



**Level 7 Materials Process Engineer (Degree)
Apprenticeship (ST0659)**

**AM1 (Component 2): Presentation of
Work-Based Project Guidance**

Version 1

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INTRODUCTION

An apprentice must undertake a work-based project and submit this report to PIABC Limited for review by an independent assessor.

This work-based project is started after the apprentice has gone through the gateway process and must be submitted to PIABC Limited by the end of 30 weeks of the EPA at the latest. The apprentice will have 10 days after the work-based project report has been submitted to prepare, complete, and submit the presentation to PIABC Limited. The apprentice must also at this time outline details of any visual aids to be used and specify any equipment required.

Apprentices will prepare and deliver a presentation that appropriately covers the knowledge, skills and behaviours (KSBs) assigned to this method of assessment (see below).

The presentation will be based on the work-based project and will cover:

- A summary of the project and the apprentice's role and level of responsibility
- The key issues or challenges on the project and how they were met
- The practical application of relevant KSBs
- The options considered, solutions identified and reasons why some options were not feasible
- What the apprentice achieved and how this was achieved

The presentation will be presented to an independent assessor, either face-to-face or via online video conferencing.

The rationale for this assessment method is: The presentation is part of the overall "Work-based Project and Presentation" assessment method. The rationale behind the use of the presentation element is that it replicates the sort of work undertaken by competent individuals in this profession. They are expected to be able to make presentations to individuals and groups. The presentation allows the project to be explored in more depth.

KNOWLEDGE, SKILLS AND BEHAVIOURS (KSBs)

The Level 7 Material Process Engineer apprenticeship standard states that all apprentices will need to develop specialist KSBs. These KSBs will be generic and/or technology specific, but the subject areas indicated below will provide a foundation for an apprentice development in materials process engineering.

The KSBs of the of the Level 7 Material Process Engineer apprenticeship standard are set out below for Assessment Method 1 (AM1):

Knowledge

A Material Process Engineer will require a thorough understanding of the industry in which they are employed. They will be able to understand and apply the following areas:

- K1** Theories of team working
- K2** Principles of programme management
- K4** Risk management theories and practice
- K23** The principles of effective presentations (including planning, structuring, how and when to engage with the audience, using visual aids, presenting data)
- K24** Art of technical report writing
- K25** Principles of mentoring people

- K26** Fundamentals of casting process and technology*
- K28** Fundamentals of coating processes and technology*
- K29** Fundamentals of welding processes and technology*
- K30** Fundamentals of brazing processes and technology*
- K31** Fundamentals of heat treatment processes and technology*
- K32** Fundamentals of surface treatment processes and technology*

Skills

A Material Process Engineer will be asked to demonstrate skills in the following:

- S1** Work within a team environment. This may include acting as a team leader with people management skills. They undertake risk analysis and problem solving on behalf of the team.
- S2** Communicate and present information appropriately and effectively taking account of target audience
- S3** Apply appropriate programme management tools. Typically, this would include a RACI chart, Project Plans, Load and Capacity analysis and cost analysis.
- S5** Mentor and support others using coaching skills and actively support continuous professional development.
- S7** Operate and control process equipment using continuous improvement methodologies
- S8** Apply process control procedures correctly and effectively
- S11** Make appropriate use of problem-solving tools (e.g. 8D, 5 whys)
- S12** Apply change control tools and practices
- S13** Apply risk management tools and techniques
- S15** Apply production control methods (e.g. planning and project management)
- S16** Correct use of specialist equipment and process knowledge*

Behaviours

A Material Process Engineer will be asked to demonstrate the following behaviours:

- B1** Working collaboratively - is comfortable in working in teams and being a team leader to agreed goals*
- B3** Commitment to leadership - Taking personal responsibility for their actions, managing projects including resource management within their remit and able to mentor and instruct others in associated standards and best practice*
- B5** Curiosity and Innovation Utilising own and others creativity to Improve the industry through embracing new technology and the digital world*
- B6** System Thinking Seeing whole systems and parts and how they connect recognising interdependencies and integration*

* These KSBs are mapped to apprentice's specialist option (i.e. casting, coating, welding, brazing, heat treatment and surface treatment).

