

## EPA DRAFT PREVIEW

# DRAFT END-POINT ASSESSMENT PLAN FOR THE METAL CASTING TECHNICIAN APPRENTICESHIP

ST0566/1.3

APPRENTICESHIP REFERENCE NUMBER	LEVEL OF THIS END-POINT ASSESSMENT (EPA)	INTEGRATED
ST0566	3	No

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## Introduction and overview

This document explains the requirements for end-point assessment (EPA) for the metal casting technician apprenticeship. End-point assessment organisations (EPAOs) must follow this when designing and delivering the EPA.

Metal casting technician apprentices, their employers and training providers should read this document.

This is a core and options apprenticeship. An apprentice must be trained and assessed against the core and one option. The options are:

- Methods development technician
- Pattern making technician
- Foundry manufacturing technician

A full-time metal casting technician apprentice typically spends 36 months on-programme. The apprentice must spend at least 12 months on-programme and complete the required amount of off-the-job training in line with the apprenticeship funding rules.

The EPA should be completed within an EPA period lasting typically 5 months.

The apprentice must complete their training and meet the gateway requirements before starting their EPA. The EPA will assess occupational competence.

An approved EPAO must conduct the EPA for this apprenticeship. Employers must work with the training provider to select an approved EPAO from the apprenticeship providers and assessment register (APAR).

This EPA has 2 assessment methods.

The grades available for each assessment method are below.

Assessment method 1 - project with question and answer session:

- fail
- pass

- distinction

Assessment method 2 - interview underpinned by a portfolio of evidence:

- fail
- pass

The result from each assessment method is combined to decide the overall apprenticeship grade. The following grades are available for the apprenticeship:

- fail
- pass
- distinction

## **EPA summary table**

<p><b>On-programme - typically 36 months</b></p>	<p>The apprentice must:</p> <ul style="list-style-type: none"> <li>• complete training to develop the knowledge, skills and behaviours (KSBs) outlined in this apprenticeship's standard</li> <li>• complete training towards English and mathematics qualifications in line with the apprenticeship funding rules</li> <li>• compile a portfolio of evidence</li> </ul>
<p><b>End-point assessment gateway</b></p>	<p>The apprentice's employer must be content that the apprentice is occupationally competent.</p> <p>The apprentice must:</p> <ul style="list-style-type: none"> <li>• confirm they are ready to take the EPA</li> <li>• have achieved English and mathematics qualifications in line with the apprenticeship funding rules</li> </ul> <p>For the interview underpinned by a portfolio of evidence, the apprentice must submit a portfolio of evidence.</p> <p>Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.</p>
<p><b>End-point assessment - typically 5 months</b></p>	<p><b>The grades available for each assessment method are below</b></p> <p>Project with question and answer session:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> <li>• distinction</li> </ul> <p>Interview underpinned by a portfolio of evidence:</p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> </ul>

	<p><b>Overall EPA and apprenticeship can be graded:</b></p> <ul style="list-style-type: none"> <li>• fail</li> <li>• pass</li> <li>• distinction</li> </ul>
<b>Professional recognition</b>	<p>This apprenticeship aligns with:</p> <ul style="list-style-type: none"> <li>• Institute of the Cast Metals Engineers (ICME) for Engineering Technician (EngTech) [TBC]</li> </ul>
<b>Re-sits and re-takes</b>	<ul style="list-style-type: none"> <li>• re-take and re-sit grade cap: pass</li> <li>• re-sit timeframe: typically 3 months</li> <li>• re-take timeframe: typically 4 months</li> </ul>

## Duration of end-point assessment period

The EPA is taken in the EPA period. The EPA period starts when the EPAO confirms the gateway requirements have been met and is typically 5 months.

The EPAO should confirm the gateway requirements have been met and start the EPA as quickly as possible.

## EPA gateway

The apprentice's employer must be content that the apprentice is occupationally competent. That is, they are deemed to be working at or above the level set out in the apprenticeship standard and ready to undertake the EPA. The employer may take advice from the apprentice's training provider, but the employer must make the decision. The apprentice will then enter the gateway.

The apprentice must meet the gateway requirements before starting their EPA.

They must:

- confirm they are ready to take the EPA
- have achieved English and mathematics qualifications in line with the apprenticeship funding rules

- submit a portfolio of evidence for the interview underpinned by a portfolio of evidence

### **Portfolio of evidence requirements:**

The apprentice must compile a portfolio of evidence during the on-programme period of the apprenticeship. It should only contain evidence related to the KSBs that will be assessed by the interview. 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 suggested.

Evidence sources may include:

- workplace documentation and records, for example: production records, defect reports
- workplace policies and procedures
- witness statements
- annotated photographs
- video clips with a maximum total duration 10 minutes; the apprentice must be in view and identifiable

This is not a definitive list; other evidence sources can be included.

The portfolio of evidence should not include reflective accounts or any methods of self-assessment. Any employer contributions should focus on direct observation of performance, for example, witness statements, rather than opinions. The evidence provided should be valid and attributable to the apprentice; the portfolio of evidence should contain a statement from the employer and apprentice confirming this.

The EPAO should not assess the portfolio of evidence directly as it underpins the interview. The independent assessor should review the portfolio of evidence to prepare questions for the interview. They are not required to provide feedback after this review.

Gateway evidence must be submitted to the EPAO, along with any organisation specific policies and procedures requested by the EPAO.

## **Order of assessment methods**

The assessment methods can be delivered in any order.

The result of one assessment method does not need to be known before starting the next.

## **Project with question and answer session**

### **Overview**

The project assessment method involves the apprentice completing a significant and defined piece of work that has a real business application and benefit. This process may include for example, research, analysis and the completion of tasks or activities to achieve the outcome.

The assessment method will have an output at the end of the defined piece of work. The work completed for the project assessment method must meet the needs of the employer's business and be relevant to the apprentice's occupation and apprenticeship.

This assessment method has 2 components:

- completion of the defined piece of work for the project with a project output
- completion of the defined piece of work for the question and answer session

Together, these components give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method. They are assessed by an independent assessor.

