Level 3

CVQ Occupational Standard in Electrical Installation

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GRENADA

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ACKNOWLEDGEMENT

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INTRODUCTION

The Grenada National Training Agency (GNTA) as empowered by the GCTVET Act of 2009 is the agency mandated to co-ordinate, facilitate and enable the development and growth of Technical and Vocational Education and Training in Grenada Carriacou and Petite Martinique.

The Agency through modes of training intervention intends to help in ensuring that there exists a supply of trained and skilled workers to service labour market needs and thereby contribute to higher levels of productivity in the Grenadian economy. The organisation by way of policy seeks to have developed and approved occupational standards derived from industry specifications and to guide the training, assessment and certification within the Grenada TVET System.

The Grenada Council for Technical Vocational Education and Training (GCTVET) created by an ACT of parliament in 2009 is empowered to approve standards for the award certification leading to Caribbean Vocational Qualification (CVQ's) and National Vocational Qualification (NVQ's). The GNTA has established industry lead groups responsible for vetting standards as well as specifying and recommending standards to be approved.

ABOUT THIS STANDARD

This is a Regional Occupational Standard that has been approved for training and certification in CARICOM territories.

This standard was adapted and approved by the Grenada Council for Technical Vocational Education and Training (GCTVET) on 01st November, 2011.

There are some minor modifications made to accommodate the local context; however the overall content of the document is unchanged.

QUALIFICATION OVERVIEW

The CVQ Level 3 in Electrical Installation is for individuals whose electrical role requires well developed behavioural competencies but whose scope for independent decision making and for bringing about change is unlimited. They can also function in a supervisory role.

They are likely to be in roles where they are required to:

- use electrical/electronic measuring devices
- use graduated measuring devices
- install, terminate and connect electrical wiring
- cut, bend and install electrical conduit
- install distribution panels, metering sockets, terminal mains and meter earthing systems
- plan for wiring and installation of electrical/electronic machinery appliances and fixtures

Normally persons working at Level 3 should be able to competently carry out simple, complex and routine work activities and to collaborate with others through groups and teams. The qualification covers competencies by providing services in Electrical Installation Level 3 include as indicated in the competency standard

Relevant occupations include:

- Electrical installer
- Electronic technician
- Linemen/Line installers

The holders of this qualification will demonstrate a range of personal presentations and demonstrations of team work skills and literacy skills. To achieve this qualification all core units must be achieved. Any elective completed will be awarded unit statement of competency. The nominal training hours are a guide for planning the delivery of training programmes.

Please note that certification can be gained through formal training or on the job experience by scheduling assessments with the Grenada National Training Agency (GNTA) certified assessors.

Competency Standards for Caribbean Vocational Qualifications (CVQ)

