theoretical knowledge test** using multiple choice question papers containing generic questions relevant to all welders and specific questions relevant to the theoretical part of the skill/knowledge modules selected by the employer.
2. **A practical/oral examination** comprising three practical tests and an oral examination. The practical tests will be carried out in accordance with a recognised industry specification and will be in the most difficult welding positions for the skill/knowledge modules selected. The Authorised Examiner (Appendix 1), responsible for supervising the tests, will also conduct an oral examination to assess the apprentice's understanding of the tests he/she is undertaking and of the wider responsibilities of a welder.
3. **A professional interview** which is designed to do two things: firstly, to further explore the apprentice's knowledge relevant to his/her role and, secondly, to assess if the apprentice's occupational behaviours meet the requirements specified in the Apprenticeship Standard.

Part 3 must be carried out last.

In order to be successful, apprentices must pass all three parts.

The criteria for passing the assessment will be such that successful apprentices will also be eligible for Engineering Technician Registration through a licenced body of the Engineering Council.



There are no mandatory gateways for entry to the end-point assessment. However, the Apprentice must achieve the required level of English and Mathematics. The employer must also be satisfied that the Apprentice has undertaken sufficient training to be ready to attempt the end point assessment. This will be ascertained by the apprentice and employer holding a review meeting. In order to facilitate this it is strongly recommended that Training Bodies have in place systems of continuous on-programme assessment of knowledge, skills and behaviours in order to enable an informed decision to be made about when apprentices, nearing completion of the programme, are ready for the end-point assessment. Records of these assessments should be kept and made available to the Assessment Organisation prior to the end-point assessment.

All parts of the end-point assessment are to be carried out under the direct control of the Assessment Organisation. Assessments may be conducted on the employer's premises, at the Training Body, at the Assessment Organisation's premises or at a mixture of the three. The Assessment Organisation is responsible for ensuring that the equipment and facilities required for the end-point assessment are in place, regardless of where the assessment is carried out. More details of the required facilities and responsibilities are given in Appendix 1

## Detailed explanation of the end-point assessment

The end-point assessment has been designed to ensure that the Apprentice has satisfied all the knowledge, skill and behavioural requirements as set out in the Apprenticeship Standard.

The options regarding skill/knowledge modules are shown in Table 1 below. The employer is required to select three of the 21 skill/knowledge modules from the table, covering all welding positions (Flat, Horizontal, Vertical, Overhead, Inclined) in pipe and/or plate. The scope of the specific part of the theoretical knowledge tests (Table 2) and the practical skill tests will be in accordance with the modules selected by the employer.

**Table 1. Skill/knowledge modules available**

Welding Filler Material Groups	Welding Process(es)				
	TIG (GTAW)	MIG/MAG (GMAW)	MMA (SMAW)	TIG root /MMA Fill	FCAW
Carbon & Low Alloy steel (up to 4% total alloy content)	Module 1	Module 6	Module 11	Module 15	Module 19
High Alloy Ferritic / Martensitic Steels	Module 2	Module 7	Module 12	Module 16	Module 20
Austenitic Stainless Steels	Module 3	Module 8	Module 13	Module 17	Module 21
Nickel and Ni Alloys	Module 4	Module 9	Module 14	Module 18	Not applicable
Aluminium & Al Alloys	Module 5	Module 10	Not applicable	Not applicable	Not applicable

The knowledge requirements are listed in the Apprenticeship Standard and more details may be found in References 1 and 6. The practical skills required are given in the welder qualification specification(s) selected by the employer (References 2, 3, 4 and 5). The apprentice will be required to demonstrate that he/she has achieved the skill requirement for welding plate and/or pipe in all positions with the completed test pieces meeting the required levels of quality in accordance with the selected specification.

Each of the three parts of the end-point assessment (1, 2 and 3) is described in detail below.

### 1. Knowledge test

This will be a written multiple choice examination paper structured in accordance with Table 2. The content will be tailored to suit the skill/knowledge modules selected and the training curriculum,(References 1 and 6). Examinations are conducted by the Assessment Organisation.

