

Performing Engineering Operations



QPEO2/003N

Credit Value: 4 QCF Level: 2 GLH: 29

Using and communicating technical information

Learner Name:

EAL Assessment Route Summary

This EAL assessment route covers the skills and knowledge needed to prove the competences required to make full use of text, numeric and graphical information, by interpreting and using technical information extracted from a range of documentation such as engineering drawings, technical manuals, technical specifications, reference tables and charts, electronic displays, planning and quality control documentation.

This will prepare the learner for entry into the engineering or manufacturing sectors, creating a progression between education and employment, or will act as a basis for the development of additional skills and occupational competences in the working environment.

The learner will be required to extract the necessary data from the various specifications and related documentation, in order to establish and carry out the work requirements, and to make valid decisions about the quality and accuracy of the work carried out. The learner will also need to be able to communicate and record technical information, using a range of different methods such as producing detailed sketches, preparing work planning documentation, producing technical reports and recording data from testing activities.

The learner's responsibilities will require them to comply with organisational policy and procedures for obtaining, using and communicating the technical information applicable to the activity. 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 the types of documentation available for use, and will provide an informed approach to applying and communicating engineering instructions and procedures. The learner will be able to read and interpret the documentation available, and will know about the conventions, symbols and abbreviations to the required depth to provide a sound basis for carrying out the activities to the required specification.

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.

Using and communicating technical information

Performance Learning outcomes – the learner will...

Use and communicate technical information

Assessment criteria - the learner can...

(Performance to be assessed and evidenced)

Reference

1. Use the approved source to obtain the required data, documentation or specifications

To include **all** of the following:

- a) check the currency and validity of the data and documentation used
- b) exercise care and control over the documents at all times
- c) correctly extract all necessary data in order to carry out the required tasks
- d) seek out additional information where there are gaps or deficiencies in the information obtained
- e) deal with or report any problems found with the data
- f) make valid decisions based on the evaluation of the engineering information
- g) return all documentation to the approved location on completion of the work
- h) complete all necessary production documentation

2. Extract and interpret information from engineering drawings and other related documentation

3. Use information extracted from engineering documentation, to include **one** or more of the following:

- a) detailed component drawings
- b) general assembly drawings
- c) repair drawings
- d) fluid power drawings
- e) wiring/circuit diagrams
- f) installation drawings
- g) approved sketches
- h) illustrations
- i) visual display screens
- j) modification drawings
- k) sub-assembly drawings
- l) schematic diagrams
- m) fabrication drawings
- n) pattern drawings
- o) welding drawings
- p) casting drawings
- q) operational diagrams
- r) physical layouts
- s) manufacturers' manuals/drawings
- t) photographic representations
- u) contractual specifications

Using and communicating technical information

4. Use information extracted from related documentation, to include **two** from the following:
- a) job instructions _____
 - b) drawing instructions _____
 - c) test schedules _____
 - d) manufacturers' instructions _____
 - e) welding procedure specifications _____
 - f) material specifications _____
 - g) finishing specifications _____
 - h) reference tables/charts _____
 - i) national, international and organisational standards _____
 - j) planning documentation _____
 - k) quality control documents _____
 - l) operation sheets _____
 - m) process specifications _____
5. Extract information that includes **three** of the following:
- a) materials or components required _____
 - b) dimensions _____
 - c) tolerances _____
 - d) build quality _____
 - e) installation requirements _____
 - f) connections to be made _____
 - g) surface texture requirements _____
 - h) location/orientation of parts _____
 - i) process or treatments required _____
 - j) assembly sequence _____
 - k) inspection requirements _____
 - l) part numbers for replacement parts _____
 - m) surface finish required _____
 - n) weld type and size _____
 - o) operations required _____
 - p) shape or profiles _____
 - q) test points to be used _____
 - r) circuit characteristics (such as pressure, flow, current, voltage, speed) _____
6. Report any inaccuracies or discrepancies in the drawings and specifications _____
7. Use the information obtained to establish work requirements _____

Using and communicating technical information

8. Record and communicate the technical information by appropriate means to include

three of the following methods:

- a) producing fully detailed sketches of work/circuits completed or required
- b) preparing work planning documentation
- c) recording data from testing activities
- d) producing technical reports on activities they have completed
- e) completing material and tool requisition documentation
- f) producing a list of replacement parts required for a maintenance activity
- g) completing training records or portfolio references

9. 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

Using and communicating technical information

Knowledge Learning outcomes – the learner will...

Know how to use and communicate technical information

Assessment criteria - the learner can...

(Knowledge to be assessed and evidenced)

1. Describe the information sources used for the data and documentation that they use in their work activities (such as verbal, written, electronic)
2. Explain why technical information is presented in different forms (such as drawings, data sheets, and national and international standards)
3. Explain how and where to obtain the various documents that they will be using (such as safety handouts, drawings, planning documentation, work instructions, maintenance records, technical manuals and reference tables/charts), and how to check that they are current and valid
4. Describe the types of engineering drawings used, and how they interrelate (such as isometric and orthographic drawings; assembly, sub-assembly and general arrangement drawings; circuit and wiring diagrams, block and schematic diagrams; fluid power and instrumentation and control diagrams)
5. Describe the meaning of the different symbols and abbreviations found on the documents that they use (such as surface finish to be achieved, linear and geometric tolerances, electronic components, weld symbols and profiles, pressure and flow characteristics, torque values, imperial and metric systems of measurement, tolerancing and fixed reference points)
6. Explain how to use other sources of information to support the data (such as electronic component pin configuration specifications, standard reference charts for limits and fits, tapping drill reference charts, bend allowances required for material thickness, electrical conditions required for specific welding electrodes, mixing ratios for bonding and finishing materials, metal finishing specifications and inspection requirements)
7. Describe the procedures for reporting discrepancies in the data or documents, and for reporting lost or damaged drawings and documents
8. Describe the care and control procedures for the documents, how damage or graffiti on drawings can lead to scrapped work and the importance of returning them to the designated location on completion of the work activities
9. Describe the typical ways of communicating technical information (such as sketches, test and inspection reports, work planning documents), and the amount of detail that should be included
10. Describe the need to ensure that sketches are of a suitable size, use appropriate drawing conventions, are in proportion and are legible to others
11. Explain why it is important to use a fixed common reference point for dimensioning of drawings and sketches

Using and communicating technical information

12. Explain when to act on their own initiative to find, clarify and evaluate information, and when to seek help and advice from others
13. Explain why they should always seek clarification if they are in any doubt as to the validity or suitability of the information they have gathered
14. Explain to whom they should report in the event of problems that they cannot resolve