CCMEM32507 Level III in Electrical Installation

Unit Number	Unit Title	Mandatory /Elective	Hours
MEMCOR0051A	Perform related computations – (basic)	Mandatory	20
MEMCOR0071A	Use electrical/electronic measuring devices	Mandatory	20
MEMCOR0081A	Mark off/out (general engineering)	Mandatory	20
MEMCOR0091A	Draw and interpret sketches and simple drawings	Mandatory	20
MEMCOR0111A	Use power tools	Mandatory	10
MEMCOR0131A	Undertake interactive workplace communication	Mandatory	20
MEMCOR0141A	Follow principles of Occupational Health and Safety (OH&S) in work environment	Mandatory	20
MEMCOR0161A	Plan to undertake a routine task	Mandatory	10
MEMCOR0171A	Use graduated measuring devices	Mandatory	10
MEMCOR0191A	Use hand tools	Mandatory	5
MEMMAH0071A	Perform manual handling and lifting	Mandatory	5
MEMMAH0081A	Perform housekeeping duties	Mandatory	10
MEMFAB0011A	Perform manual soldering/de-soldering – electrical/electronic components	Mandatory	15
MEMINS0011A	Install, terminate and connect electrical wiring	Mandatory	20
MEMINS0051A	Cut, bend and install electrical conduit	Mandatory	20
MEMINS0071A	Prepare for electrical conduits/wiring installation	Mandatory	20
MEMMRD0091A	Terminate signal and data cables – (basic)	Mandatory	20
MEMMRD0121A	Perform basic repair to electrical/electronic apparatus	Mandatory	40
MEMMRD0161A	Disconnect and reconnect fixed wired electrical machinery, appliances and fixtures	Mandatory	20
MEMMRD0181A	Attach flexible cables & plugs to electrical machinery appliances and fixtures	Mandatory	20
MEMCOR0012A	Plan a complete activity	Mandatory	5
MEMCOR0022A	Perform related computations	Mandatory	20
MEMCOR0042A	Interpret standard specifications and manuals	Mandatory	5
MEMCOR0052A	Operate in an autonomous team environment	Mandatory	5
MEMCOR0122A	Write technical reports (basic)	Mandatory	40
MEMINS0062A	Terminate and connect specialist cables	Mandatory	30
MEMINS0092A	Install electrical/electronic apparatus, machinery, fixtures and secondary wiring	Mandatory	60
MEMINS0162A	Cut fit and install trunking systems	Mandatory	10
MEMINS0172A	Prepare and install basic cable trays	Mandatory	10
MEMINS0262A	Install distribution panels, metering sockets, terminal mains and meter earthing systems	Mandatory	25
MEMMRD0072A	Shut down/isolate machines/equipment	Mandatory	20
MEMMRD0182A	Locate and repair/ rectify basic electrical circuits and secondary wiring	Mandatory	30
MEMMRD0402A	Check/identify/isolate/rectify malfunctioning electrical machinery appliance and fixtures	Mandatory	30
MEMMRD0872A	Install and maintain electrical equipment	Mandatory	60
MEMMRD0892A	Install and maintain electronic electrical equipment and distribution circuits	Mandatory	40

CCMEM32507 Level III in Electrical Installation (Cont'd)

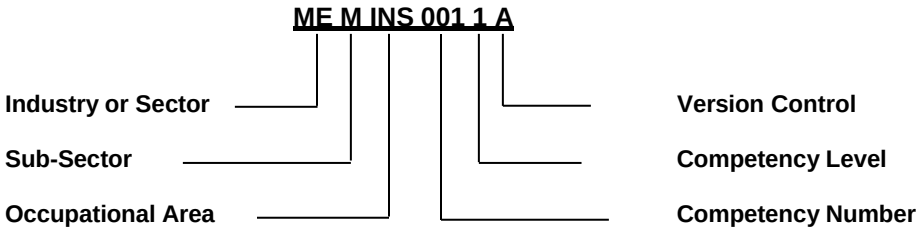
Unit Number	Unit Number	Mandatory /Elective	Hours
MEMQUA0012A	Perform inspection (basic)	Mandatory	20
MEMMAH0073A	Purchase materials	Mandatory	20
MEMPLN0063A	Coordinate and manage basic installation projects	Mandatory	20
MEMPLN0113A	Plan for wiring and installation of electrical/electronics machinery appliances and fixtures	Mandatory	20
MEMCOM0023A	Perform internal/external customer service	Mandatory	20
MEMCOR0093A	Plan and organise work	Mandatory	10
MEMCOR0103A	Maintain quality systems within a team	Mandatory	10
BSBFLM0023A	Support leadership in the workplace	Mandatory	20
MEMMRD0423A	Diagnose and repair faults in electrical and electronic systems	Mandatory	20
MEMMRD0663A	Perform testing and inspection of electrical installations	Mandatory	20
MEMMRD0673A	Coordinate the installation of electrical wiring support system infrastructure	Mandatory	20
MEMMRD0683A	Coordinate the installation of electrical cable and accessories	Mandatory	20
MEMMRD0693A	Coordinate the installation of electrical equipment, ancillary apparatus and secondary wiring	Mandatory	20
MEMCOR0101A	Prepare basic engineering drawing	Elective	30
MEMCOR0121A	Classify engineering materials – (basic)	Elective	30
ITICOR0011A	Carry out data entry and retrieval procedures	Elective	40
MEMMRD0191A	Assemble & disassemble scaffolding to enable access to the work area	Elective	20
BSBSBM0012A	Craft personal entrepreneurial strategy	Elective	50
MEMMAH0042A	Order materials	Elective	20
MEMINS0122A	Install below ground communication cables	Elective	20
MEMCOR0132A	Use Industrial Instrumentation measuring devices	Elective	10
MEMCOR0063A	Attend to breakdowns in hazardous areas	Elective	20
MEMCOR0013A	Assist in the provision of on the job training	Elective	30
MEMMRD0703A	Co-ordinate the installation of substation plant and apparatus	Elective	20
MEMMRD0443A	Diagnose and repair faults in electrical equipment	Elective	40
BSBFLM0053A	Support operational plan	Elective	20
BSBFLM0093A	Support continuous improvement systems and processes	Elective	20
MEMPLN0034A	Coordinate and manage commissioning processes	Elective	20
MEMPLN0094A	Determine and plan for electrical installation requirements	Elective	60
MEMPLN0104A	Interpret and carry out electrical design	Elective	20
MEMPLN0114A	Evaluate electrical installation requirements	Elective	20
MEMPLN0124A	Perform tests on complex electrical installation	Elective	20