## Rationale

This assessment method is being used because:

- it allows for the assessment of KSBs that take place over a long period of time
- it allows for a broad set of KSBs to be evidence during the post-gateway period
- it assesses knowledge, skills and behaviour holistically
- it can produce something that is of genuine business benefit to the apprentice's employer
- it allows the apprentice to directly demonstrate KSBs relating to communication and presentation
- it allows for the presentation of evidence and testing of responses where there are a range of potential answers
- it can be conducted remotely, potentially reducing cost

## Delivery

The apprentice must complete a project based on any of the following:

### **Option 1. Methods development technician**

- producing a metal castings production specification

### **Option 2. Pattern making technician**

- producing a metal castings pattern

### **Option 3. Foundry manufacturing technician.**

- producing a metal casting or castings

The EPAO must provide a project assessment method specification. It must detail how a project can enable an apprentice to meet the KSBs mapped to this assessment method to the highest available grade. The EPAO must also provide suggested project titles.

The project output must be in the form of a product.

The apprentice must start the project after the gateway. The employer should ensure the apprentice has the time and resources, within the project period, to plan and complete their project.

The apprentice may work as part of a team to complete the project, which could include internal colleagues or technical experts. The apprentice must however, complete their product unaided and they must be reflective of their own role and contribution. The apprentice and their employer must confirm this when the product is submitted.

## **Component 1: Product**

The product must include at least:

- project pack showing:
  - metal casting knowledge
  - work planning
  - ensuring health, safety, security, and environmental compliance
  - using manufacturing data, information, and drawings
  - conducting quality assurance
  - communicating with others
  - producing documentation
  - using information technology
  - continuous improvement
- the final product

The apprentice must complete and submit the product to the EPAO by the end of week 12 of the EPA period. The apprentice must produce and include a mapping, showing how the product evidences the KSBs mapped to this assessment method.

## **Component 2: Question and answer session**

The question and answer session must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

The apprentice must be questioned about their project and product.

The question and answer session must last for 30 minutes. The independent assessor must use the full time available for questioning and they can increase the total time by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The independent assessor must ask at least 3 questions. They must use the questions from their EPAO's question bank or create their own questions in line with the EPAO's training. Follow up questions are allowed where clarification is required.

The purpose of the independent assessor's questions is:

- to verify that the activity was completed by the apprentice



- to seek clarification where required
- to assess those KSBs that the apprentice did not have the opportunity to demonstrate with the product, although these should be kept to a minimum
- to assess level of competence against the grading descriptors

The independent assessor must have at least 2 weeks to review the product before the question and answer session, to allow them to prepare questions.

The apprentice must be given at least 2 weeks' notice of the question and answer session.

The apprentice may choose to end the question and answer session early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless in an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

## **Assessment decision**

The independent assessor must make the grading decision. They must assess the project components holistically when deciding the grade.

The independent assessor must keep accurate records of the assessment. They must record:

- the KSBs demonstrated in the product and question and answer session
- the apprentice's answers to questions
- the grade achieved

## **Assessment location**

The question and answer session must take place in a suitable venue selected by the EPAO for example, the EPAO's or employer's premises. It should take place in a quiet room, free from distractions and influence.

The question and answer session can be conducted by video conferencing. The EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

## **Question and resource development**

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions

are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

EPAO must produce the following materials to support the project:

- independent assessor EPA materials which include:
  - training materials
  - administration materials
  - moderation and standardisation materials
  - guidance materials
  - grading guidance
  - question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

## **Interview underpinned by a portfolio of evidence**

### **Overview**

In the interview, an independent assessor asks the apprentice questions. It gives the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method.

The apprentice can refer to and illustrate their answers with evidence from their portfolio of evidence.

### **Rationale**

This assessment method is being used because:

- it assesses KSBs holistically and objectively
- it allows for the assessment of KSBs that do not occur on a predictable or regular basis
- it allows for assessment of responses where there are a range of potential answers
- it can be conducted remotely, potentially reducing cost

### **Delivery**

The interview must be structured to give the apprentice the opportunity to demonstrate the KSBs mapped to this assessment method to the highest available grade.

An independent assessor must conduct and assess the interview.

The purpose is to assess the apprentice's competence against the following themes:

- role and responsibilities
- procedures - site security, emergency response, and incident reporting
- sustainability
- problem solving and fault finding
- teamwork
- continued professional development (CPD)
- applied mathematics
- inspecting sample castings and identifying casting defects
- metal casting fundamentals

The EPAO must give an apprentice 2 weeks' notice of the interview.

The independent assessor must have at least 2 weeks to review the supporting documentation.

The apprentice must have access to their portfolio of evidence during the interview.

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

The interview must last for 90 minutes. The independent assessor can increase the time of the interview by up to 10%. This time is to allow the apprentice to respond to a question if necessary.

The independent assessor must ask at least 12 questions. The independent assessor must use the questions from the EPAO's question bank or create their own questions in line with the EPAO's training. Follow-up questions are allowed where clarification is required.

The apprentice may choose to end the assessment method early. The apprentice must be confident they have demonstrated competence against the assessment requirements for the assessment method. The independent assessor or EPAO must ensure the apprentice is fully aware of all assessment requirements. The independent assessor or EPAO cannot suggest or choose to end the assessment methods early, unless in an emergency. The EPAO is responsible for ensuring the apprentice understands the implications of ending an assessment early if they choose to do so. The independent assessor may suggest the assessment continues. The independent assessor must document the apprentice's request to end the assessment early.

The independent assessor must make the grading decision.

The independent assessor must keep accurate records of the assessment. They must record:

- the apprentice's answers to questions
- the KSBs demonstrated in answers to questions

- the grade achieved

## **Assessment location**

The interview must take place in a suitable venue selected by the EPAO for example, the EPAO's or employer's premises.

The interview can be conducted by video conferencing. The EPAO must have processes in place to verify the identity of the apprentice and ensure the apprentice is not being aided.

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

## **Question and resource development**

The EPAO must develop a purpose-built assessment specification and question bank. It is recommended this is done in consultation with employers of this occupation. The EPAO must maintain the security and confidentiality of EPA materials when consulting with employers. The assessment specification and question bank must be reviewed at least once a year to ensure they remain fit-for-purpose.

The assessment specification must be relevant to the occupation and demonstrate how to assess the KSBs mapped to this assessment method. The EPAO must ensure that questions are refined and developed to a high standard. The questions must be unpredictable. A question bank of sufficient size will support this.

The EPAO must ensure that the apprentice has a different set of questions in the case of re-sits or re-takes.