**Table 2. Maximum duration of each theoretical examination section in accordance with the curriculum given in Reference 1.**

Process Section (Duration)	Welding	MMA (SMAW)	TIG (GTA)	MIG/MAG (GMAW) FCAW
	<b>A</b>	<b>General Theoretical Training (includes questions on Carbon and low alloy steels)</b>		
Basic welding equipment and processes (A.1-A.9*) (20 hours)	55 minutes (40 questions)			

	Making welded joints (B.1-B.9*) (18hours)	40 minutes (36 questions)		
	Pipe welding and materials other than steel (C.1-C.4*) (7 hours)	15 minutes (14 questions)		
<b>B</b>	<b>Welding Process Specific Theoretical Training</b>			
	MMA (SA.1-SA.3*) (5 hours)	10 min (10 questions)		
	TIG (ST.1- ST.3*) (5 hours)		10 min (10 questions)	
	MIG/MAG/FCAW (SM.1-SM.4*) (7 hours)			15 min (14 questions)
<b>C</b>	<b>Materials Specific Theoretical Training</b>			
	High alloy steel (8 hours)	20 minutes (16 questions)		
	Austenitic stainless steel (PSS.1-PSS.4*) (8 hours)	20 minutes (16 questions)		
	Nickel (8 hours)	20 Minutes (16 questions)		
	Aluminium (PAL.1-PAL.4*) (8 hours)	20 minutes (16 questions)		

(\* - see References 1 and 6.)

As an example, if skill/knowledge module 13 (Table 1) is selected, the following would be the options for the apprentice for each section:

- A = **ALL** general theoretical training would apply
- B = **ONLY** MMA (SMAW) specific theoretical training would apply
- C = **ONLY** austenitic stainless steel specific theoretical training would apply

It is only necessary to pass Section A once, it is not repeated for the other skill/knowledge modules selected.

If another module selected from Table 1 was module 5, then the apprentice's other skill/knowledge modules would be:

- B = TIG specific theoretical training
- C = Aluminium specific theoretical training

During the course of their training, it is recommended that apprentices complete interim theoretical examinations, set by the Training Body using their own questions, based on the curriculum given in References 1 and 6, in order to prepare them for the final theoretical test.

An Assessment Organisation seeking approval to conduct the end-point assessment for the Trailblazer Welding Apprenticeship will be required to develop a bank of examination questions which adequately test the knowledge requirements in the Apprenticeship Standard. The Assessment Organisation would also be required to show how it selects questions from their bank, in order to produce examination papers that comply with the structure in Table 2 and to ensure a reasonable spread of questions across the syllabus for each section.

The grading of the knowledge test is decided by the Assessment Organisation's Authorised Examiner (Appendix 1).

## 2. Practical tests and associated oral examination

This part is synoptic because, as well as testing the apprentice's skill in the practical part, he/she also has the opportunity to demonstrate the required knowledge and behaviours in the oral part.

#### **a) Practical test**

In many senses this is the most important part of the end-point assessment because in the vast majority of cases, employers are obliged to use only those welders who have passed a recognised skill test. For over 60 years this has been the practice in welding manufacture and construction world-wide and consequently there are several national and international specifications that provide detailed requirements for the practical testing of welding skills (References 2, 3, 4 and 5). Success in a practical test in accordance with one of these, or an equivalent specification, has effectively become a licence to practice as a welder.

The existence of this testing regime facilitates the end-point assessment of practical skills in the welding apprenticeship programme. All apprentices must undertake and pass the practical test in order to successfully complete the apprenticeship.

It is simply a matter for the employer to select the appropriate welder qualification specification which is the most relevant to the employer's welding activities, and the Assessment Organisation implementing the tests (using the process/material combinations selected from Table 1, in welding positions which provide the widest range of approval) in accordance with that specification.

The employer may select one of the referenced specifications (2, 3, 4 or 5) or another specification containing equivalent technical criteria.

It is strongly recommended that the Apprentice undertakes progressive tests to build up his/her practical skills as part of their training. This ensures that, on reaching the end-point assessment, the apprentice has received the optimum preparation. This will also allow the apprentice to carry out production activities within the scope of any practical tests already passed.

Whichever specification is selected, the test conditions, inspection and quality requirements, will be defined by the specification. The Assessment Organisation will supervise the welding and testing, and evaluate the result against the requirements of the selected specification (Appendix 1). Where agreed between the Employer and Assessment Organisation, practical tests may be undertaken as an on-the-job production activity.

