

# End-point assessment plan for Plate Welder apprenticeship standard

Apprenticeship standard reference number	Apprenticeship standard level	Integrated end-point assessment
ST0852	3	No

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## Introduction and overview

This document sets out the requirements for end-point assessment (EPA) for the Plate Welder 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 Plate Welder apprentices, their employers and training providers.

Full time apprentices will typically spend 36 months on-programme (before the gateway) working towards the occupational standard and complete the required amount of off-the-job training in line with the apprenticeship funding rules. All apprentices will spend a minimum of 12 months on-programme.

The EPA period should only start, and the EPA be arranged, once the employer is satisfied that the apprentice is 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 that they can be evidenced to an EPAO. All pre-requisites for EPA assessment methods must also be complete and available for the assessor as necessary.

Achieved English and mathematics qualifications in line with the apprenticeship funding rules.

The EPA must be completed within an EPA period lasting typically three months, beginning when the apprentice has passed the EPA gateway.

The EPA consists of three discrete assessment methods.

The individual assessment methods will have the following grades:

### **Assessment method 1:** Multiple choice knowledge test

- Fail
- Pass
- Distinction

### **Assessment method 2:** Professional Discussion supported by portfolio

- Fail
- Pass
- Distinction

### **Assessment method 3:** Practical Skills Test

- Fail
- Pass
- Distinction

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

- Fail
- Pass
- Distinction

## EPA summary table

<b>On-programme</b> (typically 36 months)	<p>Training to develop the occupation standard's knowledge, skills and behaviours. complete training towards English and mathematics qualifications in line with the apprenticeship funding rules. Compilation of a portfolio of evidence</p>
<b>End-point assessment gateway</b>	<ul style="list-style-type: none"> <li>• employer is satisfied the apprentice is consistently working at, or above, the level of the occupational standard.</li> <li>• achieved English and mathematics qualifications in line with the apprenticeship funding rules</li> <li>• apprentice compiled a portfolio of evidence, to support the Professional Discussion</li> <li>• employer welding procedure specifications shall be provided by the employer to support the practical skills tests and preparations of equipment, consumables and materials at the test venue</li> </ul>
<b>End Point Assessment</b> (which would typically take 3 months)	<p>Assessment Method 1: Multiple choice knowledge test With the following grades:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul> <p>Assessment Method 2: Professional Discussion supported by portfolio With the following grades:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul> <p>Assessment Method 3: Practical Skills Test With the following grades:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul> <p>Overall EPA apprenticeship graded:</p> <ul style="list-style-type: none"> <li>• Fail</li> <li>• Pass</li> <li>• Distinction</li> </ul>

## Professional recognition

Aligns with recognition by:

- The Welding Institute - Engineering Technician

## Length of end-point assessment period:

The EPA (including all assessment methods) will typically be completed within three months of the apprentice passing the gateway.

If an EPA assessment method is failed, it should be re-sat/retaken in-line with the requirements set out in this 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 to the employer's confirmation that the apprentice is working at or above the level in the occupational standard, the apprentice must have completed the following gateway requirements prior to beginning EPA:

- achieved English and mathematics qualifications in line with the apprenticeship funding rules

For the multiple choice knowledge test:

- no specific requirements

For the professional discussion supported by portfolio, the apprentice must have completed and submitted a portfolio of evidence.

Portfolio of evidence requirements:

- apprentices must compile a portfolio of evidence during the on-programme period of the apprenticeship
- The format and structure of the portfolio needs to be agreed between the employer, the apprentice and the EPA (for example hard copy or on-line).

- However, the content must be sufficient to evidence the apprentice can apply the knowledge, skills and behaviours required as mapped to the assessment method
- it will typically contain 10 discrete pieces of evidence
  - evidence must be mapped against the KSBs
  - evidence may be used to demonstrate more than one KSB; a qualitative as opposed to quantitative approach is required
  - any employer contributions should focus on direct observation of evidence (for example witness statements) of competence rather than opinions
  - naturally occurring evidence from production welding quality records. Collectively these shall cover the processes, materials groups, welding positions and welding joint geometries selected by the apprentice and employer as per S14, S15, S16 and S17. These shall also meet the quality requirements of recognised international standards for welding for example ISO 9606, ISO5817. This is expected to include:
    - welder approval certificates validated by a recognised third party organisation that are held by the apprentice, with six monthly prolongation signatures where appropriate
    - production welding records showing welding procedure specification, production control card used, method of inspection and acceptance criteria applied to the finished weld, volumetric inspection acceptance report for the identified weld authenticated by a suitably qualified welding inspector or non-destructive testing (NDT) technician
    - these records must be authenticated or signed by an employer representative (for example quality engineer, welding inspector, NDT technician), a list of these individuals and their email address and contact telephone numbers shall be held within the portfolio to allow independent validation of authenticity.
  - Each piece of evidence can be referenced against more than one knowledge, skill or behavioural requirement.
  - The portfolio should contain written accounts of activities that have been completed and referenced against the knowledge, skills and behaviours, supported by appropriate evidence, including photographic evidence and work products, such as work instructions, safety documentation, company policies and procedures as appropriate to the activities. Progress review documentation, witness testimonies, and feedback from colleagues and or clients should also be included. The apprentice's Manager and or Mentor will typically support the development of the portfolio in accordance with company policy and procedures, although the assessment organisation will provide further guidance on the content.
  - It is not expected that the portfolio will contain a daily diary of production work, but selectively record the activities that contribute to covering the range of skills statements listed above.

