

SEMMAN23-02 – SQA Unit Code HE9C 04

Using and interpreting engineering data and documentation



Overview

This standard identifies the competencies you need to make effective use of text, numeric and graphical information, by interpreting and using technical information extracted from engineering documentation such as drawings, technical manuals, reference tables, specifications, charts or electronic displays, in accordance with approved procedures. You will be required to extract the necessary information from the various sources, data and documentation, in order to establish and carry out the work requirements and to make valid decisions about the quality and accuracy of the work produced.

Your responsibilities will require you to comply with organisational policy and procedures for obtaining and using the data and documentation. You will be expected to report any problems with the use and interpretation of data and documentation that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to work with minimum supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of the types of data and documentation used, and will provide an informed approach to applying and communicating instructions and procedures. You will be able to read and interpret the data and documentation used, and will know about the conventions, symbols and abbreviations, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

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Performance criteria

You must be able to:

- P1 use the approved source to obtain the required data and documentation
- P2 correctly interpret the data and documentation
- P3 identify, extract and interpret the required information
- P4 use the information obtained to ensure that work output meets the specification
- P5 deal promptly and effectively with any problems within your control and report those which cannot be solved
- P6 report any inaccuracies or discrepancies in data and documentation

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Knowledge and understanding

You need to know and understand:

- K1 the information sources used for the data and documentation that you use in your work activities
- K2 how documents are obtained, and how to check that they are current and valid
- K3 the basic principles of confidentiality (including what information should be available and to whom)
- K4 the different ways/formats that data and documentation can be presented (such as drawings, job instructions, product data sheets, manufacturers' manuals, financial spreadsheets, production schedules, inspection and calibration requirements, customer information)
- K5 how to use other sources of information to support the data (such as electronic component pin configuration specifications, reference charts, standards, bend allowances required for material thickness, electrical conditions required for specific welding electrodes, mixing ratios for bonding and finishing materials, metal specifications and inspection requirements, health and safety documentation)
- K6 the importance of differentiating fact from opinion when reviewing data and documentation
- K7 the importance of analysing all available data and documentation before decisions are made
- K8 the different ways of storing and organising data and documentation to ensure easy access
- K9 the procedures for reporting discrepancies in the data or documentation, and for reporting lost or damaged documents
- K10 the importance of keeping all data and documentation up to date during the work activity, and the implications of this not being done
- K11 the care and control procedures for documents, and how damage or graffiti on documents can lead to errors in work produced
- K12 the importance of returning documents to the designated location on completion of the work activities
- K13 the basic drawing conventions that are used and why there needs to be different types of drawings (such as isometric and orthographic, first and third angle, assembly drawings, circuit and wiring diagrams, block and schematic diagrams)
- K14 the types of documentation that are used and how they interrelate (such as first and third angle component drawings, assembly drawings, production data, circuit and wiring diagrams, block and schematic diagrams)
- K15 the imperial and metric systems of measurement, tolerancing and fixed reference points (where applicable)
- K16 the meaning of the different symbols and abbreviations found on the documents that you use (such as surface finish, electronic components, weld symbols, linear and geometric tolerances, pressure and flow)

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characteristics)

- K17 the extent of your own responsibility, when to act on your own initiative to find, clarify and evaluate information, and whom you should report to if you have problems that you cannot resolve

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Additional Information

Scope/range related to performance criteria

You must be able to:

1. use approved sources to obtain the necessary data and documentation, and carry out **all** of the following:
 - 1.1 check the currency and validity of the data and documentations used
 - 1.2 exercise care and control over the documents at all times
 - 1.3 correctly extract all necessary data and information in order to carry out the required tasks
 - 1.4 seek out additional information where there are gaps or deficiencies in the information obtained
 - 1.5 deal with or report any problems found with the data and documentation
 - 1.6 make valid decisions based on the evaluation of the data and documentation
 - 1.7 return all documentation to the approved location on completion of the work
 - 1.8 complete all necessary documentation on completion of the work activity
2. use information extracted from **one** from the following:
 - 2.1 drawings (such as component drawings, assembly drawings, modification drawings repair drawings, welding/fabrication drawings, distribution and installation drawings)
 - 2.2 diagrams (such as schematic, fluid power diagrams, piping, wiring/circuit diagrams, operational diagrams)
 - 2.3 manufacturers' manuals/drawings
 - 2.4 approved sketches
 - 2.5 technical illustrations
 - 2.6 photographic representations
 - 2.7 visual display screens information
 - 2.8 technical sale/marketing documentation
 - 2.9 contractual documentation
 - 2.10 other specific documents or drawings
3. use information extracted from related documentation, to include **two** from the following:
 - 3.1 instructions (such as job instructions, drawing instructions, manufacturers' instructions)
 - 3.2 specifications (such as material, finish, process, contractual, calibration)
 - 3.3 reference materials (such as manuals, tables, charts, guides, notes)

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- 3.4 schedules
- 3.5 company procedures
- 3.6 operation sheets
- 3.7 service bulletins/test information
- 3.8 planning documentation
- 3.9 quality control documents
- 3.10 company specific technical instructions
- 3.11 national, international and organisational standards
- 3.12 health and safety standards related to the activity (such as COSHH)
- 3.13 other specific related documentation such as airworthiness directives and routine technical instructions
- 4. extract information that includes **three** of the following:
 - 4.1 materials or components required
 - 4.2 dimensions
 - 4.3 tolerances
 - 4.4 build quality
 - 4.5 installation requirements
 - 4.6 customer requirements
 - 4.7 time scales
 - 4.8 financial information
 - 4.9 operating parameters
 - 4.10 surface texture requirements
 - 4.11 location/orientation of parts
 - 4.12 process or treatments required
 - 4.13 dismantling/assembly sequence
 - 4.14 inspection/testing requirements
 - 4.15 fault finding procedures
 - 4.16 safety/risk factors
 - 4.17 environmental controls
 - 4.18 number/volumes required
 - 4.19 repair/service methods
 - 4.20 method of manufacture
 - 4.21 weld type and size
 - 4.22 operations required
 - 4.23 connections to be made
 - 4.24 surface finish required
 - 4.25 shape or profiles
 - 4.26 other specific related information

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Originating organisation	SEMTA
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Relevant occupations	Engineering; engineering and manufacturing technologies
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Suite	AERONAUTICAL ENGINEERING SUITE 2 2006 AERONAUTICAL ENGINEERING SUITE 3 2008 AERONAUTICAL ENGINEERING SUITE 3 2009 AUTOMOTIVE ENGINEERING SUITE 3 2008 Composite Engineering Suite 3 ELECTRICAL AND ELECTRONIC ENGINEERING SUITE 3 2004 ENGINEERING MAINTENANCE AND INSTALLATION SUITE 2 2008 ENGINEERING MAINTENANCE SUITE 3 2008 ENGINEERING TECHNICAL SUPPORT SUITE 2 2007 ENGINEERING TECHNICAL SUPPORT SUITE 3 2009 ENGINEERING TOOLMAKING SUITE 3 2005 ENGINEERING WOODWORKING, PATTERN AND MODEL MAKING SUITE 3 2002 Fabrication and welding suite 2 Fabrication and Welding Engineering Suite 3 INSTALLATION AND COMMISSIONING SUITE 3 2003 MARINE ENGINEERING SUITE 2 MARINE ENGINEERING SUITE 3 MATERIALS PROCESSING AND FINISHING SUITE 2 AND 3 2003 MECHANICAL MANUFACTURING ENGINEERING SUITE 2 2008 MECHANICAL MANUFACTURING ENGINEERING SUITE 3 2008
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Key words

Engineering data, engineering drawings, engineering documentation, general assembly drawing, technical manuals, technical specifications, schematic layouts