The duration of the practical test is entirely dependent on the skill/knowledge modules selected and the thicknesses of the materials being welded. The test shall be completed within a representative timeframe commensurate with the employer's production requirements.

Destructive and non-destructive tests for qualification testing of welders shall be carried out by qualified inspection personnel, in accordance with appropriate testing specifications.

A pass or fail result for the practical test will be awarded by the Assessment Organisation's Authorised Examiner (Appendix 1).

#### **b) Oral examination**

During the course of the practical test, the Authorised Examiner will also be required to conduct an oral examination of the apprentice to assess the understanding of the tests he/she is undertaking along with the wider responsibilities of a welder.

The questions asked will be commensurate with the employer's production activities. The scope of the oral examination will include observations of the apprentice's actions and responses to the following:

- Understanding and identification of the safety requirements for arc welding.
- Correct preparation of the welding environment.
- Identify and ensure correct function and parameter settings of welding equipment.
- Identify consumables to be used and the components to be welded.
- Verify the fit up, weld preparations and preheating where required.
- Competent execution of the welding task including any tack welding.
- Adopting good practice in the execution of welds, in accordance with the applicable welding procedure specification.
- Visual inspection of the completed weld.
- Completion of all necessary documentation.
- Disposing of waste materials appropriately.
- Additional factors to be considered when welding outdoors, if applicable.

A pass or fail result for the oral examination will be awarded by the Assessment Organisation's Authorised Examiner (Appendix 1).

### **3. Professional interview**

The professional interview will be attended by:

- The Apprentice.
- An Authorised Examiner of the Assessment Organisation, (Appendix 1); competent in conducting and deciding the result of the professional interview.

If required, a person authorised by a Professional Engineering Institution (PEI) (which must be licenced by the Engineering Council to register Engineering Technicians) to conduct Professional Review Interviews leading to Engineering Technician Registration.

The Authorised Examiner and the person authorised by the PEI can be the same person.

The Authorised Examiner (and PEI representative if applicable) is responsible for leading the interview and for making a decision on the outcome. The Authorised Examiner (or PEI representative if applicable) or the Apprentice may request the presence in the interview of the Training Body's representative and/or the employer's representative as observers only. Training Bodies and employers are not permitted to influence the conduct of the interview or its outcome.

If required, a person authorised by a Professional Engineering Institution (PEI) (which must be licenced by the Engineering Council to register Engineering Technicians) to conduct Professional Review Interviews leading to Engineering Technician Registration.

The professional interview will cover three areas:

1. Application of knowledge learned during the apprenticeship.
2. Role of the welder in industry.
3. Professional behaviours as listed in the Apprenticeship Standard.

4. Evaluation against the requirements for registration as an Engineering Technician if not already covered in items 1-3 above.

In order to satisfy items 1 and 2 above, questions relating to the subjects identified in the knowledge and practical test sections can be used in the professional interview. The interview will also provide an opportunity for employers to probe further into gaps in the apprentice's skills, knowledge and behaviours that may require further development.

Documentation from the apprentice's progress throughout the apprenticeship programme can be used to support the interview process including:

- Evidence from the employer and separate evidence from the Training Body concerning key areas of the apprentice's behaviour such as: timekeeping, health and safety, working with others, professional commitment, problem solving and identifying improvements, dealing with identified shortcomings, etc.

Although it will not be mandatory for apprentices to register as Engineering Technicians, they must satisfy the requirements for Registration in order to successfully complete the apprenticeship.

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

A comprehensive list of behavioural requirements for EngTech registration is given in Appendix 2.

It is expected that the interview should last no more than 60 minutes. The questions asked and the score achieved by the apprentice for each question will be recorded. The result of the interview will be decided by the Assessment Organisation's Authorised Examiner and the PEI representative (if applicable), who may consult with the employer and Training Body. An exemplar record form for the Professional Interview is shown in Appendix 3.

#### **4. Quality Assurance**

The key to success with any training and qualification programme lies in ensuring that the required standards are met consistently and reliably. This can only be achieved through a rigorous quality assurance regime. For the welding apprenticeship, international best practice in the control of training and assessment activities will be followed:

- Training Bodies will be expected to meet the requirements given in Reference 6.
- Assessment Organisations will be required to meet the requirements given in Appendix 1.