To be awarded this Caribbean Vocational Qualification (CVQ) all Mandatory competency standards must be achieved. Electives achieved with the qualification will be awarded unit statement of competency.

The nominal training hours are a guide for planning the delivery of Training Programmes.

Legend to Unit Code

Example: MEMINS0011A



KEY: Man – Mandatory; BSB – Business Services (Industry) SBM – Small Business Management (Sub-Sector); FAB – Fabrication; MAH – Machine Handling; INS – Installation; MRD – Maintenance Repairs & Diagnostic COM - Communication; PLN - Planning; ITI - Information Technology (Industry); MEM – Metal Engineering (Maintenance); QUA – Quality; FLM – Front Line Management.

MEMCOR0051A: Perform related computations – (basic)

Competency Descriptor: This unit deals with the skills and knowledge required to perform basic computations and effectively carry out measurements of work to required tolerance, and applies to all individuals working in the metal engineering and maintenance industry.

Competency Field: Maintenance and metal fabrication

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Apply four basic rules of calculation	1.1 Simple calculations are performed using four basic rules, addition, subtraction, multiplication and division.
	1.2 Concepts are understood and simple calculations are performed involving length, perimeter, angles, area and volume.
2. Perform basic calculations involving fractions and decimals	2.1 Simple calculations are performed involving fractions and mixed numbers using the four basic rules.
	2.2 Simple calculations are performed involving decimal fractions and mixed numbers using the four basic rules.

RANGE STATEMENT

This unit applies to simple projects applicable to:

- metal fabrication
- mechanical maintenance
- electrical/electronic maintenance
- manufacturing

Calculations may be performed using:

- pen
- paper
- calculator
- protractor

Basic numeracy skills below those described in this unit are not covered in these standards and are assumed to be held on entry to the industry. Basic numeracy means the ability to:

- perform simple arithmetic using whole numbers
- apply the four basic rules of:
- addition
- subtraction
- multiplication
- division

Computations performed in an appropriate application for the industry in which the person is working. Skills may be demonstrated in relation to:

- measurement
- statistical application
- ratio and proportion
- estimation
- calculations with fractions and decimals
- interpretation of drawings
- interpretation of diagrams
- interpretation of mathematical statements and formulae.
- interpretation of numbers and arithmetic operations.

EVIDENCE GUIDE

Competency is to be demonstrated by the effective calculation of measurements and calculation of materials in accordance with range of variables statement relevant to the work orientation.

