

Performing Engineering Operations



QPEO2/002N

Credit Value: 4

QCF Level: 2

GLH: 29

Carrying out engineering activities efficiently and effectively

Learner Name:

EAL Assessment Route Summary

This EAL assessment route covers the skills and knowledge needed to prove the competences required to cover a broad range of basic activities that will prepare the learner for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or that will act as a basis for the development of additional skills and occupational competences in the working environment.

Prior to undertaking the engineering activity, the learner will be required to carry out all necessary preparations, within the scope of their responsibility. This will include preparing the work area and ensuring that it is in a safe condition to carry out the intended activities. The learner will need to obtain the appropriate job documentation, work instructions, tools, equipment and materials required for the work activities undertaken, and to check they are in a safe and usable condition. Planning their work activities before they start them will also form part of this unit.

On completion of the engineering activity, the learner will be required to return their immediate work area to an acceptable condition before undertaking further work. This may involve placing part-completed or completed work in the correct location, returning and/or storing any tools and equipment in the correct area, removing any waste and/or scrapped materials, and reporting any defects or damage to the tools and equipment used.

In order to be efficient and effective in the workplace, the learner will also be required to demonstrate that they can create and maintain effective working relationships with colleagues and supervisors. The learner will be expected to review objectives and targets for their personal development and to contribute to, and communicate any opportunities for, improvements that could be made to working practices and procedures.

The learner's responsibilities will require them to comply with health and safety requirements and organisational policy and procedures for the activities undertaken. The learner will need to take account of any potential difficulties or problems that may arise with the activities, and to seek appropriate help and advice in determining and implementing a suitable solution. The learner will work under a high level of supervision, whilst taking responsibility for their own actions and for the quality and accuracy of the work that they carry out.

The learner's knowledge will provide a good understanding of their work, and will provide an informed approach to working efficiently and effectively in an engineering environment. The learner will understand the need to work efficiently and effectively, and will know about the items they need to consider when preparing and tidying up the work area. The learner will know how to contribute to improvements, deal with problems, maintain effective working relationships, and agree their development objectives and targets, in adequate depth to provide a sound basis for carrying out the activities safely and correctly.

The learner will understand the safety precautions required when carrying out the specific engineering activities. The learner will be required to demonstrate safe working practices throughout, and will understand the responsibility they owe to themselves and others in the workplace.

NOTE: Pre 16 Learners

It is a requirement of the EAL qualification that **ALL** teaching and assessment staff are fully competent and can provide evidence of their competence in the technical and health and safety requirements of the specific technical units chosen; such as machining, electrical and electronic, welding and fabrication for delivery/ assessment of pre 16 learners to enable the learner to safely meet the required standards. Centres approved to deliver this PEO qualification must ensure that ALL pre 16 learners are safeguarded at all times. The higher the risk activities within the technical units require supervision at all times and can only be delivered within a secure environment.

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Performance Learning outcomes – the learner will...

Work efficiently and effectively in engineering

Assessment criteria - the learner can...

(Performance to be assessed and evidenced)

Reference

1. Work safely at all times, complying with health and safety legislation, regulations and other relevant guidelines _____

2. Ensure that they apply **all** of the following checks and practices at all times during the engineering activities:
 - a) adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment (PPE) and other relevant safety regulations _____
 - b) wear the appropriate personal protective equipment for the work area and specific activity being carried out _____
 - c) use all tools and equipment safely and correctly, and only for their intended purpose _____
 - d) ensure that the work area is maintained and left in a safe and tidy condition _____

3. Plan the engineering activities before they start them _____

4. Prepare for the specific engineering activity, by producing a work plan which includes **all** of the following:
 - a) documentation required (such as drawings, technical/reference documents - such as tapping drill sizes, imperial to metric conversion books, component specifications, quality documentation) _____
 - b) materials required (such as stock material, components, part-machined components, cables/wire, welding consumables) _____
 - c) equipment required (such as machine tools to be used, lifting and handling equipment, bending and forming equipment, anti-static equipment, test equipment) _____
 - d) workholding methods and equipment (such as machine or bench vice, clamps, special workholding arrangements), where appropriate _____
 - e) tools required (such as hand tools, portable power tools, cutting tools, soldering irons) _____
 - f) measuring equipment required (such as mechanical, electrical, pressure, flow, level, speed, sound) _____
 - g) the operating sequence to be followed _____
 - h) timescale required to complete the engineering operations _____

5. Prepare the work area for carrying out the engineering activity _____

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6. Prepare to carry out the engineering activity, ensuring **all** of the following, as applicable to the work to be undertaken:
 - a) the work area is free from hazards and is suitably prepared for the activities to be undertaken _____
 - b) any required safety procedures are implemented _____
 - c) any necessary personal protection equipment is obtained, and is in a usable condition _____
 - d) tools and equipment required are obtained and checked that they are in a safe and usable condition _____
 - e) all necessary drawings, specifications and associated documents are obtained _____
 - f) job instructions are obtained and understood _____
 - g) the correct materials or components are obtained _____
 - h) appropriate authorisation to carry out the work is obtained _____
7. Obtain all necessary tools and equipment and check that they are in a safe and usable condition _____
8. Deal promptly and effectively with problems within their control, and seek help and guidance from the relevant people if they have problems that they cannot resolve _____
9. Deal with problems affecting the engineering activity, to include **two** of the following:
 - a) materials _____
 - b) tools and equipment _____
 - c) drawings _____
 - d) job specification _____
 - e) quality _____
 - f) people _____
 - g) timescales _____
 - h) safety _____
 - i) work activities or procedures _____
10. Maintain effective working relationships with colleagues and supervisors _____
11. Create and maintain effective working relationships, to include carrying out **all** of the following:
 - a) turning up at their place of work on time and suitably dressed for the work activities to be carried out _____
 - b) following instructions given to them and checking out any uncertainties before they start work _____
 - c) seeking information and assistance in a courteous and polite manner _____
 - d) taking advice from others in a positive way _____
 - e) dealing with disagreements in an amicable and constructive way _____
 - f) communicating with others nearby to make sure that they know about actions they are taking which may affect their work _____
 - g) showing respect for the views, rights and property of others _____
12. Review personal training and development, as appropriate to the job role _____