The EPAO must produce the following materials to support the interview underpinned by a portfolio of evidence:

- independent assessor assessment materials which include:
  - training materials
  - administration materials
  - moderation and standardisation materials
  - guidance materials
  - grading guidance
  - question bank
- EPA guidance for the apprentice and the employer

The EPAO must ensure that the EPA materials are subject to quality assurance procedures including standardisation and moderation.

## **Grading**

### **Project with question and answer session**

Fail - does not meet pass criteria

THEME KSBS	PASS APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS	DISTINCTION APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS AND ALL OF THE DISTINCTION DESCRIPTORS
(Core) Metal casting knowledge <a href="#">K1</a>	Outlines what the metal castings is and where the metal casting is used. (K1)	None
(Core) Work planning <a href="#">K4</a> <a href="#">K5</a> <a href="#">S1</a>	Plans tasks and identifies and organises resources using planning, prioritising, and time management techniques with consideration of different factors. (K4, K5, S1)	Justifies the balance of factors considered in their planning decisions. (K4, K5, S1)
(Core) Ensuring health, safety, security, and environmental compliance <a href="#">K7</a> <a href="#">K9</a> <a href="#">S2</a> <a href="#">S3</a> <a href="#">B1</a>	Identifies metal casting manufacturing safety hazards and risks and identifies work area safety and mitigation measures in line with safe systems of work. (K7, S2)  Prioritises and follows safe working practices in compliance with health, safety, site security, and environmental regulations, standards and procedures. (K9, S3, B1)	None
(Core) Using manufacturing data, information, and drawings <a href="#">K21</a> <a href="#">S18</a>	Interprets engineering and manufacturing information, data, and drawings to complete the task. (K21, S18)	None

<p>(Core) Conducting quality assurance <a href="#">K20</a> <a href="#">S17</a> <a href="#">B4</a></p>	<p>Takes ownership for the delivery and quality of their own work by accessing and applying quality standards in line with task requirement and their company's quality systems. (K20, S17, B4)</p>	<p>Explains the importance of quality systems and applying quality standards. (K20, S17)</p>
<p>(Core) Communicating with others <a href="#">K15</a> <a href="#">S8</a></p>	<p>Uses communication methods and techniques and industry terminology suitable for the context. (K15, S8)</p>	<p>None</p>
<p>(Core) Producing documentation <a href="#">K16</a> <a href="#">S9</a> <a href="#">S10</a></p>	<p>Records information and produces written content in line with documentation requirements for the task. (K16, S9, S10)</p>	<p>None</p>
<p>(Core) Using information technology <a href="#">K17</a> <a href="#">S11</a></p>	<p>Uses information and digital technology, and software packages in work tasks in compliance with cyber security requirements. (K17, S11)</p>	<p>None</p>
<p>(Core) Continuous improvement <a href="#">K19</a> <a href="#">S15</a></p>	<p>Applies continuous improvement (CI) techniques and identifies a viable suggestion for improvement in their work to support CI systems. (K19, S15)</p>	<p>Evaluates the potential impact of the improvement suggestion with consideration to benefits and any potential risks. (K19, S15)</p>
<p>(Methods development technician) Producing a metal castings production specification <a href="#">K33</a> <a href="#">K34</a> <a href="#">K35</a> <a href="#">K36</a> <a href="#">K37</a> <a href="#">S22</a> <a href="#">S23</a> <a href="#">S24</a></p>	<p>Uses design, simulation, and analysis software applications to produce casting design taking account of design considerations, casting shape optimisation techniques to reduce defects, and manufacturing considerations in line with task requirements. (K33, K34, K35, K36, S22, S23)</p> <p>Produces costings and quotes for design options using models suitable for the task and in line with company procedures. (K37, S24)</p>	<p>Justifies the decisions they made for the design relating to shape optimisation, defect reduction and manufacturing efficiencies. (K33, K34, K35, K36, S22, S23)</p>

<p>(Pattern making technician) Producing a metal castings pattern K38 K39 K40 S25 S26 S27 S28</p>	<p>Prepares material for pattern making in line with task requirements and company procedures. (K38, S25)</p> <p>Selects, checks and operates pattern making machinery and tools to produce pattern in line with task requirements and company procedures. (K39, S26)</p> <p>Conducts pattern accuracy checks in line with task requirements and company procedures. (S27)</p> <p>Conducts preventative maintenance of pattern making tools in line with company procedures. (K40, S28)</p>	<p>Justifies the decisions they made for the pattern making process including the preparation of materials, machine operations and the process to ensure accuracy of final cast. (K38, K39, S25, S26, S27)</p>
<p>(Foundry manufacturing technician) Producing a metal casting or castings K41 K42 K43 K44 S29 S30 S31 S32 S33</p>	<p>Operates foundry and post casting plant, equipment, and tools to produce a metal casting or castings in line with task requirements and company procedures. (K41, K42, S29, S30)</p> <p>Conducts post production operations in line with task requirements and the company's logistical arrangements. (K43, S31)</p> <p>Uses testing equipment and techniques to identify composition and mechanical structures in line with company procedures. (S32)</p> <p>Describes how they apply NDT techniques for casting in line with associated acceptance criteria. (K44, S33)</p>	<p>Justifies the decisions they made for the post production processes including the use of NDT techniques and techniques to test composition and mechanical structure. (K44, S32, S33)</p>

## Interview underpinned by a portfolio of evidence

Fail - does not meet pass criteria

THEME KSBS	PASS APPRENTICES MUST DEMONSTRATE ALL OF THE PASS DESCRIPTORS
(Core) Role and responsibilities K3 S13 B3	Describes their role and how they escalate issues outside their limits of responsibility in line with their company's escalation procedures and how they respond and adapt to work demands in line with organisational requirements. (K3, S13, B3)
(Core) Procedures - site security, emergency response, and incident reporting K8 S4	Describes what they would do in an emergency situation including incident reporting in line with their company's procedures. (K8, S4)
(Core) Sustainability K11 K12 S5 S6 B2	Describes how they consider and apply the principles of sustainability in their work including resource efficiency and reuse of materials in support of the UK's net zero commitment.  Describes how they recycle and manage waste in line with their company's procedures.  (K11, K12, S5, S6, B2)
(Core) Problem solving and fault finding K18 S12 S14	Describes how they identify issues and apply problem solving and fault-finding techniques to establish the root cause and solutions. (K18, S12, S14)
(Core) Team work K13 K14 S7 B5	Describes how they apply team working principles to meet work goals in line with their company's policy on equality, diversity, and inclusion. (K13, K14, S7, B5)
(Core) Continued professional development (CPD) S16 B6	Describes the planned and unplanned learning and development (CPD) activities they have carried out and recorded to meet their own skills development needs, showing a commitment to future CPD to maintain and enhance competence. (S16, B6)
(Core) Applied mathematics K22 S19	Describes how they use mathematical principles and formulae to support work tasks including algebra, trigonometry, and statistical methods to display information. (K22, S19)