(1) Critical Aspects of Evidence

During assessment the individual will:

- take responsibility for the quality of their own work
- perform computations in accordance with standard principles
- apply the four basic rules of calculations
- performs basic calculations involving fractions and decimals
- perform computations accurately
- use accepted motor vehicle repair techniques, practices, processes and workplace procedures.

All must be associated with the calculations and computations being performed or other units requiring the exercise of the skills and knowledge covered by this unit.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- drawings and specifications
- basic operations in simple geometry,
- measurement and calculations
- costing relative to the automotive trade processes
- numbers and arithmetic operations
- calculations with fractions and decimals
- estimation and measurement
- percentages (some applications)
- ratio and proportion (some applications)
- basic statistics (data, tables, graphs and sales)
- mathematical statements and formulae

Skills
The ability to:

- read and interpret drawings
- measure and calculate manually
- record measurements
- operate electronic calculating devices
- communicate effectively

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of installation activities to which applicant has contributed, or worked on
- training courses on basic math
- examples of authenticated assessments and/or assignments from formal education courses
- self assessment reports
- simulation

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0071A: Use electrical/electronic measuring devices

Competency Descriptor: This unit deals with the skills and knowledge required to perform electrical/electronic measurement using appropriate measuring devices in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Use electro-measuring devices to measure variables	1.1	Appropriate device or equipment and setting are selected to achieve required outcome.
		1.2	Appropriate connections are made to achieve required outcome according to standard operating procedure.
		1.3	Readings are obtained and interpreted correctly and conversion into the units of measurement made where necessary.
2.	Maintain electro devices	2.1	Routine care and storage of devices undertaken to manufacturer's specifications or standard operating procedures.

RANGE STATEMENT

This unit applies to electrical/electronic measurements on AC and DC circuits up to 1000v, using appropriate measuring devices. Electrical/electronic measuring devices may require the connection or disconnection of circuitry. Adjustment of measuring devices may include zero and linear adjustment. Work may be undertaken under supervision or as part of a team.

Measurement may include not limited to:

- voltage
- current
- frequency
- resistance
- power
- temperature

Measuring devices may include but not limited to:

- analogue/digital multimeters
- tong testers
- oscilloscopes
- potentiometers
- digital devices

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of comparison and basic measuring devices in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the taking of electrical/electronic measurements or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to mmeasure and calculate manually
- demonstrate the ability to operate electrical/electronic measuring devices
- demonstrate the ability to rrecord measurement
- take responsibility for the quality of their own work
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

For simple measurement tasks such as reading of fixed devices, testing continuity, and tasks requiring the use of devices mounted in measuring jigs etc. Unit MEMCRI0051A (Measure with graduated devices) and/or Unit MEMCOR0041A (Use comparison and basic measuring devices) should be considered.

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- comparison measurements
- comparison devices
- comparative measurements
- measuring devices
- electrical/electronic measurements
- drawings and specifications
- reading
- writing English
- basic numeracy

Skills
The ability to:

- work safely to instructions
- use power tools and hand tools
- select equipment
- apply quality assurance
- read and interpret drawings and specifications
- measure and calculate manually
- record measurement
- operate electronic measurement calculating devices

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to.

- Answer questions put by the assessor
- Identify colleagues who can be approached for the collection of competency evidence where appropriate
- Present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of related activities to which applicant has contributed, or worked on
- training courses on material related to range of variables and or knowledge requirement.
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The competencies covered by this unit would be demonstrated by an individual working undersupervision or as part of a team.

The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0081A: Mark off/out (general engineering)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively transfer dimensions from engineering drawings, prints or plans and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Determine job requirements	1.1	Drawings, job instructions and specifications are interpreted and understood.
		1.2	Appropriate methods and sequencing are selected and are consistent with proposed fabricating process.
2.	Transfer dimensions	2.1	All marking off/out is carried out to specifications using appropriate tools and equipment.
		2.2	Datum points are correctly established.
		2.3	Dimensions transferred are correct and appropriate
3.	Make templates	3.1	Appropriate template materials are selected.
		3.2	Templates are produced to specifications and appropriate to desired use.
		3.3	Correct storage procedures are followed.