##### **4.1 Internal QA**

Assessment Organisations will be required to operate in accordance with a quality management system, including an internal audit regime, which assures compliance with the requirements given in Appendix 1, Introduction, on an ongoing basis.



## 4.2 External QA

We are developing a model for External Quality Assurance with BIS and the Assessment Plan will be updated once those arrangements are confirmed.

## Grading

In the theoretical examination, each multiple choice question has four possible answers, only one of which is correct. One mark is awarded for a correct answer and no marks are awarded for an incorrect answer. The pass mark for the knowledge test is 60% and it has a weighting in the overall assessment of 20%.

The way to evaluate the outcome of the practical test(s) is fully defined in the applicable qualification specification and no additional criteria or levels are necessary. The overall result is either a pass or fail. The practical test has a weighting in the overall assessment of 50%.

The performance of the apprentice in the oral examination is scored out of 100 with the pass mark set at 60. The weighting of the oral examination in the overall assessment is 15%.

The performance of the apprentice in the professional interview is scored out of 100 with the pass mark set at 60. The weighting of the professional interview in the overall assessment is 15%.

The grading is summarised in Table 3 below.

**Table 3. End-point assessment grading summary**

Part No.	Type of Assessment	Weighting	Pass mark
1	Knowledge Test	20%	60%
2	(a) Practical test	50%	Pass
	(b) Oral Examination	15%	60%
3	Professional Interview	15%	60%

In order to successfully complete the end-point assessment, the apprentice must pass all parts. In order to achieve a merit grade, the apprentice must pass all parts and, in addition, achieve an overall mark of 87.5 or more calculated as follows:

Part 1 – Mark obtained x 20/100 = k

Part 2a – 50

Part 2b – Mark obtained x 15/100 = o

Part 3 – Mark obtained x 15/100 = p

Overall mark = k + 50 + o + p

If the apprentice is unsuccessful in any of the three parts, the following re-test conditions will apply:

1. *Knowledge test* – two retests are available in the sections failed. If the apprentice fails the second retest, he/she must retake the applicable theoretical training before taking another test. Results of all knowledge tests are to be passed back to employer for review.
2. *Practical test and oral examination* – one practical re-test is available but further welding practice relevant to any shortcomings identified in the test is recommended. If the apprentice

fails the oral examination, two further attempts at this part are permitted. If the second retest is failed, further training will be required.

3. *Professional Interview* – the shortcomings identified in the interview must be addressed and documented evidence provided before a second interview can be conducted. If the apprentice fails to meet the requirements in the second interview, at the discretion of the Authorised Examiner, the apprentice can be given the option of presenting documentary evidence, within 14 days, of how he/she has addressed the shortcomings identified during the interview. The Authorised Examiner may then decide to award a pass grade on the basis of any additional evidence presented, or may decide on an alternative course of action.

Information on failures in any of the parts as indicated above must be passed back to the employer for review.

Resits can only be funded if there is additional learning.

## Implementation

### 1. Costs

The costing plan and associated templates have been submitted separately.

It is expected that the overall end-point assessment cost will not exceed 19% of the total cost of the apprenticeship programme and that there will be around 1500 starts per year once the programme is fully established

### 2. Delivery

The plan is designed to meet the needs of a wide range of employers, large and small and be applicable to all industrial areas of activity that rely on high quality multi-positional welding, for example in sectors such as: power generation, oil and gas, marine, transport, nuclear, processing, aerospace, pharmaceuticals, construction and many more. Multi-positional welders are required in the manufacture of pressure containment equipment, pressure pipework, offshore jackets, submarines, military vehicles and equipment, aero engine components, etc. In these sectors, welders are required to work with a range of welding processes, with different metals, and to the levels of quality and inspection required in safety critical applications. The finished welds are often subjected to rigorous inspection and testing.

It is estimated that currently, there are around 40 organisations that deliver welder training in England. It is estimated that approximately 15 of these organisations already satisfy the recommended criteria for Training Bodies given in Reference 6.

There are a number of Assessment Organisations that could satisfy the requirements outlined in Appendix 1.

## References

1. EWF/IIW Guideline – European/International Welder. Minimum Requirements for the Education, Examination and Qualification. IAB-089 r5-15.