For the practical skills test:

- Employer to supply a summary of the selected material groups (two) and welding processes (two) applicable to the apprentice.
- Employer to supply a suite of employer welding procedure specifications (WPSs) for subsequent selection by Independent Assessor suitable for the range of materials and processes selected, and covering the range of main plate weld

joint configurations, from which the Independent Assessor can select the Practical Skills test pieces.

## Assessment methods

### Assessment Method 1: Multiple choice knowledge test

#### Overview

The rationale for this assessment method is that it:

- assesses the apprentice's depth of understanding in the knowledge elements that may not naturally occur during the observation.
- allows for the efficient testing of knowledge where there is a right or wrong answer
- does not require independent assessor time, reducing cost
- allows for flexibility for when and where the test is conducted

#### Test Format

The test can be:

- computer based
- paper based

It will consist of 30 questions:

- five questions must relate to the health and safety knowledge statements K19, K20
- eight questions must relate to the materials knowledge statements K1 and K2
- twelve questions must relate to the process knowledge statements K4, K11 and K12
- five questions must relate to the quality knowledge statements K13 and K17

The test will consist of closed response questions (multiple-choice questions). Apprentices must choose one correct answer from a choice of four.

Each question answered correctly will be awarded one mark. Any incorrect or missing answers will be assigned nil marks.

Apprentices will have 60 minutes to complete the test.

The test is closed book which means that the apprentice cannot refer to reference books or materials.

Apprentices must take the test in a suitably controlled environment that is a quiet space, free of distractions and influence, in the presence of an invigilator. The invigilator may be the independent assessor or another external person employed by the EPAO or specialised (proctor) software, if the test can be taken on-line. The EPAO is required to have an invigilation policy that will set out how the test or examination is to be carried out. This will include specifying the most appropriate ratio of apprentices to invigilators

to best take into account the setting and security required in administering the test or examination.

The EPAO is responsible for ensuring the security of testing they administer to ensure the test remains valid and reliable (this includes any arrangements made using online tools).

The EPAO must verify the suitability of the venue for taking the test and the identity of the person taking the test.

### **Marking**

Tests must be marked by independent assessors or markers employed by the EPAO following a marking guide produced by the EPAO. Alternatively, marking by computer is permissible where questions types allow this, to improve marking reliability.

### **Question and resources development**

Questions must be written by EPAOs and must be relevant to the occupation and employer settings. It is recommended that this be done in consultation with employers of this occupation. EPAOs should also maintain the security and confidentiality of their questions when consulting employers. EPAOs must develop 'question banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the questions they contain, are fit for purpose.

### **Required supporting material**

As minimum EPAOs will produce the following material to support this method:

- a test specification
- sample tests and mark schemes
- live tests and mark schemes
- analysis reports which show areas of weakness for completed tests/exams and an invigilation policy

## Assessment Method 2: Professional Discussion supported by portfolio

This assessment method has one component: professional discussion

The rationale for this assessment method is:

- the professional discussion is supported by a portfolio of evidence, enabling the apprentice to demonstrate the application of skill and behaviours as well as knowledge
- allows for testing of responses where there are a number of potential answers that couldn't be tested through the multiple-choice or practical tests
- it is a cost effective assessment method and does not require additional resources
- it allows the apprentice to be assessed against KSBs that may not occur naturally on a daily basis, would take too long to observe or do not lend themselves to direct observation

### Delivery

The 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. It will involve the questions that will focus on coverage of prior learning or activity in the context of the application of welding described in the portfolio of evidence.

The independent assessor will ask a minimum of 6 open, competence-based questions.

The independent assessor must combine questions from the EPAO's question bank and those generated by them. Follow up questions devised by the independent assessor are allowed to seek clarification.

The EPAO assessor will conduct and assess the professional discussion on a one to one basis.

The professional discussion must last for 60 minutes. The EPAO 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. Further time may be granted for apprentices with appropriate needs, in-line with the EPAO's Reasonable Adjustments policy.

The professional discussion must cover the following themes:

- health, safety and environment
- quality, quality system, defects, identification and avoidance
- materials and properties
- welding processes, parameters and controls
- professional integrity, collaboration, personal and organisational development

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

Evidence from the questioning must be assessed holistically using the grading criteria for this assessment method. The independent assessor will make all grading decisions.