<p>(Core) Inspecting sample castings and identifying casting defects <b>K25</b> <b>K27 S20 S21</b></p>	<p>Describes how they identify casting defects and causes using methods suitable to the task. (K25, S20)</p> <p>Describes how they inspect sample castings using techniques suitable for the task. (K27, S21)</p>
<p>(Core) Metal casting fundamentals <b>K2 K6 K10 K23</b> <b>K24 K26 K28</b> <b>K29 K30 K31</b> <b>K32</b></p>	<p>Demonstrates understanding of each of the following knowledge statements by sampling across the content of each one:</p> <ul style="list-style-type: none"> <li>• the end-to-end production process (K2)</li> <li>• health, safety, and environmental regulations (K6, K10)</li> <li>• material properties and composition (K23)</li> <li>• testing and examination techniques (K24, K26)</li> <li>• production processes (K28, K29)</li> <li>• melting processes and solidification (K30, K31)</li> <li>• processing and casting molten metal practices (K32)</li> </ul>

## Overall EPA grading

Performance in the EPA determines the overall grade of:

- fail
- pass
- distinction

An independent assessor must individually grade the project with question and answer session and interview underpinned by a portfolio of evidence in line with this EPA plan.

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

If the apprentice fails one assessment method or more, they will be awarded an overall fail.

To achieve an overall pass, the apprentice must achieve at least a pass in all the assessment methods. To achieve an overall distinction, the apprentice must achieve a distinction in the project with questions and a pass in the interview underpinned by a portfolio of evidence.

Grades from individual assessment methods must be combined in the following way to determine the grade of the EPA overall.

PROJECT WITH QUESTION AND ANSWER SESSION	INTERVIEW UNDERPINNED BY A PORTFOLIO OF EVIDENCE	OVERALL GRADING
Pass	Fail	Fail
Fail	Pass	Fail
Pass	Pass	Pass
Distinction	Pass	Distinction

## Re-sits and re-takes

If the apprentice fails one assessment method or more, they can take a re-sit or a re-take at their employer's discretion. The apprentice's employer needs to agree that a re-sit or re-take is appropriate. A re-sit does not need further learning, whereas a re-take does. The apprentice should have a supportive action plan to prepare for a re-sit or a re-take.

The employer and the EPAO should agree the timescale for a re-sit or re-take. A re-sit is typically taken within 3 months of the EPA outcome notification. The timescale for a re-take is dependent on how much re-training is required and is typically taken within 4 months of the EPA outcome notification.

If the apprentice fails the project assessment method, they must amend the project output in line with the independent assessor's feedback. The apprentice will be given 4 weeks to rework and submit the amended product.

Failed assessment methods must be re-sat or re-taken within a 6-month period from the EPA outcome notification, otherwise the entire EPA will need to be re-sat or re-taken in full.

Re-sits and re-takes are not offered to an apprentice wishing to move from pass to a higher grade.

The apprentice will get a maximum EPA grade of pass if they need to re-sit or re-take one or more assessment methods, unless the EPAO determines there are exceptional circumstances.

## Roles and responsibilities

ROLES	RESPONSIBILITIES
Apprentice	<p>As a minimum, the apprentice should:</p> <ul style="list-style-type: none"> <li>• complete on-programme training to meet the KSBs as outlined in the apprenticeship standard for a minimum of 12 months</li> <li>• complete the required amount of off-the-job training specified by the apprenticeship funding rules and as arranged by the employer and training provider</li> <li>• understand the purpose and importance of EPA</li> <li>• prepare for and undertake the EPA including meeting all gateway requirements</li> </ul>
Employer	<p>As a minimum, the apprentice's employer must:</p> <ul style="list-style-type: none"> <li>• select the training provider</li> <li>• work with the training provider to select the EPAO</li> <li>• work with the training provider, where applicable, to support the apprentice in the workplace and to provide the opportunities for the apprentice to develop the KSBs</li> <li>• arrange and support off-the-job training to be undertaken by the apprentice</li> <li>• decide when the apprentice is working at or above the apprenticeship standard and is ready for EPA</li> <li>• ensure the apprentice is prepared for the EPA</li> <li>• ensure that all supporting evidence required at the gateway is submitted in line with this EPA plan</li> <li>• confirm arrangements with the EPAO for the EPA in a timely manner, including who, when, where</li> <li>• provide the EPAO with access to any employer-specific documentation as required for example, company policies</li> <li>• ensure that the EPA is scheduled with the EPAO for a date and time which allows appropriate opportunity for the apprentice to meet the KSBs</li> <li>• ensure the apprentice is given sufficient time away from regular duties to prepare for, and complete the EPA</li> <li>• ensure that any required supervision during the EPA period, as stated within this EPA plan, is in place</li> <li>• ensure the apprentice has access to the resources used to fulfil their role and carry out the EPA for workplace based assessments</li> </ul>

	<ul style="list-style-type: none"> <li>• remain independent from the delivery of the EPA</li> <li>• pass the certificate to the apprentice upon receipt</li> </ul>
EPAO	<p>As a minimum, the EPAO must:</p> <ul style="list-style-type: none"> <li>• conform to the requirements of this EPA plan and deliver its requirements in a timely manner</li> <li>• conform to the requirements of the apprenticeship provider and assessment register</li> <li>• conform to the requirements of the external quality assurance provider (EQAP)</li> <li>• understand the apprenticeship including the occupational standard and EPA plan</li> <li>• make all necessary contractual arrangements including agreeing the price of the EPA</li> <li>• develop and produce assessment materials including specifications and marking materials, for example mark schemes, practice materials, training material</li> <li>• maintain and apply a policy for the declaration and management of conflict of interests and independence. This must ensure, as a minimum, there is no personal benefit or detriment for those delivering the EPA or from the result of an assessment. It must cover: <ul style="list-style-type: none"> <li>• apprentices</li> <li>• employers</li> <li>• independent assessors</li> <li>• any other roles involved in delivery or grading of the EPA</li> </ul> </li> <li>• have quality assurance systems and procedures that ensure fair, reliable and consistent assessment and maintain records of internal quality assurance (IQA) activity for external quality assurance (EQA) purposes</li> <li>• appoint independent, competent, and suitably qualified assessors in line with the requirements of this EPA plan</li> <li>• appoint administrators, invigilators and any other roles where required to facilitate the EPA</li> <li>• deliver induction, initial and on-going training for all their independent assessors and any other roles involved in the delivery or grading of the EPA as specified within this EPA plan. This should include how to record the rationale and evidence for grading decisions where required</li> </ul>