2. BS 4872 - Specification for approval testing of welders when welding procedure approval is not required.
3. ISO 9606 - Qualification testing of welders - Fusion welding, Part 1: Steels and Part 2: Aluminium and aluminium alloys.
4. ASME IX - ASME Boiler and Pressure Vessel Code Section IX-Welding, Brazing, and Fusing Qualifications.
5. AWS D1.1. American National Standard. Structural Welding Code – Steel.
6. Employer Occupational Brief for Level 2 and 3 Welding Apprenticeship Standards: <http://www.theweldinginstitute.com/careers-and-education/careers-in-welding/welding-trailblazer-apprenticeship/> ISO/IEC 17024 - Conformity assessment - General requirements for bodies operating certification of persons.

## **Appendix 1**

### **Criteria for Assessment Organisations**

#### **Introduction**

Assessment Organisations have the responsibility to conduct the examinations, tests and interviews required for the end-point assessment of the apprenticeship programme. The following are rules under which the examinations, tests and interviews shall be conducted.

All Assessment Organisations must be able to demonstrate competence in the functions they are required to undertake and be independent and impartial.

In order to ensure consistency of assessments, Assessment Organisations will be required to operate in accordance with a quality management system, including an internal audit regime, which assures compliance with the requirements given in this appendix on an ongoing basis. Such internal QA measures shall include: regular standardisation meetings, periodic moderation of the competence of Authorised Examiners, for example by observing practical tests, oral examinations and interviews; and by consistency checks between the marking of individual examiners, for example by performing duplicate checks on a sample of written examination papers.

Assessment Organisations will need to be registered with the SFA and be accredited to ISO/IEC 17024 (Reference 7) by the United Kingdom Accreditation Service (UKAS) with a scope that is relevant to the apprenticeship programme.

An end-point Assessment Organisation must:

- Have relevant occupational experience of the applicable Apprenticeship Standard
- Provide Quality Assurance of their activity.

An end-point Assessment Organisation cannot:

- Deliver the learning elements to the same apprentice
- Deliver end-point assessment to anyone who has not completed an apprenticeship programme in accordance with the applicable Apprenticeship Standard.

Examinations, tests and interviews shall be planned and structured in a manner which ensures that all the requirements of the end-point assessment are objectively and systematically verified, with sufficient documented evidence produced to confirm that this is the case.

#### **Authorised Examiners**

Assessment Organisations shall appoint representatives to act as Authorised Examiners. Authorised Examiners shall be qualified, as a minimum to:

- International/European Welding Specialist, or
- Certified CSWIP or PCN Welding Inspector, or
- A1 Assessors with recent, relevant occupational experience and competence in the occupational areas covered by the Apprenticeship Standard and this Assessment Plan

The overall responsibilities of Authorised Examiners are to:

- Organise the end-point assessment (theoretical, practical and interview).
- Conduct the practical test as detailed below.
- Set the questions (written and verbal as applicable).
- Supervise (invigilate) theoretical examination(s).
- Mark and collate the results of the assessments: written, practical and interview.
- Decide the result of the end-point assessment.
- Provide feedback to the candidate on the outcome of the assessment(s).

The above is to be carried out in accordance with the Assessment Organisations written procedures.

With regard to part 2(a) of the end point assessment, it is the responsibility of the Assessment Organisation's Authorised Examiner to verify compliance with the test specification selected (ISO 9606, ASME IX, etc.) with particular with reference to the following:

### **1. Before starting test**

- a) *Checking of the welder's identity (e.g. driving licence).*
- b) *Checking of the welding procedure specification and handing it to the welder.*
- c) *Checking of the test piece:*
  - *Parent material (identification)*
  - *Dimensions (thickness, length and diameter)*
  - *Joint preparation (according to the welding procedure specification)*
  - *Welding position*
  - *Stamping (welder's and examiner's stamps)*
- d) *Checking of tack welds.*
- e) *Identification of the welding consumables (according to the welding procedure specification).*

### **2. During the test (as applicable)**

- a) *Welding parameters (according to the welding procedure specification) e.g.*
  - *Current*
  - *Polarity*
  - *Voltage*
  - *Wire feed speed*
  - *Stand-off distance*
  - *Gas flow rate*
- b) *Interruption of root, capping and other weld runs as required by the specification.*
- c) *Possible permission for repair.*
- d) *Weld time (reasonable).*
- e) *Interruption of the test (if welder's capability to carry out the test is in question).*