## Venue

The professional discussion, supported by a portfolio of evidence, 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

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

## Other relevant information

A question bank must be developed by EPAOs. The 'question bank' must be of sufficient size to prevent predictability and the EPAO must review it regularly (and at least once a year) to ensure that it, and its content, is fit for purpose. The questions relating to the underpinning knowledge, skills and behaviours, must be varied yet allow assessment of the relevant KSBs.

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

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

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

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

- outline of the assessment method's requirements
- assessment recording documentation including marking materials
- guidance for apprentices and employers

## Assessment Method 3: Practical Skills Test

This assessment method has one component: practical skills test

The rationale for this assessment method is:

- The occupation involves practical activity best assessed through practical demonstration as it is relatively simple to replicate the working environment in a valid way and one in which employers would accept the occupational competence of an individual. It is expected that apprentices will be assessed in their workplace to ensure they are able to demonstrate competence in the real work environment. Where this is not possible (for example where the access to the employer's location is limited for security reasons), the EPAO is responsible for ensuring that the apprentice is assessed under normal conditions, in a familiar environment, using familiar resources and equipment that are representative of the apprentice's workplace. The external quality assurance provider is responsible for determining the impact of an alternative location on the validity and comparability of end-point assessments. Where access to an employer's site requires the independent assessor to be accompanied by a facility escort, the employer is responsible for liaising with the EPAO ensure that this is provided.
- the practical demonstrations reflect tasks that would be completed by plate welders on a regular basis; tasks not best suited to a practical skills test are assessed via the other assessment methods

### Delivery

Apprentices must be observed by an independent assessor completing two practical skills tests selected by the independent assessor that aligns to the production experience demonstrated in the portfolio of evidence in which they will demonstrate the KSBs assigned to this assessment method. Each test piece will be sufficiently different to assess different combinations of process, position, material (S14, S15, and S16). The end-point assessment organisation will arrange for the practical skills tests to take place, in consultation with the employer. The independent assessor shall select a range of test pieces to allow demonstration of skills on different materials, processes and welding positions. Practical skills tests must be carried out over a total assessment time of six hours. Questioning must be completed within the total time allowed for the practical demonstration.

The practical skills test may be undertaken over 2 working days, preferably concurrent working days. The assessor has the discretion to increase the time of the practical skills tests by up to 10% to allow the apprentice to complete the last task that is part of this element of the EPA.

The independent assessor may conduct and observe up to a maximum of four apprentices during this assessment method. To allow for cost effective use of resources while maintaining quality and rigour the assessor should be assisted by an invigilator when more than 2 candidates are being assessed concurrently, though by staggering the start times the necessity for an invigilator may be negated. The invigilator's role is to

observe the apprentice during the time when the assessor is observing or questioning the other apprentices. The invigilator cannot play a role in assessing the apprentice. Their role is to ensure that the apprentice carries out the task unaided during the period when the assessor is absent. Practical skills tests will be conducted in separate welding work stations. Adequate separation shall be implemented during questioning. This will reflect the specific environment of the test location, including line of sight, noise levels etc, to ensure reliability and fairness are not compromised.

There may be breaks during the practical demonstration to allow the apprentice to move from one location to another and for meal and or comfort breaks. During these breaks, the clock must be stopped and restarted to ensure that the assessment duration is not reduced.

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

The independent assessor will make all grading decisions, using clarifying questions as part of this decision making process.

The apprentice welder shall not be advised of the specific test piece details ahead of the start of the practical assessment test. To allow for the requisite test piece materials and consumables to be obtained, prepared and conditioned the following steps will be followed:

At gateway submission the employer will provide and confirm

- the selected Material types (two) and Processes (two) applicable to the Plate Welder apprentice
- the contact person, contact details to arrange material and consumable provision
- the necessary lead time needed to obtain and suitably prepare materials, for example the lead time is necessary due to the time required to machine compound angle butt welds, to be ready for the assessment day
- a suite of welding procedure specifications (WPSs) to cover the range of joint types defined in the plate welder apprenticeship standard for these materials and processes.

The EPAO will:

- select the specific WPSs to be used for practical skills test (defines materials, consumables and joint configurations)
- confirm to the test location (employer or training provider) to ensure test piece are ready on the day. This detail shall NOT be communicated to the apprentice.

The EPAO will only confirm the specific test piece details at the start of the practical skills assessment, which will include the selected test piece position and orientation to be tested.

The practical skills tests should be conducted in the following way to take account of the occupational context in which the apprentice operates:

- personal protective equipment (PPE) must be worn

- test pieces (prepared) and welding consumables must be agreed in advance. Where the apprentice is assessed in the workplace (preferred), the employer is responsible for ensuring that the apprentice has access to the resources used on a daily basis. Where the apprentice is not assessed in the workplace, the EPAO is responsible for ensuring that the apprentice has access to those resources. The EPAO may liaise with the employer to agree this provision in advance.

