

Overview

This standard identifies the competences you need to set up and operate a computer aided drawing (CAD) system to produce fully detailed drawings for engineering activities, in accordance with approved procedures.

The drawings produced will include detailed component drawings for manufacturing, assembly and sub-assembly drawings, installation drawings, and fault location aids such as flow diagrams and modification drawings.

You will be given a detailed drawing brief or a request for change/modification order, and you will be required to access these requirements and to extract all necessary information in order to carry out the drawing operations. You will need to select the appropriate equipment and drawing software to use, based on the type and complexity of the drawing functions to be carried out.

You will be expected to use appropriate and current British, European, international and company standards to produce drawing template, for a range of paper sizes, and must include the drawing title, scale used, date of drawing, material to be used and other relevant information. You will then be expected to produce fully detailed drawings to enable the manufacture, assembly, installation or modification of the product to take place.

Your responsibilities will require you to comply with organisational policy and procedures for working in the drawing office or CAD suite. You will be required to report any problems with the computer hardware, software or drawing procedures that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work unsupervised, either on your own or as part of a team, which you may lead or direct, taking full responsibility for your actions, and possibly for the work of colleagues or subordinates.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to applying computer aided drawing procedures for engineering drawings. You will understand the computer system and software used, and its application, and will know about the various tools and techniques used to produce the drawings, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when working with the computer drawing system. You will be fully aware of any health, safety and environmental requirements, and the appropriate legislative and regulatory frameworks applicable to your area of responsibility. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. produce drawings that are sufficiently and clearly detailed
3. produce drawings in the required formats
4. use codes and other references that follow the required conventions
5. make sure that drawings are checked and approved within agreed timescales by authorised people
6. ensure that drawings are properly registered and stored securely
7. ensure that changes are completed as required by organisational procedures

Knowledge and understanding

You need to know and understand:

1. the specific safety precautions to be taken when working with computer systems (to include safety guidance relating to the use of visual display unit (VDU) equipment and work station environment (such as lighting, seating, positioning of equipment), repetitive strain injury (RSI); the dangers of trailing leads and cables; how to spot faulty or dangerous electrical leads, plugs and connections)
2. good housekeeping arrangements (such as cleaning down work surfaces; putting media, manuals and unwanted items of equipment into safe storage; leaving the work area in a safe and tidy condition)
3. the methods and procedures used to minimise the chances of infecting a computer with a virus
4. the implications if the computer you are using does become infected with a virus and who to contact if it does occur
5. the basic set-up and operation of the computer system, and the peripheral devices that are used (such as mouse, light pen, digitiser and tablet, printer or plotter, scanner)
6. the correct start-up and shutdown procedures to be used for the computer system
7. how to access the specific computer drawing software to be used, and the use of software manuals and related documents to aid efficient operation of the relevant drawing system
8. how to deal with system problems (such as error messages received, peripherals which do not respond as expected, obvious faults with the equipment or connecting leads)
9. the documentation required for particular applications (such as drawing briefs, specification sheets, request for change orders)
10. types of drawing that may be produced by the software (such as first and third angle drawings, sectional elevations, isometric or oblique drawings)
11. how to set up the viewing screen to show multiple views of the pattern to help with drawing creation (to include isometric front and side elevations)
12. the national, international and organisational standards and conventions that are used for the drawings
13. how to set up the drawing template parameters (such as layers of drawings, scale, paper size, colour set-up, line types, dimensioning system, text styles)

14. the application and use of drawing tools (such as for straight lines, curves and circles; how to create hatching and shading on drawings; how to add dimensions and text to drawings, producing layers of drawings)
15. how to access, recognise and use a wide range of standard components and symbol libraries from the CAD equipment
16. the need for document control (such as ensuring that completed drawings are approved, labelled and stored on a suitable storage medium, the need to create backup copies and to file them in a separate and safe location, filing and storing hard copies for use in production)
17. the procedures for drawing change notes, trial changes, up-issuing of drawings, modifications, and miscellaneous amendments to drawings
18. the sources and methods for obtaining the required technical information relevant to the drawing being produced (such as limits and fits, contraction allowances, bearing selection, surface finish)
19. the basic principles of engineering manufacturing operations, assembly and installation methods, and limitations of the equipment/processes that are used to produce the drawn item (such as machining methods, joining processes, fabrication, casting and forging) and how these can influence the way you present the drawing
20. the functionality of the component, and its inter-relationship with other components and assemblies
21. the extent of your own responsibility, and to whom you should report if you have problems that you cannot resolve when producing the drawings

Scope/range related to performance criteria

1.

Prepare the CAD system for operation, by carrying out **all** of the following:

- 1.1 check that all the equipment is correctly connected and is in a safe, tested and usable condition (cables undamaged, correctly connected, safely routed)
- 1.2 power up the equipment and activate the drawing software
- 1.3 set up the drawing system to be able to produce the drawing to the appropriate scale
- 1.4 set up and check that all peripheral devices are connected and correctly operating (such as keyboard, mouse, light pen, digitiser/tablet, scanner, printer, plotter)
- 1.5 set the drawing datum at a convenient point (where applicable)
- 1.6 set up drawing parameters to include layers, line types, colour, text styles, to company procedures or to suit the drawing produced
- 1.7 create a drawing template to the required standards, which includes all necessary detail (such as title, drawing number, scale, materials, date)

2.

Use **three** of the following to obtain the necessary data to produce the required drawings:

- 2.1 drawing brief/request
- 2.2 specifications
- 2.3 change order/modification request
- 2.4 regulations
- 2.5 manuals
- 2.6 sample component
- 2.7 calculations
- 2.8 previous drawings/designs
- 2.9 sketches
- 2.10 standards reference documents
- 2.11 notes from meetings/discussions
- 2.12 other available data

3.

Produce detailed drawings which include **ten** of the following:

- 3.1 straight lines
- 3.2 symbols and abbreviations
- 3.3 hidden detail
- 3.4 dimensions
- 3.5 curved/contour lines
- 3.6 sectional detail
- 3.7 angled lines
- 3.8 circles or ellipses
- 3.9 parts lists

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- 3.10 text
- 3.11 geometrical tolerancing
- 3.12 other specific detail

4.

Save and store drawings in appropriate locations, to include carrying out **all** of the following:

- 4.1 ensure that your drawing has been checked and approved by the appropriate person/s
- 4.2 check that the drawing is correctly titled and referenced
- 4.3 save the drawing to an appropriate storage medium
- 4.4 create a separate backup copy and place it in safe storage
- 4.5 produce a hard copy printout of the drawing for file purposes
- 4.6 register and store the drawings in the appropriate company information system
- 4.7 where appropriate, record and store any changes to the drawings in the appropriate company information system

5.

Produce detailed drawings for **two** of the following engineering activities:

- 5.1 production activities (such as processing of materials, fabrication, finishing, assembly, joining)
- 5.2 installation activities (such as commissioning/decommissioning, site preparation, equipment installation)
- 5.3 operational activities (such as movement of materials, workplace layouts, work-flow diagrams)
- 5.4 maintenance activities (such as planned preventative maintenance, part/sub-assembly exchange)

6.

Produce drawings which comply with **three** of the following:

- 6.1 organisational guidelines and procedures
- 6.2 recognised compliance agency/body standards, directives or codes of practice
- 6.3 CAD software standards/protocols
- 6.4 British, European or International standards or directives
- 6.5 customer standards and requirements
- 6.6 health, safety and environmental requirements

Behaviours

Additional Information

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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