### **3. After welding**

- a) *Ensure that the required NDT and mechanical testing for the particular approval test are carried out (test reports):*
  - *Visual inspection, ISO 17637*
  - *Fracture tests, ISO 9017*
  - *Macro examination, ISO 17639*
  - *Bend tests, ISO 5173*
  - *Magnetic particle testing, ISO 17638*
  - *Penetrant testing, ISO 3452-1*
  - *Ultrasonic testing ISO 13588*
  - *Radiography, ISO 17636*
  - *Transverse tensile test, ISO 4136*

*That the acceptance levels are fulfilled, ISO 5817, ISO 10042, or equivalent.*

Authorised Examiners shall:

- Have a detailed understanding of the Apprenticeship Standard and this Assessment Plan.
- Have a thorough knowledge of the relevant assessment methods and assessment documents.
- Have appropriate knowledge and competence in the field to be examined, see exemplar qualifications above.
- Be free from any conflict of interest so that they can make impartial and non-discriminatory judgements.

Where an Examiner has a potential conflict of interest in the assessment of an apprentice, the Assessment Organisation shall take measures to ensure that confidentiality and impartiality of the assessment is not compromised.

### **Facilities**

Written examinations shall be held in a quiet, well-lit, well ventilated and comfortable room with adequate desk space for the documents being used. There should be adequate separation of candidates, (where more than one candidate is being examined concurrently) to minimise the risk of plagiarism.

Wherever possible, interviews shall be conducted in a quiet area, with a degree of privacy for the candidate. However, it is recognised that some questioning is likely to occur during the observation of practical assessments.

Practical assessments shall be conducted in a fully equipped work area. The range of welding and auxiliary equipment and consumables available must be sufficient in quantity to cover the maximum number of apprentices being tested concurrently. All equipment must be in good working order and fit for purpose. Instruments of checking of welding parameters must be available and calibrated, validated or verified as appropriate (for example to ISO17662).

It is the responsibility of the employer to ensure the correct protection of the apprentice.

It is essential that the facility has sufficient risk assessments in place which, define the necessary requirements for a candidates planned activities. Risk assessments must also consider the presence of the Authorised Examiner and any supporting people in close proximity to the assessment activity.

Risk assessments shall include (but not be limited to) welding equipment, protective screening, ventilation, welding fume extraction, personal protective equipment, welding fume COSHH assessment data, manual handling, working at heights and other associated activities and the location of access and egress points.

Risk assessments shall be reviewed by the candidate at the start of the practical assessment to determine their suitability and may form part of the oral assessment. The risk assessment must be reviewed and accepted by the employer and/or the Authorised Examiner.

### **Security and confidentiality**

The Assessment Organisation must ensure the security and confidentiality of all examination questions, records and information related to end-point assessments.

Examination papers shall be stored in a secure manner to prevent access by unauthorised persons.

Question papers shall be printed and copied under secure supervised conditions and retained in sealed envelopes in a locked area prior to use.

All persons involved in these activities shall be made aware of their obligations with regard to security and confidentiality.

## Appendix 2

### Selected EngTech behavioural requirements from UK SPEC

1. Identify the limits of own personal knowledge and skills.
2. Strive to extend own technological capability.
3. Broaden and deepen own knowledge base through new applications and techniques.
4. Contribute to the evaluation and development of continuous improvement systems.
5. Apply knowledge and experience to investigate and solve problems arising during engineering tasks and implement corrective action.
6. Operate appropriate management systems.
7. Contribute to meetings and discussions.
8. Prepare communications, documents and reports on technical matters.
9. Exchange information and provide advice to technical and non-technical colleagues.
10. Know and manage own emotions, strengths and weaknesses.
11. Be aware of the needs and concerns of others, especially where related to diversity and equality.
12. Be confident and flexible in dealing with new and changing interpersonal situations.
13. Identify, agree and work towards collective goals.
14. Create, maintain and enhance productive working relationships and resolve conflicts.
15. Comply with the rules of professional conduct of own institution.
16. Manage work within all relevant legislation and regulatory frameworks, including social and employment legislation.
17. Operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously.
18. Provide products and services which maintain and enhance the quality of the environment and community and meet financial objectives.
19. Understand and encourage stakeholder involvement in sustainable development.
20. Use resources efficiently and effectively.
21. Undertake reviews of own development needs.
22. Plan how to meet personal and organisational objectives.
23. Carry out planned (and unplanned) CPD activities.
24. Maintain evidence of competence development.
25. Evaluate CPD outcomes against any plans made.
26. Assist others with their own CPD.
27. Exercise responsibilities in an ethical manner.