DELIVERY

The presentation will take place on a one-to-one basis between the independent assessor and the apprentice. The way in which the content of the presentation is made is not prescriptive.

The presentation assessment method will last for 60 minutes. The presentation will be 20 minutes with 40 minutes of questions and answers to be held following the presentation. The independent assessor has the discretion to increase the time of the presentation by up to 10% to allow the apprentice to complete their last point.

The independent assessor will ask a minimum of 10 questions at the end of the presentation. Supplementary questions are allowed to seek clarification and don't form part of this question number count.

The questions will come from a question bank created by PIABC Limited, although independent assessor will be able to tailor questions according to the work-based project.

To deliver the presentation, the apprentice will have access to:

- PowerPoint
- Flip Chart
- Computer
- Work products
- Videos
- Interactive demonstrations
- Notes

The independent assessor will review the presentation alongside the project report and prepare questions to be asked at the end of the presentation.

An employer representative must also be present to observe the presentation. This employer representative's role is to provide technical engineering information, at the independent assessor's request, in relation to the apprentice's workplace and work, such as confirming company policies, procedures, processes, providing context on technical information or on emerging technologies. The employer representative may be the work-based project sponsor, programme sponsor, the apprentice's line manager, site engineer, head of engineering or operations manager. The employer representative will not provide information on behalf of the apprentice or influence the apprentice in any way. The employer representative will not have any role in the decision-making process as the independent assessor will solely determine the grade for the work-based project and presentation with questioning.

ON THE DAY

- **Dress code**
Apprentices are expected to look smart on the day of the professional discussion. This must be in accordance with health and safety requirements of the venue (e.g. no open toe shoes).
- **Identification confirmation**
Apprentices must bring personal photographic identification (e.g. passport or driving licence), which will be checked before the professional discussion.
- **Mobile phones and tablets**
The use of mobile phones and other electronic devices at the professional discussion by the apprentice is prohibited.
- **Punctuality and timing**
All apprentices must be on time for the start of their professional discussion. It is recommended that apprentices arrive at least 30 minutes before its scheduled start. In instances where the apprentice may arrive late, the apprentice must inform their training provider as soon as possible so the panel is aware.

VENUE

PIABC Limited will ensure that the presentation and questioning elements are conducted in a suitable controlled environment in any of the following:

- Employer's premises
- Other suitable venue selected by PIABC Limited (e.g. at training provider location or PIABC Limited office)

The presentation may be conducted face-to-face or via an electronic platform (e.g. video-conferencing).

Should an electronic option be used, then PIABC Limited will ensure appropriate methods are used to prevent misrepresentation (e.g. screen share and 360-degree camera function with an administrator/invigilator present).

ASSESSMENT CRITERIA

Apprentices will only be assessed on KSBs mapped to the core and the ones mapped to their specialist choice (see apprentice occupational standard for details).

PIABC Limited will assess the apprentice against the higher order descriptors outlined in the Pass and Distinction columns rather than the lower order knowledge, skills, and behaviours references in the second column. By showing competence against the higher order descriptors, then it will be assumed that the apprentice is working at or above the level outlined in the standard. The apprentice will be considered to have failed if they do not meet the criteria outlined in the pass descriptor.

Fail - The apprentice will be deemed to have failed if they do not meet the criteria outlined in the pass descriptor.