The following activities **MUST** be observed during the practical skills tests; that is a practical skills test without these tasks would seriously hamper the opportunity for the apprentice to demonstrate occupational competence in the KSBs assigned to this assessment method.

- set-up of equipment, consumables and test-pieces.
- welding activities
- interpreting and complying with welding procedure specification
- dressing, cleaning and removal of materials and contaminants
- working safely
- setting up and restoring working area

EPAOs will create and set open questions to assess related underpinning knowledge associated with knowledge, skills and behaviours that do not occur naturally during the practical skills test (for example dealing with emergent problems). The questions must be asked after each stage of the practical skills tests:

Stage 1 planning and preparation for welding; the independent assessor must a minimum of five questions (typically 20 minutes).

Stage 2 welding operations; the independent assessor must a minimum of five questions (typically 20 minutes).

Stage 3 post welding activities; the independent assessor must ask a minimum of three questions (typically 15 minutes).

Questioning must be completed within the total time allowed for the practical demonstration.

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

The independent assessor will make all grading decisions.

### **Questions and resources development**

EPAOs will create and set open questions to assess related underpinning knowledge, skills and behaviours.

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

EPAOs must develop 'practical specification banks' of sufficient size to prevent predictability and review them regularly (and at least once a year) to ensure they, and the specifications they contain, are fit for purpose. The specifications, including questions relating to underpinning knowledge, skills and behaviours must be varied, yet allow assessment of the relevant KSBs.

## Venue

Practical skills-tests must be conducted in one of the following locations:

- the employer's premises
- a suitable venue selected by the EPAO and agreed by the employer (for example a training provider's premises or another employer's premises)

The venue must be able to provide the following:

- electrical power supply
- gas supply
- lighting
- ventilation
- fume extraction
- screening and access barriers
- welding equipment

## Supporting material

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

- outline of the assessment method's requirements
- welding procedure specifications to be followed. The EPAO may present range of standard test pieces to be selected through consultation with the employer or may select from those used by the employer and submitted within the portfolio of evidence.
- assessment recording documentation including marking materials
- guidance for apprentices and employers

## Weighting of assessment methods

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

## Grading

### Assessment method 1: Multiple choice knowledge test

KSBs	Fail	Pass	Distinction
K1, K2, K4, K11, K12, K13, K17, K19, K20	Below 18 marks (60%) or Fewer than 4 marks for K19 and K20	18 to 23 marks (60% to 79%) and the following must be achieved: a minimum of 4 marks for K19 and K20	24 marks (80%) or above and the following must be achieved: a minimum of 4 marks for K19 and K20

### Assessment method 2: Professional Discussion supported by portfolio

To achieve a pass in the professional discussion supported by portfolio all the pass grading statements must be achieved.

To achieve a distinction in the professional discussion a distinction grade must be achieved for all grading descriptors, in two or more sections, one of which must be the **welding capability section**.

Quality, Health and Safety, Environment	
K10, K14, K15, K16, K18, S2, B8	
Fail	Does not meet pass criteria
Pass - apprentices must demonstrate all of the grading statements	Identifies the factors which will contribute to successful performance including the types of inspection reports required, the checks to be made in relation to product dimensions and non-destructive testing requirements.  Explains the time factors related to productivity for example for a given joint dimension and process the duration the welding activity should take as a norm.  Explains their role in the overall quality process and the organisational documentation that is required to be completed.

	<p>Participates in continuous improvement practices and explains methods of identifying and reporting where continuous improvement can be achieved e.g. Improvement Observation Reporting</p> <p>Explains the reasons why only approved organisational documentation should be used and the impacts of not using it.</p> <p>Explains the types of risks and hazards associated with the welding activity and how these are controlled in the working environment for example welding fume, arc UV and visible high intensity light.</p>
Distinction	<p>Analyses and makes recommendations for improvements in performance through application of the organisational continuous improvement processes.</p> <p>Demonstrates the impact of not using the organisational documentation.</p> <p>Evaluates and makes recommendations on the risk mitigation measures and contributes to the organisational HSE management processes.</p> <p>Provides illustrative examples of the use of quality control documentation where suggested continuous improvements have been put forward for review.</p>

<b>Personal Integrity</b>	
S9, B3, B4, B5, B6 and B8	
Fail	Does not meet pass criteria
Pass - apprentices must demonstrate all of the grading statements	<p>Describes typical problems in their area of responsibility, the importance of dealing with these in a timely and effective manner and how to escalate problems they are not able to resolve to the appropriate person for example non-conforming equipment and materials.</p> <p>Identifies and explains a range of methods (for example diagnostic testing) and techniques that can be used to resolve problems.</p> <p>Explains how they have planned and prepared for and reflected on safety, quality and production goals taking into account their competence and continuing professional development opportunities.</p> <p>Describes an occasion where they have confidently intervened and challenged poor practice for example nominated process not practical in environment.</p> <p>Identifies how and when to share feedback with others in order to implement change for example lessons learned feedback, improvement observation forms.</p>