## Appendix 3

### PROFESSIONAL REVIEW INTERVIEW FOR ENGINEERING TECHNICIAN REGISTRATION (EngTech)

Applicant:

Applicant Number:

Venue/Location

Date & Time:

ID PROVIDED:

Passport

Driving Licence

#### See KEY for definition of score grades

ENGINEERING TECHNICIAN (EngTech) Score Grades		Very Strong 3	Practice Standard 2	Adequate Awareness 1	Little or No Evidence 0	Row Score	Block Mean Score
<b>A - Key Words as aide memoire:</b> Engineering Knowledge & understanding. Technical Skills. Practical Skills. Experience. Application of Skills. Competencies. Selection of Techniques, Procedures & Methods. Problem solving. Deep understanding of equipment, system or mechanism. Process Improvement. Initiative.							
A 1	Use of engineering knowledge and understanding to apply technical and practical skills, techniques and methods to task - competence.						
A 2	Sound evidence-based approach to application of engineering principles in problem-solving. (i.e. processes, equipment or mechanism)						
<b>Any Comments:</b>							
<b>B – Key Words as aide memoire:</b> Design, Development, Manufacture, Construction, Commissioning, Operation. Maintenance of Products, Equipment, Processes, Systems or Services. Measurement, Monitoring, Application of diagnostic tools, Material selection, Component selection, People, Resource, Plant, New working methods. Safety, Cost, Environment.							
B 1	Use of engineering techniques, procedures and methods to Identify source of problem or an opportunity for continuous improvement (i.e. measurement monitoring, application of diagnostic tools or methods)						
B 2	Contribute to design or development of engineering solutions. Organise and use resource with consideration for cost, quality, safety and environmental impact.						
<b>Any Comments:</b>							
<b>C – Key Words as aide memoire:</b> Personal responsibility, Agreed targets, Cradle to grave project. Relevant standards for project. Variation orders, Concessions, Minutes, Meetings, Site notes, Specifications, Drawings, Reports, Programmes of work.							
C 1	Plan for effective project implementation, working reliably without close supervision to the appropriate codes of practice. Personal contribution.						
C 2	Take responsibility for work of self and others. Supervise the planning and organisation of tasks, people and resources.						
C 3	Accept, allocate and supervise practical, technical and other tasks. Support to individuals and teams (i.e. drawings, reports planning).						
<b>Any Comments:</b>							

ENGINEERING TECHNICIAN (EngTech) Score Grades		Very Strong 3	Practice Standard 2	Adequate Awareness 1	Little or No Evidence 0	Row Score	Block Mean Score	
D – <i>Key Words as aide memoire:</i> Effective Communication. Interpersonal skills. Contribution to discussions, Presentations, Progress meetings. Interpretation of written information. Different documents, Letters, Reports, Drawings, Work instructions, Advice, Task planning. Organisation of documents from Colleagues, Clients, Customers, Management (Individuals application form).								
D 1	Communicate with others at all levels using oral, written electronic methods, (i.e. presentations, oral, computer, work instructions, face-to-face with customers).							
D.2	Demonstrate personal and social skills (i.e. with colleagues, clients, suppliers, public)							
<b>Any Comments:</b>								
E – <i>Key Words as aide memoire:</i> Personal commitment to code of professional conduct. Ethics. Attitude, Diversity. COSHH. HS&E. Risk Assessments, Environmental considerations, Recycling. CPD.								
E.1	Understand and comply with TWI Codes of Conduct							
E.2	Manage and apply safe Systems of Work (i.e. COSHH, safety training).							
E.3	Undertake engineering activities in a way that contributes to sustainable development (i.e. minimise risk, HS&E, environment)							
E.4	Carry out Continuing Professional Development (CPD) necessary to maintain and enhance competence in own area of practice, keep up-to-date (i.e. CPD evidence, study, magazine, branch meetings, conferences)							
<b>Any Comments:</b>								
<b>TOTAL SCORE</b>								
Note 1	Pass mark is 28 with a minimum block mean score of 1.5 and not more than 1 zero score across the whole form.							
Note 2	Where these conditions are not met by a small margin but the panel wishes to recommend registration, it may make a positive recommendation provided it argues a case for dispensation from normal guidelines in the Chairman's summary on page 5 of this form.							