	<ul style="list-style-type: none"> <li>• conduct standardisation with all their independent assessors before allowing them to deliver an EPA, when the EPA is updated, and at least once a year</li> <li>• conduct moderation across all of their independent assessors' decisions once EPAs have started according to a sampling plan, with associated risk rating of independent assessors</li> <li>• monitor the performance of all their independent assessors and provide additional training where necessary</li> <li>• develop and provide assessment recording documentation to ensure a clear and auditable process is in place for providing assessment decisions and feedback to all relevant stakeholders</li> <li>• use language in the development and delivery of the EPA that is appropriate to the level of the apprenticeship</li> <li>• arrange for the EPA to take place in a timely manner, in consultation with the employer</li> <li>• provide information, advice, and guidance documentation to enable apprentices, employers and training providers to prepare for the EPA</li> <li>• confirm the gateway requirements have been met before they start the EPA for an apprentice</li> <li>• arrange a suitable venue for the EPA</li> <li>• maintain the security of the EPA including, but not limited to, verifying the identity of the apprentice, invigilation and security of materials</li> <li>• where the EPA plan permits assessment away from the workplace, ensure that the apprentice has access to the required resources and liaise with the employer to agree this if necessary</li> <li>• confirm the overall grade awarded</li> <li>• maintain and apply a policy for conducting appeals</li> </ul>
Independent assessor	<p>As a minimum, an independent assessor must:</p> <ul style="list-style-type: none"> <li>• be independent, with no conflict of interest with the apprentice, their employer or training provider, specifically, they must not receive a personal benefit or detriment from the result of the assessment</li> <li>• have, maintain and be able to evidence up-to-date knowledge and expertise of the occupation</li> <li>• have the competence to assess the EPA and meet the requirements of the IQA section of this EPA plan</li> </ul>

	<ul style="list-style-type: none"> <li>• understand the apprenticeship's occupational standard and EPA plan</li> <li>• attend induction and standardisation events before they conduct an EPA for the first time, when the EPA is updated, and at least once a year</li> <li>• use language in the delivery of the EPA that is appropriate to the level of the apprenticeship</li> <li>• work with other personnel, where used, in the preparation and delivery of assessment methods</li> <li>• conduct the EPA to assess the apprentice against the KSBs and in line with the EPA plan</li> <li>• make final grading decisions in line with this EPA plan</li> <li>• record and report assessment outcome decisions</li> <li>• comply with the IQA requirements of the EPAO</li> <li>• comply with external quality assurance (EQA) requirements</li> </ul>
Training provider	<p>As a minimum, the training provider must:</p> <ul style="list-style-type: none"> <li>• conform to the requirements of the apprenticeship provider and assessment register</li> <li>• ensure procedures are in place to mitigate against any conflict of interest</li> <li>• work with the employer and support the apprentice during the off-the-job training to provide the opportunities to develop the KSBs as outlined in the occupational standard</li> <li>• deliver training to the apprentice as outlined in their apprenticeship agreement</li> <li>• monitor the apprentice's progress during any training provider led on-programme learning</li> <li>• ensure the apprentice is prepared for the EPA</li> <li>• work with the employer to select the EPAO</li> <li>• advise the employer, upon request, on the apprentice's readiness for EPA</li> <li>• ensure that all supporting evidence required at the gateway is submitted in line with this EPA plan</li> <li>• remain independent from the delivery of the EPA</li> </ul>

## Reasonable adjustments

The EPAO must have reasonable adjustments arrangements for the EPA.

This should include:

- how an apprentice qualifies for a reasonable adjustment
- what reasonable adjustments may be made

Adjustments must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

Special considerations

The EPAO must have special consideration arrangements for the EPA.

This should include:

- how an apprentice qualifies for a special consideration
- what special considerations will be given

Special considerations must maintain the validity, reliability and integrity of the EPA as outlined in this EPA plan.

## **Internal quality assurance**

Internal quality assurance refers to the strategies, policies and procedures that an EPAO must have in place to ensure valid, consistent and reliable EPA decisions.

EPAOs for this EPA must adhere to the requirements within the roles and responsibilities table.

They must also appoint independent assessors who:

- have recent relevant experience of the occupation or sector to at least occupational level 3 gained in the last 3 years or significant experience of the occupation or sector

## **Value for money**

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

- utilising digital remote platforms to conduct applicable assessment methods
- using the employer's premises
- conducting assessment methods on the same day

## **Professional recognition**

This apprenticeship aligns with:

- Institute of the Cast Metals Engineers (ICME) [for](#) Engineering Technician (EngTech) [TBC]

## **Mapping of KSBs to assessment methods**



KNOWLEDGE	ASSESSMENT METHODS
<p><b>K1:</b> Core. Metal castings – what they are and where they are used.</p>	<p>Project with question and answer session</p>
<p><b>K2:</b> Core. Stages and functions involved in producing metal castings. Production practices. Technological developments in the sector.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K3:</b> Core. Individual role and responsibilities. Escalation procedures.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K4:</b> Core. Business operation considerations: quality, cost, and delivery.</p>	<p>Project with question and answer session</p>
<p><b>K5:</b> Core. Planning, prioritisation, organisation, and time management techniques.</p>	<p>Project with question and answer session</p>
<p><b>K6:</b> Core. Health and safety regulations requirements and impact on role: The Health and Safety at Work Act, Control of Substances Hazardous to Health (COSHH), The Health and Safety (Safety Signs and Signals), The Provision and Use of Work Equipment, The Health and Safety (Display Screen Equipment), The Personal Protective Equipment at Work (PPE), The Management of Health and Safety at Work, The Workplace (Health, Safety and Welfare), The Manual Handling Operations, First Aid at Work, Noise at Work Regulations, Vibration at Work Regulations, Lifting Operations and Lifting Equipment Regulations, and Work at Height Regulations.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K7:</b> Core. Metal casting manufacturing safety hazards: fire, molten metal, hot surfaces, noise, dusts, vapours, fumes, vibration, explosion, and machinery. Risk assessment and safe systems of work.</p>	<p>Project with question and answer session</p>
<p><b>K8:</b> Core. Company emergency procedures and incident reporting procedures.</p>	<p>Interview underpinned by a portfolio of evidence</p>

