



**Australian Government**

# **UEEEL0007 Develop detailed electrical drawings**

**Release: 1**

# UEEEL0007 Develop detailed electrical drawings

## Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

## Application

This unit involves the skills and knowledge required to develop detailed electrical drawings and documentation.

It includes preparing and developing detailed electrical drawing, and following documentation and workplace procedures.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## Pre-requisite Unit

UEECD0031 Prepare engineering drawings using manual drafting and CAD for electrotechnology applications

UEECD0030 Prepare electrotechnology/utilities drawings using manual drafting and CAD equipment and software

UEECD0032 Produce detailed electrotechnology/utilities drawings using CAD equipment and software

## Competency Field

Electrical

## Unit Sector

Electrotechnology

## Elements and Performance Criteria

### ELEMENTS

Elements describe the essential outcomes.

#### 1 Prepare to develop

### PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) procedures for a given work area are

|                                                             |            |                                                                                                                                                                            |
|-------------------------------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>detailed electrical drawing</b>                          |            | identified, obtained and applied                                                                                                                                           |
|                                                             | <b>1.2</b> | WHS/OHS risk control measures and procedures in preparation for the work are followed                                                                                      |
|                                                             | <b>1.3</b> | Detailed electrical drawings are determined from the scope of work to be undertaken                                                                                        |
|                                                             | <b>1.4</b> | Electrical drawing details required for work to be undertaken are obtained from project specifications and in accordance with workplace procedures                         |
|                                                             | <b>1.5</b> | Appropriate person/s is consulted to ensure the work is coordinated effectively with others                                                                                |
|                                                             | <b>1.6</b> | Software, tools and equipment for work are obtained in accordance with workplace procedures                                                                                |
| <b>2 Develop detailed electrical drawing</b>                | <b>2.1</b> | WHS/OHS risk control measures and workplace procedures for carrying out the work are followed                                                                              |
|                                                             | <b>2.2</b> | Detailed electrical drawings design and layout requirements are determined from project specifications                                                                     |
|                                                             | <b>2.3</b> | Technical data of electrical system components are interpreted to determine parameters included in the detailed electrical drawings                                        |
|                                                             | <b>2.4</b> | Appropriate software tools are used to produce detailed electrical drawings based on workplace procedures                                                                  |
|                                                             | <b>2.5</b> | Detailed electrical drawings are checked for accuracy in accordance with workplace procedures and project specifications                                                   |
|                                                             | <b>2.6</b> | Unplanned situations are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment                                   |
| <b>3 Complete detailed electrical drawing documentation</b> | <b>3.1</b> | Completed detailed electrical drawings are submitted to appropriate person/s to be checked for accuracy in accordance with workplace procedures and project specifications |
|                                                             | <b>3.2</b> | Alterations, additions or correction instructions are followed and detailed electrical drawings are re-submitted for final approval                                        |
|                                                             | <b>3.3</b> | Completed detailed electrical drawings are filed securely in accordance with workplace procedures                                                                          |

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

## Unit Mapping Information

This unit replaces and is equivalent to UEENEEG179A Develop detailed electrical drawings.

## Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

# Assessment Requirements for UEEEL0007 Develop detailed electrical drawings

## Modification History

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## Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including using risk control measures
- completing detailed electrical drawings documentation and presenting preliminary and final drafts for verification, including:
  - applying, storing and retrieving data related requirements
  - digitising and scanning drafting/drawings products
  - producing related documentation for presentations
- preparing and developing detailed electrical drawings, including:
  - applying electrical equipment design drawing methods, techniques, procedures and protocols and documenting design
  - applying project specifications
  - interpreting and using technical data and specifications
  - producing drafting documentation
  - producing drawing sets
  - using advanced computer-aided design (CAD) systems and commands
  - using relevant drafting peripheral systems, equipment and tools to develop detailed drawings.

## Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- project specifications
- relevant industry standards
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant software tools and equipment
- relevant WHS/OHS legislated requirements

- relevant workplace documentation and file storage, including digitising and scanning
- relevant workplace policies, procedures and instructions
- producing final drafts for verification, including:
  - principles, purpose and concept of verification of drafting products encompassing:
    - production of electrical drawings for verification by authorised persons, production of drawing sets, production of related documentation and presentations of final drafts
  - processes and procedures related to the verification of final drafts by authorised persons encompassing accuracy
  - publication of verified electrical drawings
- detailed electrical drawing production, including:
  - distribution branch circuits and boards, services and load calculations encompassing panels (high voltage (HV)/low voltage (LV))/switchboards/motor control centres/final
  - conductor/cable selection and calculations encompassing:
    - electrical, data and communications
  - overcurrent and overvoltage protection
  - cable support systems encompassing:
    - cable trays, trunking, conduits, ducts, guards, saddles, carriers, raceways/cavities and poles
  - box and fitting fill requirements
  - wiring devices and terminations
  - distribution equipment encompassing:
    - power circuit devices
  - distribution system transformers encompassing:
    - specialty transformers and power circuit devices
  - lighting applications encompassing:
    - lamps, ballasts and components
  - motors encompassing:
    - functional controls, advanced motor controls, motor calculations and motor maintenance arrangements
  - hazardous areas encompassing electrical equipment; classification of emergency standby systems encompassing uninterrupted power supply (UPS)/inverter and battery banks
  - fire alarm systems
  - HV terminations/splices
  - cable size selection for installation cable run
  - cable sizes, voltage drops, conduit sizes, fault levels, fuse/circuit breaker sizes and working temperatures
  - short circuit calculations
  - earth-loop impedance compliance test arrangements on the completed design
  - touch potentials calculations
  - cable schedules creation
  - single line and as built drawings encompassing:

- three phase schematic colour diagrams, marked up cable calculations, short circuit results and earth-loop impedance results
- quantities parts list and drawings for tender drawings issued by electrical consultants/engineers
- coordination and discrimination studies
- building management systems (BMS), including:
  - building information modelling and sustainable design
- fuse and circuit breaker trip curves, plots and displays
- troubleshooting/fault finding
- detailed panel layouts, including:
  - detailed panel layouts creation
  - din rail tool
  - terminal strip editor
  - detailed panel layout annotation
  - detailed reports
- schematic component commands, including:
  - schematic symbols editor
  - schematic editor
  - components from lists
  - connectors
  - terminals: multiple level and jumpers
  - circuits
  - multiple phase circuits
- schematic editing, including:
  - advanced utilities
  - copy catalogue and location
  - values
  - swapping and updating blocks
  - using the auditing tools
  - update and retag drawings
- digitising and scanning, including:
  - drawings: digitisation - tablet and software configuration, tablet and puck, grids set-up and alignment marks for various size drawings, software parameters setting, and hard copy drawings digitisation to tablet parameters
  - digitised drawing editor, manipulation and save
  - digitise and grid set-ups and alignment marks on a hard copy of a large drawing (e.g. A1)
  - scanning devices and peripherals set-up encompassing associated software usage, save (e.g. file formats for use other software applications) and management
  - drawing hard copy scan
  - scanned image conversion to vector format, edit and save in file formats for use in CAD encompassing:

- importation of scanned images into CAD drawings in image formats for editing.

## Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated suitable workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, relevant industry standards, codes of practice and operation manuals.

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