The following assessment criteria and full grading descriptors are for Assessment Method 1 (AM1) covering both the work-based project and presentation:

Area of Assessment	Method	Pass Criteria – The apprentice’s project must demonstrate that they:	A successful contribution at distinction will meet the pass criteria in all areas and meet seven of the individual distinction descriptors from the criteria below:
Application of technical knowledge	<p>K26 Fundamentals of casting process and technology*</p> <p>K28 Fundamentals of coating processes and technology*</p> <p>K29 Fundamentals of welding processes and technology*</p> <p>K30 Fundamentals of brazing processes and technology*</p> <p>K31 Fundamentals of heat treatment processes and technology*</p> <p>K32 Fundamentals of surface treatment processes and technology*</p>	Applies appropriate theoretical and technological methods to design, develop and commission engineering solutions, with reference to the appropriate process relating to their specialism.	Appraises solution and explains the risks and implications of the process, alternative approaches and ways to address them.

Area of Assessment	Method	Pass Criteria – The apprentice’s project must demonstrate that they:	A successful contribution at distinction will meet the pass criteria in all areas and meet seven of the individual distinction descriptors from the criteria below:
<p>Manage the delivery of innovative, stable and robust solutions with full integration into the Manufacturing ecosystem</p>	<p>S12 Apply change control procedures</p> <p>S15 Apply production control methods</p>	<p>Demonstrates resilience and determination in achieving project outcomes and that they are able to interact with team members and stakeholders to achieve successful outcomes.</p>	<p>Challenges the norm and investigates, proposes and articulates solutions outside the immediate business and industry sector, including researching new methods and technologies which could be applied to problems encountered in the material process engineer environment, demonstrated by supporting evidence.</p>
	<p>S16 Use of specialist equipment and process knowledge*</p> <p>B3 Commitment to leadership - Taking personal responsibility for their actions, managing projects including resource management within their remit and able to mentor and instruct others in associated standards and best practice*</p> <p>B5 Curiosity and Innovation - Utilising own and others creativity to Improve the industry through embracing new technology and the digital world*</p> <p>B6 System Thinking - Seeing whole systems and parts and how they connect recognising interdependencies and integration*</p>	<p>Proposes solutions based on in-house knowledge and expertise relating to specialist equipment and processes used in the company.</p> <p>Takes a broad view into account, looking at the whole system, not just component parts when making key decisions, embracing specialist equipment and new technology and communicating with stakeholders.</p> <p>Selects and interprets change control procedures and production methods, as appropriate, and applies the requirements leading to the successful delivery of the project.</p> <p>Evidence of consistent professional working practices, taking responsibility for their own actions with clear examples of leadership and followership. Approach demonstrates curiosity and innovation.</p>	<p>Demonstrates an understanding of the risks and implications to the business of the application of new technologies and in the way procedures and methods are selected, and unintended consequences to the business when they are applied (i.e they understand that solving problem A, can cause problem B and can weigh up the benefits).</p>

Area of Assessment	Method	Pass Criteria – The apprentice’s project must demonstrate that they:	A successful contribution at distinction will meet the pass criteria in all areas and meet seven of the individual distinction descriptors from the criteria below:
Deliver Materials Process systems engineering/ operational solutions effectively	K4 Risk management theories and practice	Leads the application of risk management tools and techniques meaning the engineering/operational solution is well managed and successfully implemented.	Interprets, critically evaluates and recommends actions to mitigate problems which have the potential to impact business performance for example, impact on product quality, cost and delivery.
	S13 Use of risk management tools		
Lead/manage multi-disciplinary teams	K25 Principles of mentoring people S5 Mentoring	Leads their team with appropriate mentoring/coaching for individuals within the team, understanding the importance of team values to support a high-performance work culture.	Demonstrate the ability to lead beyond the immediate team at organisational level and above to motivate and mentor people beyond those they directly line-manage to produce a high-performance work culture, showing insight into the needs and motivations of others.
Use of team and role play theory to develop high performance teams and individuals	K1 Theories of team working S1 Working within a team environment B1 Working collaboratively - is comfortable in working in teams and being a team leader to agreed goals*	Demonstrates understanding of team and role theory and evidence of application of theory to produce intended outcomes.	Applies theory with insight and awareness of risks and rewards, describing how theory was applied with clear analysis of the impact and risks.