	<p>Describes how they have carried out their work role in accordance with organisational requirements in safety, quality, ethics and self-development.</p> <p>Explains the importance of risk assessments and how to complete these at their point of work.</p> <p>Describes an occasion where they have encouraged and supported the development of others.</p> <p>Explains the importance of self-reflection and describes how they have done this to reflect on their current and past performance, with regard to improving their performance as a plate welder.</p>
Distinction - apprentices must demonstrate all of the grading statements	<p>In addition to the criteria for a PASS:</p> <p>Analyses typical problems in their work area of responsibility and investigates how and why they occur for example productivity and safety impact of multiple operations and organisational interfaces within the working environment.</p> <p>Evaluates their current and past performance to identify training and development needs to inform current performance improvements and onward career progression within their organisation or wider industry.</p>

### Welding Capability

K3, K8, K9, S11, S16, S17, B1, B2

Fail	Does not meet pass criteria
Pass - apprentices must demonstrate all of the grading statements	<p>Explains fundamental features of each welding process, and key differences in productivity, shielding of the arc and weld pool for example control, speed, defect risk</p> <p>Interprets a given welding procedure specification from portfolio, to explain features of welding preparation, welding process and consumable selection, welding parameters, thermal treatment</p> <p>Explains sources of information available where further clarification is needed in Welding and associated activities within their organisation and the limitations in their authority to proceed.</p> <p>Illustrates through reference to Portfolio completing plate or structural component welding activities to cover:</p> <ul style="list-style-type: none"> <li>• 2 selected welding processes</li> <li>• 2 selected material groups</li> <li>• 3 main joint configurations (Butt Weld, T-Butt Weld, Fillet)</li> <li>• 3 plate welding positions which must include Vertical (either upward or downward progression) plus Overhead Plate</li> <li>• Achieves international acceptance requirements e.g. ISO5817 Category B / ASME IX / AWS D1.1</li> </ul>

	<p>Describes levels of responsibility within own organisation for the control of welding, reporting into quality and Health and Safety systems for example safety committee, welding supervisors, quality engineer</p> <p>Gives at least two examples of where additional guidance should be sought and sources of additional information and learning associated with processes and associated industrial applications</p>
Distinction - apprentices must demonstrate all of the grading statements	<p>In addition to the criteria for a PASS:</p> <p>Explains the preparation methods, and how they may affect the mechanical properties of materials (for example thermal cycling), steps to address any changes and therefore their limitations for certain materials and operating conditions</p> <p>Calculates welding heat input for a given welding condition, and can describe what steps can be taken to either increase or decrease the heat input. (for example by adjusting current, arc voltage, travel speed)</p> <p>Explains the reasons for capturing welding quality control information and describe how welding data is captured into production quality records for example material batch ID, consumable batch ID, welder ID, welding parameters, weld procedure specification used.</p>

### Assessment method 3: Practical Skills Test

To achieve a pass in the practical skills test all the pass grading statements must be achieved.

<b>Planning and Preparation for Welding</b>	
K6, S3, S4, S5, S6, S7	
Fail	Does not meet pass criteria
Pass - apprentices must demonstrate all of the grading statements	<p>Identifies, selects and uses welding components and ancillary equipment suitable for the welding process being applied</p> <p>Inspects and ensure that the welding materials are assembled in accordance with Welding Procedure Specification</p> <p>Identifies risks associated with subsequent welding and preparation processes, and demonstrates mitigation steps are in place in accordance with organisational requirements for example material contamination, storage, consumable conditioning, cable management</p> <p>Inspects and ensures that the welding consumables are prepared and conditioned in accordance with welding procedure specification</p>