<p><b>K9: Core.</b> Site security requirements.</p>	<p>Project with question and answer session</p>
<p><b>K10: Core.</b> Environmental regulations and standards – impact on role: Environmental Management Systems standard – ISO14001, Environmental Protection Act, and Hazardous Waste Regulations.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K11: Core.</b> The UK's net zero commitment. Principles of sustainability: resource efficiency, reuse of materials, and recycling.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K12: Core.</b> Waste management requirements.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K13: Core.</b> Team working principles: roles within teams, team formation, and characteristics of effective teams.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K14: Core.</b> Principles of equality, diversity, and inclusion in the workplace.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K15: Core.</b> Communication methods and techniques. Industry terminology.</p>	<p>Project with question and answer session</p>
<p><b>K16: Core.</b> Documentation requirements.</p>	<p>Project with question and answer session</p>
<p><b>K17: Core.</b> Information and digital technology applications and software packages. General data protection regulation (GDPR). Cyber security.</p>	<p>Project with question and answer session</p>
<p><b>K18: Core.</b> Problem-solving and fault-finding techniques.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>K19: Core.</b> Continuous improvement (CI) systems and techniques.</p>	<p>Project with question and answer session</p>

<p><b>K20:</b> Core. Quality standards and systems. How to access and use quality documents.</p>	Project with question and answer session
<p><b>K21:</b> Core. Conventions for engineering and manufacturing information, data, and drawings.</p>	Project with question and answer session
<p><b>K22:</b> Core. Mathematical principles of algebra, trigonometry, and statistical methods to display information.</p>	Interview underpinned by a portfolio of evidence
<p><b>K23:</b> Core. Material properties, composition analysis and alloy analysis.</p>	Interview underpinned by a portfolio of evidence
<p><b>K24:</b> Core. Mechanical testing techniques for castings. Material standards.</p>	Interview underpinned by a portfolio of evidence
<p><b>K25:</b> Core. Casting defects identification methods and causes.</p>	Interview underpinned by a portfolio of evidence
<p><b>K26:</b> Core. Metallographic examination of castings techniques and standards.</p>	Interview underpinned by a portfolio of evidence
<p><b>K27:</b> Core. Sample castings inspection techniques.</p>	Interview underpinned by a portfolio of evidence
<p><b>K28:</b> Core. Production processes: consumable and permanent moulds.</p>	Interview underpinned by a portfolio of evidence
<p><b>K29:</b> Core. Sand moulding and core making processes - automated and manual.</p>	Interview underpinned by a portfolio of evidence
<p><b>K30:</b> Core. Melting processes.</p>	Interview underpinned by a portfolio of evidence
<p><b>K31:</b> Core. Theory behind the solidification of molten metal.</p>	Interview underpinned by a portfolio of evidence

<p><b>K32:</b> Core. Processing and casting molten metal practices.</p>	Interview underpinned by a portfolio of evidence
<p><b>K33:</b> Methods development technician. 1. Casting design, simulation, and analysis software applications.</p>	Project with question and answer session
<p><b>K34:</b> Methods development technician. 1. Design considerations.</p>	Project with question and answer session
<p><b>K35:</b> Methods development technician. 1. Casting shape optimisation techniques to reduce defects.</p>	Project with question and answer session
<p><b>K36:</b> Methods development technician. 1. Manufacturing considerations and the importance of inspection feedback.</p>	Project with question and answer session
<p><b>K37:</b> Methods development technician. 1. Costing and quoting models.</p>	Project with question and answer session
<p><b>K38:</b> Pattern making technician. 2. Pattern material preparation requirements.</p>	Project with question and answer session
<p><b>K39:</b> Pattern making technician. 2. Application and operation of pattern making machinery and tools.</p>	Project with question and answer session
<p><b>K40:</b> Pattern making technician. 2. Maintenance requirements for pattern making machinery and tools.</p>	Project with question and answer session
<p><b>K41:</b> Foundry manufacturing technician. 3. Application and operation of foundry plant, equipment, and tools.</p>	Project with question and answer session
<p><b>K42:</b> Foundry manufacturing technician. 3. Application and operation of post casting plant, equipment, and tools.</p>	Project with question and answer session
<p><b>K43:</b> Foundry manufacturing technician. 3. Post production requirements and logistics.</p>	Project with question and answer session

<p><b>K44:</b> Foundry manufacturing technician. 3. Non-destructive testing (NDT) techniques for casting and associated acceptance criteria.</p>	<p>Project with question and answer session</p>
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SKILL	ASSESSMENT METHODS
<p><b>S1:</b> Core. Plan tasks. Identify and organise resources with consideration of different factors. For example, safety, environmental impact, quality, cost, and delivery.</p>	Project with question and answer session
<p><b>S2:</b> Core. Identify hazards and risks in the workplace, work area safety and mitigation measures.</p>	Project with question and answer session
<p><b>S3:</b> Core. Follow health, safety, site security, and environmental procedures in compliance with regulations, standards, and procedures. For example, wear PPE relevant for department they are working in.</p>	Project with question and answer session
<p><b>S4:</b> Core. Follow emergency and incident reporting procedures. For example, make area safe and evacuate.</p>	Interview underpinned by a portfolio of evidence
<p><b>S5:</b> Core. Apply sustainability principles.</p>	Interview underpinned by a portfolio of evidence
<p><b>S6:</b> Core. Follow recycling and waste management procedures.</p>	Interview underpinned by a portfolio of evidence
<p><b>S7:</b> Core. Apply team working principles.</p>	Interview underpinned by a portfolio of evidence
<p><b>S8:</b> Core. Communicate with others for example, colleagues and stakeholders.</p>	Project with question and answer session
<p><b>S9:</b> Core. Record information.</p>	Project with question and answer session
<p><b>S10:</b> Core. Produce written content for example, handover notes or emails, non-conformances, design change requests.</p>	Project with question and answer session
<p><b>S11:</b> Core. Use information and digital technology for example, to record information or produce written documents. Comply</p>	Project with question and answer session