Area of Assessment	Method	Pass Criteria – The apprentice’s project must demonstrate that they:	A successful contribution at distinction will meet the pass criteria in all areas and meet seven of the individual distinction descriptors from the criteria below:
Manage the delivery of engineering solutions within a regulated sector	K2 Principles of programme management S3 Use of programme management tools	Manages delivery with appropriate levels of planning, governance, implementation and relevant risk management procedures pertaining to the discipline, and use of appropriate programme management tools.	Investigates innovative improvement methods and techniques and evaluates their suitability for use within the context of their discipline. Takes a leadership role in justifying the use of such tools and techniques and supporting the organisation in achieving benefits from using them.
Use of communication and influencing skills	K23 Presentation Skills K24 Art of technical report writing	<p>Presents and communicates the key content and messages bounded by quality information pertaining to the discipline. Written report includes introduction, methodology, results and conclusion and defends choice of methods selected. Report takes account of the target audience, is grammatically correct and cohesive.</p> <p>Motivates and mentors team members in both their technical and professional development.</p>	<p>Drafts report in a way that ensures arguments flow from each other to a logical conclusion, which are outlined in a non-confrontational way, encouraging discussion.</p> <p>Responds to technical questioning during presentation with ability to argue and defend their view while showing respect for the opinions of others.</p> <p>Applies best practices with a disciplined and responsible approach to avoid risk through application of technical skills and mitigation strategies.</p>

Area of Assessment	Method	Pass Criteria – The apprentice's project must demonstrate that they:	A successful contribution at distinction will meet the pass criteria in all areas and meet seven of the individual distinction descriptors from the criteria below:
Use six-sigma methodologies, problem	S11 Make appropriate use of problem-solving tools	Applies improvement management tools and techniques meaning that the project is well managed and successfully implemented.	<p>Demonstrates an understanding of problem-solving tools and the application of them and how they might enhance the business, selecting the most appropriate but discussing merits of alternatives.</p> <p>Understands the risks and benefits of each when making the selection.</p>
Use data analytics, process control methodologies and design principles	<p>S7 Operate and control process equipment</p> <p>S8 Apply process control procedures correctly and effectively</p>	Demonstrates evidence that the correct selection of the approach is aligned with the problem being addressed within the work-based project. Well-structured approach to data analysis and how this is integrated into the process standards/controls pertaining to the discipline.	Compares a range of principles and techniques to enhance the robustness of decisions, is able to critique the various options and provide supporting evidence for justifying and defending preferred option.

* These KSBs are mapped to apprentice's specialist option (i.e. casting, coating, welding, brazing, heat treatment and surface treatment).

GRADING

The following grading are for Assessment Method 1 (AM1) covering both the work-based project and presentation:

KSBs	Fail	Pass	Distinction
K1 K2 K4 K23 K24 K25 K26 K28 K29 K30 K31 K32 S1 S2 S3 S5 S7 S8 S11 S12 S13 S15 S16 B1 B3 B5 B6	The apprentice will be deemed to have failed the assessment method if they do not meet the criteria outlined in the pass descriptor.	In order to achieve a "pass" all of the pass descriptors mapped to this assessment method must be met.	In order to achieve a "distinction", all of the pass criteria and seven of the distinction criteria mapped against this assessment method must be met.

The independent assessor will make all grading decisions.

SUCCESSFUL COMPLETION OF THE END POINT ASSESSMENT

For an apprentice to pass the end point assessment (EPA) as a whole and be deemed to be competent, the apprentice must pass all assessment methods (AM1: Work-Based Project and Presentation, AM2: Professional Review/Discussion and the AM3: Knowledge and Skills Test).

Should the apprentice fail either AM1, AM2 or AM3 they are required to re-sit/re-take that component. The number of times an apprentice is permitted to re-sit/re-take the end point assessment and the date at which they do so is determined by the employer.