	Completes remedial work that may be required and steps to report within organisational requirements for example welding test pieces do not conform to specification, welding equipment requires change.
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<b>Welding Operations</b>	
K5, K7, S1, S8, S10, S14, S15	
Fail	Does not meet pass criteria
Pass - apprentices must demonstrate all of the grading statements	<p>Interprets the welding procedure specification to determine the welding consumables, welding parameters, progression and control measures to be applied</p> <p>Demonstrates welding within the requirements defined within the welding procedure specification including the adjustment and monitoring of welding process controls</p> <p>Demonstrates compliance with health and safety requirements as specified in the procedures and risk assessments of the EPA location.</p> <p>Identifies areas of risk associated with health and safety within the selected welding practical demonstration set for example asphyxiation from welding gases, welding fume, hand-arm vibration from rotary tools.</p> <p>Employ appropriate manual processes (powered or non-powered) to remove material for initial, intermittent and final cleaning of the welded component, for example chipping hammer, file, wire brush.</p> <p>Produce weld joints using a minimum of two welding processes (from TIG, PAW, MMA, MIG or MAG, FCAW) and a minimum of two material groups (from Carbon Steel, Low Alloy Steel, High Alloy Ferritic or Martensitic Steel, Austenitic Stainless Steel, Nickel and Nickel Alloys, Aluminium and Aluminium alloys, Titanium and Titanium Alloys, Copper and Copper Alloys). The weld surface shall be inspected and defects shall comply with:</p> <ul style="list-style-type: none"> <li>• shall not include crack(s) in, around the surface or underneath of the weld; lack of fusion visible on either surface; incomplete root penetration if visible on the inside of the weld; inclusions; end crater shrinkage pipe; stray arc marks; continuous undercut; overlap, cold lap or cold lapping ;incomplete filled groove or under filled weld joint; burn through or melt through; root concavity or suck-back</li> <li>• excessive weld metal: <math>0 &lt; \text{cap height} \leq (1 + \text{weld cap width } 5)</math>. maximum 7mm</li> <li>• excessive penetration: root height <math>\leq 4\text{mm max}</math></li> <li>• intermittent undercut: less than 25% of total weld length. total undercut depth <math>\leq (\text{plate thickness } 10)</math>, maximum of 1mm</li> </ul>
Distinction - apprentices must demonstrate all of the	<p>In addition to the criteria for a PASS:</p> <p>Produce weld joints using a minimum of two welding processes (from TIG, PAW, MMA, MIG or MAG, FCAW) and a minimum of two material groups (from Carbon Steel, Low Alloy Steel, High Alloy</p>

grading statements	<p>Ferritic/Martensitic Steel, Austenitic Stainless Steel, Nickel and Nickel Alloys, Aluminium and Aluminium alloys, Titanium and Titanium Alloys, Copper and Copper Alloys). The weld surface shall be inspected and defects shall comply with the higher tolerances:</p> <ul style="list-style-type: none"> <li>• excessive weld metal: <math>0 &lt; \text{cap height} \leq (1 + \text{weld cap width}/10)</math>. maximum 5mm</li> <li>• excessive penetration: root height <math>\leq 3\text{mm max}</math></li> <li>• intermittent undercut: less than 15% of total weld length. total undercut depth <math>\leq (\text{plate thickness } 10)</math>, maximum of 1mm</li> </ul> <p>Identifies areas of risk associated with weld defects within the selected welding practical demonstration for example slag entrapment, root over-penetration, undercut.</p>
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<b>Post Welding Activities</b>	
S12, S13, B7	
Fail	Does not meet pass criteria
Pass - apprentices must demonstrate all of the grading statements	<p>Returns tools and equipment to required storage location and classify un-used consumables in line with organisational procedure at location.</p> <p>Identifies risks associated with post-weld remediation steps, and demonstrate mitigation steps are in-place in accordance with organisational or location requirements.</p> <p>Demonstrates full adherence to procedures and controls and identifies opportunities for personal development for example additional training and development needs and qualifications.</p>

## 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.

Independent assessors 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 'pass' overall apprentices must achieve at least a pass in all three assessment methods.

In order to achieve a 'distinction' apprentices must achieve a distinction in assessment method 3: the **practical skills test** and **one** other assessment method: either the professional discussion or the multiple-choice knowledge test.

Where apprentices re-sit or re-take an assessment method, the Grading will be Pass or Fail – see the re-sit and re-take 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 – multi choice knowledge test	Assessment method 2 – professional discussion supported by portfolio	Assessment method 3 – practical skills test	Overall grading
Fail	Any grade	Any grade	<b>Fail</b>
Any grade	Fail	Any grade	<b>Fail</b>
Any grade	Any grade	Fail	<b>Fail</b>
Pass	Pass	Pass	<b>Pass</b>
Pass or Distinction	Pass or Distinction	Pass	<b>Pass</b>
Pass	Distinction	Distinction	<b>Distinction</b>
Distinction	Pass	Distinction	<b>Distinction</b>
Distinction	Distinction	Distinction	<b>Distinction</b>