RANGE STATEMENT

This unit applies to the marking off/out techniques used for the transfer of dimensions from engineering drawings, prints or plans. Work is undertaken under supervision using predetermined standards of quality, safety and workshop procedures. The task may be performed in the workshop or on site. Marking off/out is undertaken using appropriate tools and equipment; templates and are produced as required. Marking off/out techniques may apply to a range of materials and shapes.

Storage procedures include labelling and identification to standard operating procedures

Marking out covers but not limited to:

- engineering components
- jigs and fixtures
- castings
- templates
- dies and tooling

Equipment may include but not limited to:

- marking out tables
- surface tables
- rotary tables
- dividing heads etc.
- vee blocks
- cylinder squares
- sine bars and the like
- vernier height gauges
- protractors
- straight edge
- set squares
- marking out tools

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of the marking off/out techniques used for the transfer of dimensions in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the marking off/out of components or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to measure and calculate manually
- demonstrate the ability to transfer and record measurements accurately
- demonstrate the ability to mark off/out accurately
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0091A Draw and Interpret sketches and simple drawings

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- tools
- apparatus
- drawing interpretation
- basic numeracy
- marking off/out techniques
- materials relevant to the engineering process
- basic operations in simple geometry measurement and calculations

Skills
The ability to:

- work safely to instructions
- use marking out tools and equipment
- handle materials
- select tools/equipment
- select material
- transfer measurements
- apply quality assurance
- read and interpret drawings and specifications
- measure and calculate manually
- record measurement

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0091A: Draw and interpret sketches and simple drawings

Competency Descriptor: This unit deals with the skills and knowledge required to effectively draw and interpret sketches and simple drawings, and applies to all individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare freehand sketch	1.1	Sketch is correctly and appropriately drawn.
		1.2	Sketch depicted object or part.
		1.3	Dimensions are obtained correctly.
		1.4	Dimensions are shown clearly.
		1.5	Instructions are shown clearly.
		1.6	Base line or datum point is indicated.
2.	Interpret details from freehand sketch	2.1	Components, assemblies or objects are recognised.
		2.2	Dimensions identified are appropriate to field of employment.
		2.3	Instructions are identified and followed.
		2.4	Material requirements are identified.
		2.5	Symbols are recognised in sketch.
3.	Select correct technical drawing	3.1	Drawing is checked and validated against job requirements or equipment.
		3.2	Drawing version is checked and validated.
4.	Identify drawing requirements	4.1	Requirements and purpose of drawing is determined from customer and/or work specification and associated documents.

		4.2	Identified and collected all data necessary to produce the drawing
		4.3	Drawing requirements are confirmed with relevant personnel and timeframes for completion established.
5.	Prepare or make changes to engineering drawing	5.1	Selected appropriate drafting equipment
		5.2	Applied drafting principles to produce a drawing that is consistent with standard operating procedures within the company.
		5.3	All work is undertaken to prescribed procedure.
		5.4	Completed drawing is approved in accordance with standard operating procedures.

RANGE STATEMENT

Technical drawing interpretation is applied to any of the full range of metal, engineering and maintenance disciplines.

Technical drawings may utilise any of the following techniques:

- perspective
- exploded views
- hidden view

Drawings are to be provided to Engineering Standards and/or their equivalents from the full range of engineering disciplines.

Standard engineering symbols or equivalent and are to be recognised in the field of employment.