with cyber security requirements and general data protection requirement (GDPR).	
<b>S12:</b> Core. Identify issues.	Interview underpinned by a portfolio of evidence
<b>S13:</b> Core. Escalate issues outside limits of responsibility.	Interview underpinned by a portfolio of evidence
<b>S14:</b> Core. Apply problem solving and fault-finding techniques. For example, 5-Whys, Fishbone, 8D, and A3.	Interview underpinned by a portfolio of evidence
<b>S15:</b> Core. Apply continuous improvement techniques to identify improvement suggestions.	Project with question and answer session
<b>S16:</b> Core. Plan how to meet own skills development needs. Carry out and record planned and unplanned learning and development activities.	Interview underpinned by a portfolio of evidence
<b>S17:</b> Core. Access and apply quality standards. For example, process documents.	Project with question and answer session
<b>S18:</b> Core. Interpret engineering and manufacturing information, data and drawings.	Project with question and answer session
<b>S19:</b> Core. Use mathematical principles and formulae.	Interview underpinned by a portfolio of evidence
<b>S20:</b> Core. Identify casting defects and causes.	Interview underpinned by a portfolio of evidence
<b>S21:</b> Core. Inspect sample castings. For example, using CMM (Coordinate-measuring machine), lasers, micrometer, and tape measure.	Interview underpinned by a portfolio of evidence
<b>S22:</b> Methods development technician.	Project with question and answer session

1. Use design software. For example, CAD (Computer Aided Design).	
<b>S23:</b> Methods development technician. 1. Use casting simulation and analysis software.	Project with question and answer session
<b>S24:</b> Methods development technician. 1. Produce costings and quotes for design options.	Project with question and answer session
<b>S25:</b> Pattern making technician. 2. Prepare material for pattern making.	Project with question and answer session
<b>S26:</b> Pattern making technician. 2. Select, check, and operate pattern making machinery and tools.	Project with question and answer session
<b>S27:</b> Pattern making technician. 2. Conduct pattern accuracy checks. For example, dimensions.	Project with question and answer session
<b>S28:</b> Pattern making technician. 2. Conduct preventative maintenance of pattern making tools.	Project with question and answer session
<b>S29:</b> Foundry manufacturing technician. 3. Operate foundry plant, equipment, and tools.	Project with question and answer session
<b>S30:</b> Foundry manufacturing technician. 3. Operate post casting plant, equipment, and tools.	Project with question and answer session
<b>S31:</b> Foundry manufacturing technician. 3. Conduct post production operations. For example, labelling, packaging, warehousing, and loading.	Project with question and answer session
<b>S32:</b> Foundry manufacturing technician. 3. Use testing equipment to identify composition and mechanical structures.	Project with question and answer session
<b>S33:</b> Foundry manufacturing technician. 3. Apply NDT techniques.	Project with question and answer session



BEHAVIOUR	ASSESSMENT METHODS
<p><b>B1:</b> Core. Prioritise safe working practices. For example, risk aware, minimise risks, and proactively work towards preventing accidents.</p>	<p>Project with question and answer session</p>
<p><b>B2:</b> Core. Consider sustainability when using resources and carrying out tasks.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>B3:</b> Core. Respond and adapt to work demands.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>B4:</b> Core. Take ownership for the delivery and quality of own work. For example, self-motivated, disciplined in the approach to work tasks, and work carried out in line with standards.</p>	<p>Project with question and answer session</p>
<p><b>B5:</b> Core. Team-focus to meet work goals and support inclusivity. For example, support others, show respect to others, and create and maintain productive working relationships.</p>	<p>Interview underpinned by a portfolio of evidence</p>
<p><b>B6:</b> Core. Committed to continued professional development to maintain and enhance competence.</p>	<p>Interview underpinned by a portfolio of evidence</p>

## Mapping of KSBs to grade themes

### Project with question and answer session

KSBS GROUPED BY THEME	KNOWLEDGE	SKILLS	BEHAVIOUR
(Core) Metal casting knowledge K1	Metal castings – what they are and where they are used. (K1)	None	None
(Core) Work planning K4 K5 S1	Business operation considerations: quality, cost, and delivery. (K4)  Planning, prioritisation, organisation, and time management techniques. (K5)	Plan tasks. Identify and organise resources with consideration of different factors. For example, safety, environmental impact, quality, cost, and delivery. (S1)	None
(Core) Ensuring health, safety, security, and environmental compliance K7 K9 S2 S3 B1	Metal casting manufacturing safety hazards: fire, molten metal, hot surfaces, noise, dusts, vapours, fumes, vibration, explosion, and machinery. Risk assessment and safe systems of work. (K7)  Site security requirements. (K9)	Identify hazards and risks in the workplace, work area safety and mitigation measures. (S2)  Follow health, safety, site security, and environmental procedures in compliance with regulations, standards, and procedures. For example, wear PPE relevant for department they are working in. (S3)	Prioritise safe working practices. For example, risk aware, minimise risks, and proactively work towards preventing accidents. (B1)
(Core) Using manufacturing data, information, and drawings K21 S18	Conventions for engineering and manufacturing information, data, and drawings. (K21)	Interpret engineering and manufacturing information, data and drawings. (S18)	None
(Core) Conducting quality assurance	Quality standards and systems. How	Access and apply quality standards.	Take ownership for the delivery and

K20 S17 B4	to access and use quality documents. (K20)	For example, process documents. (S17)	quality of own work. For example, self-motivated, disciplined in the approach to work tasks, and work carried out in line with standards. (B4)
(Core) Communicating with others K15 S8	Communication methods and techniques. Industry terminology. (K15)	Communicate with others for example, colleagues and stakeholders. (S8)	None
(Core) Producing documentation K16 S9 S10	Documentation requirements. (K16)	Record information. (S9)  Produce written content for example, handover notes or emails, non-conformances, design change requests. (S10)	None
(Core) Using information technology K17 S11	Information and digital technology applications and software packages. General data protection regulation (GDPR). Cyber security. (K17)	Use information and digital technology for example, to record information or produce written documents. Comply with cyber security requirements and general data protection requirement (GDPR). (S11)	None
(Core) Continuous improvement K19 S15	Continuous improvement (CI) systems and techniques. (K19)	Apply continuous improvement techniques to identify improvement suggestions. (S15)	None