## Roles and responsibilities

Role	Responsibility
Apprentice	<ul style="list-style-type: none"> <li>• participate in development opportunities to improve their knowledge skills and behaviours as outlined in the standard</li> <li>• meet all gateway requirements when advised by the employer</li> <li>• understand the purpose and importance of EPA and undertake EPA</li> </ul>
Employer	<ul style="list-style-type: none"> <li>• support the apprentice to achieve the KSBs outlined in the standard to their best ability</li> <li>• determines when the apprentice is working at or above the level outlined in the standard and is ready for EPA</li> <li>• select the EPAO</li> <li>• confirm all EPA gateway requirements have been met</li> <li>• confirm arrangements with EPAO for the EPA (who, when, where) in a timely manner</li> <li>• ensure apprentice is well prepared for the EPA</li> </ul>
Facility Escort	<p>If necessary, an inducted and responsible individual familiar with the test location will accompany the independent assessor to ensure safety and security requirements are maintained.</p>
EPAO	<p>As a minimum EPAOs should:</p> <ul style="list-style-type: none"> <li>• understand the occupational role</li> <li>• appoint administrators/invigilators and markers to administer/invigilate and mark the EPA</li> <li>• provide training and CPD to the independent assessors they employ to undertake the EPA</li> <li>• provide adequate information, advice and guidance documentation to enable apprentices, employers and providers to prepare for the EPA</li> <li>• deliver the end-point assessment outlined in this EPA plan in a timely manner</li> <li>• prepare and provide all required material and resources required for delivery of the EPA in-line with best practices</li> <li>• use appropriate assessment recording documentation to ensure a clear and auditable mechanism for providing assessment decision feedback to the apprentice</li> <li>• have no direct connection with the apprentice, their employer or training provider i.e. there must be no conflict of interest</li> <li>• maintain robust internal quality assurance (IQA) procedures and processes, and conducts these on a regular basis</li> </ul>

	<ul style="list-style-type: none"> <li>• conform to the requirements of the nominated external quality assurance body</li> <li>• organise standardisation events and activities in accordance with this plan's IQA section</li> <li>• organise and conduct moderation of independent assessors' marking in accordance with this plan</li> <li>• have, and operate, an appeals process</li> <li>• arrange for certification with the relevant training provider</li> </ul>
Independent assessor	<p>As a minimum an independent assessor should:</p> <ul style="list-style-type: none"> <li>• understand the standard and assessment plan</li> <li>• deliver the end-point assessment in-line with the EPA plan</li> <li>• comply to the IQA requirements of the EPAO</li> <li>• be independent of the apprentice, their employer and training provider(s) i.e. there must be no conflict of interest</li> <li>• satisfy the criteria outlined in this EPA plan</li> <li>• hold or be working towards an independent assessor qualification for example A1 and have had training from their EPAO in terms of good assessment practice, operating the assessment tools and grading</li> <li>• have the capability to assess the apprentice at this level</li> <li>• attend the required number of EPAO's standardisation and training events per year (as defined in the IQA section)</li> </ul>
Training provider	<p>As a minimum the training provider should:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• advise the employer, upon request, on the apprentice's readiness for EPA prior to the gateway</li> <li>• Plays no part in the EPA itself</li> </ul>

## 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 knowledge of the following occupational areas:
  - comprehensive experience of plate and structural welding, welding supervision, welding inspection, welding engineering i.e. three years or more experience in the sector
  - relevant experience of the occupation/sector i.e. worked in the sector in the last five years or can demonstrate current knowledge and skills developed through continued professional development
  - 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

## 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/retake any failed assessment methods only.

The timescales for a resit or retake is agreed between the employer and EPAO. A resit or retake is typically taken within 3 months of the EPA outcome notification.

Re-sits and re-takes are not offered to apprentices wishing to increase their grading 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.

## Affordability

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

- assessing multiple apprentices simultaneously
- online assessment
- using an employer's premises

## Professional body recognition

This apprenticeship is designed to prepare successful apprentices to meet the requirements for registration as Engineering Technician with the Welding Institute

## 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.

# Mapping of knowledge, skills and behaviours (KSBs)

## Assessment method 1: Multiple choice knowledge test

Knowledge
<b>K1</b> Dimensional and mechanical properties (strength, toughness, thermal expansion etc.) of materials to be welded.
<b>K2</b> The fundamentals of welding metallurgy (weld solidification and Heat Affected Zone) and how this can affect weldability of materials and final joint integrity.
<b>K4</b> Common joint types associated with welding plate, & structural components (Fillet, Butt, T-Butt, Corner/Lap; Single-Sided, Double-Sided, Metallic Backed, Ceramic Backed).
<b>K11</b> Causes and detection of typical welding defects and how their occurrence can be reduced.
<b>K12</b> Types and functions of welding consumables, fluxing systems and the requirement for correct identification, storage, conditioning, handling and recycling.
<b>K13</b> Requirements for correct storage, handling and segregation of materials and tooling to prevent cross contamination.
<b>K17</b> Non-destructive testing reports and radiographs to identify particular defect types and the associated improvements to process and technique needed to prevent recurrence.
<b>K19</b> The importance of complying with statutory, quality, organizational and health, safety and environmental regulations.
<b>K20</b> Typical problems that may arise within their normal work activities/environment.