Drawing instruments and supplies:

- drafting kit/instruments
- blue prints
- drawings/modules/photographs

Measurement systems:

- inch/foot system
- metric(SI) system

Alphabet of line:

- object line
- hidden line
- centre line
- section line
- dimension
- extension line
- cutting line
- short break line
- phantom line

Geometric construction to include:

- circles
- regular polygons with four, seven and eight sides
- pentagon inscribed within measured circle
- ellipse
- triangles with specified angles
- arcs thru three points tangent to two
- circles

Multi-view (orthographic 2-D) drawings:

full scale (1:1) orthographic 3-view drawing using third angle projection with top, front and right side view – show all hidden features and centrelines

Pictorial (3-D) drawing to include:

- isometric corner with left and right side lines each 30 degrees up from horizontal and third line at a vertical, with all three lines joining in a common intersection
- full scale (1:1) basic isometric drawing

Dimension reading:

- dimensioning styles and methods: co-ordinate, linear/datum
- dimensioning 2-D drawing
- dimensioning complex shapes: spheres, cylinders, tapers, pyramids

EVIDENCE GUIDE

Competency is to be demonstrated by developing and effectively reading and interpreting simple drawings and sketches to locate or identify specified features or specifications in accordance with the performance criteria and the range listed within the range statement.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the drawing and interpretation of exercise of the sketches or other units requiring the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate the ability to identify, understand, read and interpret various types of technical drawings
- demonstrate the ability to identify alphabet of lines, scales, lettering, dimensions, symbols, abbreviations and key features
- demonstrate the ability to identify title panel and reference date of drawings
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard drafting procedures;
- use accepted engineering techniques, practices, processes and workplace procedures.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- types and use of drawing instruments and supplies
- identification of alphabet of lines, line type variation, order of usage and application on drawings
- types of scale and proportion and how they are used for measurement
- symbols, dimensions and terminology types of drawings and their applications

Skills
The ability to:

- estimate measurements
- read and interpret simple drawings
- measure accurately
- communicate effectively

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

Competency should be assessed in a classroom environment in accordance with work practices and industry procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0111A: Use power tools

Competency Descriptor: This unit deals with skills and knowledge required to competently select and use appropriate power tools for hand held operations of the metal engineering and maintenance trades, and applies to all individuals in the industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Use power tools	1.1 Appropriate power tools are selected according to the task requirements.
	1.2 Power tools are used following a determined sequence of operations to produce desired outcomes.
	1.3 All safety requirements are adhered to before, during and after use.
	1.4 Unsafe or faulty tools are identified and marked for repair according to designated procedures.
	1.5 Operational maintenance of tools is undertaken according to standard workplace procedures, principles and techniques.
	1.6 Power tools are stored safely in appropriate location according to standard workshop procedure and manufacturer's recommendations.

RANGE STATEMENT

Work undertaken under supervision or in a team environment using predetermined standards of quality, safety and workshop procedures involving the use of various power tools for applications, maintenance tasks and the finishing of items or components metallic and non-metallic material to size and shape using engineering principles, tools, equipment and procedures to company and regulatory requirements.

Power tools may include but not limited to electric or pneumatic:

- drills
- grinders
- jigsaws
- nibblers
- cutting saws
- threading machine
- sanders
- planers
- routers
- pedestal drills
- pedestal grinders

Applications may include power tools used for

- adjusting,
- dismantling
- assembling
- finishing
- cutting
- scraping
- threading

Operations may include:

- clamping
- aligning
- adjusting
- cleaning,
- lubricating,
- tightening
- simple tool repairs
- hand sharpening
- adjustments

Outcomes to job specifications may include

- finish
- size
- shape

EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective use of particular power tools listed within the range of variables statement relevant to the work orientation

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the use of power tools in hand held operations or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to select and use appropriate power tools for hand held operations
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

This unit should not be selected if the power tools used are dedicated to an operation or machine that is nut-runner, air drill, power driver etc. For using hand tools see Unit MEMCOR0191A (Use hand tools).

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements and OH&S legislation
- work shop procedures
- engineering principles
- technical applications
- power tools and equipment
- materials
- materials handling whilst operating tools

Skills
The ability to:

- work safely to instructions
- apply appropriate hand-eye co-ordination in the use of tools
- handle/hold materials during operation of tools
- select appropriate tools for material usage
- communicate effectively

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.