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- 13. Contribute to developing their own engineering competence, to include **all** of the following:
 - a) describing the levels of skill, knowledge and understanding needed for competence in the areas of work expected of them _____
 - b) describing their development objectives/program, and how these were identified _____
 - c) providing information on their expectations and progress towards their identified objectives _____
 - d) using feedback and advice to improve their personal performance _____

- 14. Tidy up the work area on completion of the engineering activity _____

- 15. Complete the work activities, to include **all** of the following:
 - a) returning tools and equipment to the designated location _____
 - b) returning drawings and work instructions _____
 - c) disposing of waste materials, in line with organisational and environmental requirements _____
 - d) completing all necessary documentation accurately and legibly _____
 - e) identifying, where appropriate, any damaged or unusable tools or equipment _____

- 16. Contribute to, and communicate opportunities for, improvement to working practices and procedures _____

- 17. Contribute to organisational procedures for identifying opportunities for improvement to **one** of the following:
 - a) working practices _____
 - b) working methods _____
 - c) quality _____
 - d) tools and equipment _____
 - e) internal communication _____
 - f) teamwork _____
 - g) training and development _____
 - h) safety _____
 - i) other specific procedure _____

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Knowledge Learning outcomes – the learner will...

Know how to work efficiently and effectively in engineering

Assessment criteria - the learner can...

(Knowledge to be assessed and evidenced)

1. Describe the safe working practices and procedures to be followed whilst preparing and tidying up their work area
2. Explain how to present themselves in the workplace suitably dressed for the activities to be undertaken (such as being neat, clean and dressed in clothes appropriate to the area of activity; ensuring that, if they have long hair, it is tied back or netted; and removing any jewellery or other items that can become entangled in the machinery)
3. Describe the personal protective equipment (PPE) to be worn for the engineering activities undertaken (such as correctly fitting overalls, safety shoes, eye protection, ear protection)
4. Describe the correct use of any equipment used to protect the health and safety of themselves and their colleagues
5. Explain how to plan and prepare to carry out the engineering activity (such as obtaining the appropriate drawings/documentation to be used, determining the materials required, determining the tools and equipment required, determining a suitable sequence of operations, determining the quality checks to be made and equipment to be used)
6. Describe the procedure for ensuring that all documentation relating to the work being carried out is available, prior to starting the activity
7. Describe the procedure for ensuring that all tools and equipment are available prior to undertaking the activity
8. Describe the checks to be carried out to ensure that tools and equipment are in full working order, prior to undertaking the activity
9. Describe the checks to be carried out to ensure that all materials required are correct and complete, prior to undertaking the activity
10. Describe the action that should be taken if documentation, tools and equipment or materials are incomplete or do not meet the requirements of the activity
11. Describe their role in helping to develop their own skills and knowledge (such as checking with their supervisor about the work they are expected to carry out and the standard they need to achieve; the safety points to be aware of and the skills and knowledge they will need to develop)
12. Describe the benefits of continuous personal development, and the training opportunities that are available in the workplace

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13. Describe the importance of reviewing their training and development with trainers and supervisors, of comparing the skills, knowledge and understanding that they have at any given point with the competences they need to develop, and of setting objectives to overcome any shortfall or address any development needs
14. Describe their responsibilities for providing evidence of their performance and progress (such as submitting work for assessment or the completion of assignments or tests)
15. Describe the importance of maintaining effective working relationships within the workplace (such as listening attentively to instructions told to them by their supervisor, making sure they ask for help and advice in a polite and courteous manner, responding positively to requests for help from others)
16. Describe the reason for informing others of their activities which may have impact on their work (such as the need to temporarily disconnect a shared resource like electricity or compressed air supply; making undue noise or creating sparks, fumes or arc flashes from welding)
17. Explain how to deal with disagreements with others in ways which will help to resolve difficulties and maintain long term relationships
18. Describe the organisational procedures to deal with and report any problems that can affect working relationships
19. Describe the difficulties that can occur in working relationships, and how to resolve them
20. Describe the sorts of attitudes and requests that are likely to create conflict or negative responses
21. Describe the regulations that affect how they should be treated at work (such as Equal Opportunities and Equal Pay, Race Relations and Sex Discrimination, Working Time Directive, Disabled Persons Acts)
22. Describe the importance of making a contribution to improving working practices and procedures, and the procedure and format for making suggestions for improvements
23. Describe the benefits to them and to the organisation if improvements can be identified and implemented
24. Describe the need to dispose of waste materials and consumables (such as oils and chemicals) in a safe and environmentally friendly way
25. Explain where tools and equipment should be stored and located, and the importance of returning all tools and documentation to their designated area on completion of their work activities
26. Explain when to act on their own initiative and when to seek help and advice from others
27. Describe the importance of leaving the work area in a safe condition on completion of their activities (such as equipment correctly isolated, cleaning the work area and removing and disposing of waste)