## Assessment method 2: Professional Discussion supported by portfolio

Knowledge
<b>K3</b> Common manual arc welding processes and the relative merits for a given application, including Manual Metal Arc (MMA), Metal Inert Gas (MIG), Metal Active Gas (MAG), Flux Cored Arc Welding (FCAW), Tungsten Inert Gas (TIG), Plasma Arc Welding (PAW).
<b>K8</b> Welding Procedure Specification requirements, contents, and information derived to establish specific production information.
<b>K9</b> The relative merits, applications and limitations of material preparation methods and manual material removal processes including powered and non-powered tools.
<b>K10</b> Performance success factors in production, inspection reporting, productivity including time & duration, dimensional, Angularity, Non-Destructive Examination, defect rates etc.
<b>K14</b> Organisational quality documentation, reporting systems, procedures and their role within the overall quality process.

**K15** Continuous improvement processes, performance review and how this is undertaken in their organisation.

**K16** The importance of only using approved processes, procedures, documentation and the potential implications for the organisation if this is not followed.

**K18** Risks and mitigation measures associated with welding and the working environment, and the organizational risk management processes.

## Skills

**S2** Can obtain, check and use appropriate documentation (such as job instructions, drawings, and quality control documentation).

**S9** Deal promptly and effectively with problems within the limits of their responsibility using approved diagnostic methods and techniques and report those which cannot be resolved to the appropriate personnel.

**S11** Achieves a quality of work to meet international standards for dimensional, surface inspection (e.g. Visual, Magnetic Particle, Dye Penetrant) and volumetric inspection (e.g. Radiography, Ultrasonic inspection).

**S16** Produce welds in plate, structural component covering three plate welding positions which must include Vertical (either upward or downward progression) and Overhead Plate.

**S17** Produce plate welds in 3 main joint configurations (Single or Double Sided Butt, Single or Double Sided T-Butt & Fillet).

## Behaviours

**B1** Takes responsibility for decision-making, without autonomy and within the guidelines of the work instruction, for their workplace, the application of welding processes, and for their productivity.

**B2** Enquires and to seeks guidance, in order to understand the processes and associated industrial applications.

**B3** Maintains competence through Continuing Professional Development planning, preparation and reflection to ensure safety, quality and production and Continuing Professional Development goals are achieved.

**B4** Intervenes and challenges poor practices and the confidence to channel feedback to the appropriate authorities to implement change.

**B5** Consistently and reliably delivers in accordance with expectations in safety, production, quality, ethics and self-development.

**B6** Encourages and supports the development of others and complete point of work risk assessments.

**B8** Reflects on current and past performance and provide information and recommendations for continuous improvements in efficiency and effectiveness of working practices, and training and development requirement.

## Assessment method 3: Practical Skills Test

Knowledge
<b>K5</b> Welding positions and progressions associated with plate & structural components, and their international designations including Flat; Horizontal-Vertical; Horizontal; Vertical (upward and downward progressions; Overhead).
<b>K6</b> The major components of welding equipment, ancillary equipment, cabling and their assembly, including Power Source, Wire Feed System, TIG & PAW Arc Initiation System, interconnecting communications cables, torches, tongs, gas equipment etc.
<b>K7</b> Setting, modify and monitor welding controls (e.g. Current, Arc Voltage, Wire Feed Speed, Gas Flow Rates, Polarity) and secondary controls (e.g. Heat Input, Interpass Temperature).

Skills
<b>S1</b> Work safely at all times, comply with health, safety and environmental legislation, regulations and organizational requirements.
<b>S3</b> Plan and prepare welding activities before commencing the work.
<b>S4</b> Obtain, position and assemble welding equipment and associated safety protection needed for activity.
<b>S5</b> Prepare, check and protect materials and work areas ready for welding.
<b>S6</b> Inspect assembly to be welded and undertake remedial work to comply with specification, or implement quality steps if rejected.
<b>S7</b> Receive, inspect, condition and maintain consumables.
<b>S8</b> Set, test and monitor key welding parameters as detailed within the Welding Procedure Specification.
<b>S10</b> Use manual processes and equipment to remove material (powered and non-powered).
<b>S12</b> Complete progressive and final checks on the weld prior to release for formal inspection and report into the production control system at the appropriate stages of the work activity.
<b>S13</b> Restore the work area on completion of the activity and where applicable return any resources and consumables to the appropriate location.
<b>S14</b> Produce welds in plate or structural components using two welding processes from TIG, PAW, MMA, MIG/MAG, FCAW.
<b>S15</b> Produce welds in plate or structural components using two materials from Carbon Steel, Low Alloy Steel, High Alloy Ferritic/Martensitic Steel, Austenitic Stainless Steel, Nickel & Nickel Alloys, Aluminium & Aluminium alloys, Titanium & Titanium Alloys, Copper & Copper Alloys.

Behaviours
<b>B7</b> Follows the specified procedures and controls and be personally responsible and accountable for their production work and personal development.