### KEY TO SCORE GRADES

	Score Grade	Definition
3	Very Strong	Excellent, highly skilled, very quick and competent overall
2	Practice Standard	Good, skilled and quick worker in their specialty
1	Adequate Awareness	Competent , skilled and reliable
0	Little or No evidence	Fair, moderate skills, slow and needs supervision.

**CHAIRMAN'S SUMMARY**

Enter here a brief statement, about the overall view of the Panel or Assessor, any special strength or weaknesses for successful applicants or identification of major shortfalls for unsuccessful applicants.

In borderline cases where the Panel or Assessor wishes to argue a dispensation from the normal guidelines (as per note 2 on the front page) please give reasons in full detail below:

**RECOMMENDATION FROM PANEL/ASSESSOR:**

**PROFESSIONAL MEMBERSHIP INTERVIEW PANEL/ASSESSOR**

**CHAIRMAN:** \_\_\_\_\_ **QUALIFICATIONS:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**ASSESSOR (Optional):** \_\_\_\_\_ **QUALIFICATIONS:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**ASSESSOR/OBSERVER (Optional):** \_\_\_\_\_ **QUALIFICATIONS:** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

## **ENGINEERING TECHNICIAN, INDIVIDUAL ROUTE - GUIDANCE FOR ASSESSORS**

1. Consider carefully your **understanding** of the title 'Engineering Technician'. The definition taken from the "UK Standard For Professional Engineering Competence". The aim is to adduce sufficient evidence to determine beyond reasonable doubt whether or not the candidate meets the definition:

*"ENGINEERING TECHNICIANS are concerned with applying proven techniques and procedures to the solution of practical engineering problems. They carry supervisory or technical responsibility, and are competent to exercise creative aptitudes and skills within defined fields of technology. Professional Engineering Technicians contribute to the design, development, manufacture, commissioning, decommissioning, operation or maintenance of products, equipment, processes or services. Professional Engineering Technicians are required to apply safe systems of working".*

2. Consider how you will **adduce the evidence** of the outcome of the candidate's education, training and responsible experience. The fact that the candidate is presenting for assessment by the "Individual Route" indicates that he/she cannot easily produce well recognised certificates of education. The assessor has to look for evidence of educational equivalence.
3. Remember it is the **outcome** of education and training, which is important not the method. The learning of knowledge, skill and attitudes may for instance, be by example, by discovery and experiment, by one-to-one instruction from a colleague or supervisor, from reading, computer based training (or whatever) and may be just as valid as learning acquired at college, training school or customer support centre on a formal course.
4. The process starts with the candidate completing the "Application for Assessment Documentation". This gives a biographical background and is likely to cover details of early vocational education and training, which is typically gained during an apprenticeship or equivalent.

They should show a level of vocational education up to City and Guilds Craft Part II Certificate or NVQ3. If there is no evidence of this, then the candidate should demonstrate that they have gained the necessary knowledge and skills for their job, through working closely with other skilled colleagues over a number of years on relevant projects. The application form may not give the full story; therefore, this may be elicited during a meeting with the candidate at the workplace (if required) or by other means. It is largely from here that the assessor will judge the extent to which the candidate has developed their understanding of engineering principles and educational equivalence.

5. The candidate's current employment and level of responsibility can be validated during a workplace assessment (if required). Further evidence may be sought from the candidate's senior colleagues or supervisors if deemed necessary. Permission from the candidate should be sought before this is done. Check that the candidate has understood that the application form is about their current job and not a collation of any work ever done.
6. This Assessment Form enables you to mark every competency as identified in UK Spec and score it appropriately. As you are assessing the quality of the post held by the candidate together with their abilities and competencies, it is acceptable to draw a conclusion not just from the interview (where applicable) but also from the application form, supporting evidence and where relevant a workplace visit. The final recommendation is your subjective opinion based on all the evidence used in your objective marks.
7. The ultimate judgement rests with the Membership Education and Registration Committee (MERC), so candidates must not be given any indication of result at the end of the assessment.
8. When you have completed your task, send to the Professional Division at The Welding Institute.