<p>(Methods development technician) Producing a metal castings production specification K33 K34 K35 K36 K37 S22 S23 S24</p>	<p>1. Casting design, simulation, and analysis software applications. (K33)</p> <p>1. Design considerations. (K34)</p> <p>1. Casting shape optimisation techniques to reduce defects. (K35)</p> <p>1. Manufacturing considerations and the importance of inspection feedback. (K36)</p> <p>1. Costing and quoting models. (K37)</p>	<p>1. Use design software. For example, CAD (Computer Aided Design). (S22)</p> <p>1. Use casting simulation and analysis software. (S23)</p> <p>1. Produce costings and quotes for design options. (S24)</p>	<p>None</p>
<p>(Pattern making technician) Producing a metal castings pattern K38 K39 K40 S25 S26 S27 S28</p>	<p>2. Pattern material preparation requirements. (K38)</p> <p>2. Application and operation of pattern making machinery and tools. (K39)</p> <p>2. Maintenance requirements for pattern making machinery and tools. (K40)</p>	<p>2. Prepare material for pattern making. (S25)</p> <p>2. Select, check, and operate pattern making machinery and tools. (S26)</p> <p>2. Conduct pattern accuracy checks. For example, dimensions. (S27)</p> <p>2. Conduct preventative maintenance of pattern making tools. (S28)</p>	<p>None</p>
<p>(Foundry manufacturing technician) Producing a metal</p>	<p>3. Application and operation of foundry plant,</p>	<p>3. Operate foundry plant, equipment, and tools. (S29)</p>	<p>None</p>

<p>casting or castings K41 K42 K43 K44 S29 S30 S31 S32 S33</p>	<p>equipment, and tools. (K41)</p> <p>3. Application and operation of post casting plant, equipment, and tools. (K42)</p> <p>3. Post production requirements and logistics. (K43)</p> <p>3. Non-destructive testing (NDT) techniques for casting and associated acceptance criteria. (K44)</p>	<p>3. Operate post casting plant, equipment, and tools. (S30)</p> <p>3. Conduct post production operations. For example, labelling, packaging, warehousing, and loading. (S31)</p> <p>3. Use testing equipment to identify composition and mechanical structures. (S32)</p> <p>3. Apply NDT techniques. (S33)</p>	
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**Interview underpinned by a portfolio of evidence**

KSBS GROUPED BY THEME	KNOWLEDGE	SKILLS	BEHAVIOUR
(Core) Role and responsibilities K3 S13 B3	Individual role and responsibilities. Escalation procedures. (K3)	Escalate issues outside limits of responsibility. (S13)	Respond and adapt to work demands. (B3)
(Core) Procedures - site security, emergency response, and incident reporting K8 S4	Company emergency procedures and incident reporting procedures. (K8)	Follow emergency and incident reporting procedures. For example, make area safe and evacuate. (S4)	None
(Core) Sustainability K11 K12 S5 S6 B2	The UK's net zero commitment. Principles of sustainability: resource efficiency, reuse of materials, and recycling. (K11)  Waste management requirements. (K12)	Apply sustainability principles. (S5)  Follow recycling and waste management procedures. (S6)	Consider sustainability when using resources and carrying out tasks. (B2)
(Core) Problem solving and fault finding K18 S12 S14	Problem-solving and fault-finding techniques. (K18)	Identify issues. (S12)  Apply problem solving and fault-finding techniques. For example, 5-Whys, Fishbone, 8D, and A3. (S14)	None

<p>(Core) Team work K13 K14 S7 B5</p>	<p>Team working principles: roles within teams, team formation, and characteristics of effective teams. (K13)</p> <p>Principles of equality, diversity, and inclusion in the workplace. (K14)</p>	<p>Apply team working principles. (S7)</p>	<p>Team-focus to meet work goals and support inclusivity. For example, support others, show respect to others, and create and maintain productive working relationships. (B5)</p>
<p>(Core) Continued professional development (CPD)  S16 B6</p>	<p>None</p>	<p>Plan how to meet own skills development needs. Carry out and record planned and unplanned learning and development activities. (S16)</p>	<p>Committed to continued professional development to maintain and enhance competence. (B6)</p>
<p>(Core) Applied mathematics K22 S19</p>	<p>Mathematical principles of algebra, trigonometry, and statistical methods to display information. (K22)</p>	<p>Use mathematical principles and formulae. (S19)</p>	<p>None</p>
<p>(Core) Inspecting sample castings and identifying casting defects K25 K27 S20 S21</p>	<p>Casting defects identification methods and causes. (K25)</p> <p>Sample castings inspection techniques. (K27)</p>	<p>Identify casting defects and causes. (S20)</p> <p>Inspect sample castings. For example, using CMM (Coordinate-measuring machine), lasers, micrometer, and tape measure. (S21)</p>	<p>None</p>
<p>(Core) Metal casting fundamentals K2 K6 K10 K23 K24</p>	<p>Stages and functions involved in producing metal</p>	<p>None</p>	<p>None</p>

K26 K28 K29 K30  
K31 K32

castings.  
Production  
practices.  
Technological  
developments in  
the sector. (K2)

Health and safety  
regulations  
requirements and  
impact on role: The  
Health and Safety  
at Work Act, Control  
of Substances  
Hazardous to  
Health (COSHH),  
The Health and  
Safety (Safety Signs  
and Signals), The  
Provision and Use  
of Work Equipment,  
The Health and  
Safety (Display  
Screen Equipment),  
The Personal  
Protective  
Equipment at Work  
(PPE), The  
Management of  
Health and Safety  
at Work, The  
Workplace (Health,  
Safety and Welfare),  
The Manual  
Handling  
Operations, First  
Aid at Work, Noise  
at Work  
Regulations,  
Vibration at Work  
Regulations, Lifting  
Operations and  
Lifting Equipment  
Regulations, and  
Work at Height  
Regulations. (K6)

Environmental  
regulations and



standards – impact on role:  
Environmental Management Systems standard – ISO14001, Environmental Protection Act, and Hazardous Waste Regulations. (K10)

Material properties, composition analysis and alloy analysis. (K23)

Mechanical testing techniques for castings. Material standards. (K24)

Metallographic examination of castings techniques and standards. (K26)

Production processes: consumable and permanent moulds. (K28)

Sand moulding and core making processes - automated and manual. (K29)

Melting processes. (K30)

Theory behind the solidification of molten metal. (K31)

Processing and casting molten

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