The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0131A: Undertake interactive workplace communication

Competency Descriptor: This unit deals with the skills and knowledge required to effectively undertake interactive communication at the workplace, and applies to all individuals working in the metal, engineering and maintenance industry

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Communicate information about tasks, processes, events or skills	1.1 Information about tasks, processes, events or skills is communicated.
	1.2 Multiple operations involving several topics/areas are communicated.
	1.3 Listening is undertaken without continuous interruptions of the speaker.
	1.4 Questions are used to gain extra information.
	1.5 Correct sources of information are identified.
	1.6 Information is selected and sequenced appropriately.
	1.7 Verbal and written reporting is undertaken where required.
	1.8 Communication is demonstrated in both familiar and unfamiliar situations and to familiar and unfamiliar individuals and groups.
2. Take part in group discussion to achieve appropriate work outcomes	2.1 Responses sought and provided to others in the group.
	2.2 Constructive contributions are made in terms of the production process involved.
	2.3 Goals and aims are communicated.

RANGE STATEMENT

This unit covers competencies needed for situations where employees must collectively undertake a task eg: three or four assemblers co-operating to assemble a product, a trades person who has to attend a service call, or a group of process workers who undertake a similar task in close proximity to each other.

Techniques that could be used as the subject of communication includes but is not limited to:

- sketches
- drawings
- charts and maps
- telephone
- production schedules
- written machine or job instructions;
- client instructions
- face to face
- signage
- memos
- work schedules/work bulletins

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of methods of communication relating to instructions, information sources and meeting procedures listed within the range statement relative to the work orientation.

(1) Critical Aspects of Evidence

This unit should be assessed in conjunction with other specialisation or core units and not in isolation. The assessment should be linked with performance of normal workplace activities where the competency covered by this unit is demonstrated concurrently with other core or elective competencies. The communication tasks may be related to any aspect of the job, interacting with team members, receiving instructions, reporting and any other activity that requires communication with individuals or groups.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to undertake interactive workplace communication
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- use accepted engineering techniques, practices, processes and workplace procedures.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- the use of work schedules, charts, work bulletins and memos

Skills
The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions

Basic numeracy means the ability to perform simple arithmetic using whole numbers applying the four basic rules of addition, subtraction, multiplication and division. The unit however does not refer to competence in English but in communication. English language ability should be professionally assessed.

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The communication Activities undertaken should be consistent with the individual's field of work and be based on Interaction with others related to workplace tasks and procedures, tools, equipment, materials and Documentation relevant to that field of work. The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0141A: Follow principles of Occupational Health and Safety (OH&S) in work environment

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform work activities to conform to Occupational Health and Safety requirements, and applies to all individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Follow safe work practices	1.1 Work is carried out safely and in accordance with company policy and company procedures and industry requirements.
	1.2 Housekeeping is undertaken in accordance with company procedures.
	1.3 Responsibilities and duties of employees are understood and demonstrated in day-to-day actions.
	1.4 Personal protective equipment is worn and stored according to company procedures.
	1.5 All equipment and safety devices are used according to legislative requirements and company/manufacturer's procedures/instructions.
	1.6 Safety signs/symbols are identified and followed as per instruction.
	1.7 All manual handling is carried out in accordance with Industry requirements, company procedures and National Occupational Health & Safety guidelines.
	1.8 Occupational Health & Safety Commission guidelines demonstrated.
2. Report workplace hazards	2.1 Workplace hazards identified during the course of work are reported to appropriate person according to standard operating procedures/factory act.

3.	Follow emergency procedures	3.1	Means of contacting the appropriate personnel and emergency services in the event of an accident demonstrated.
		3.2	Emergency and evacuation procedure understood and carried out when required.

RANGE STATEMENT

This Occupational Health and Safety (OHS) unit applies to safe working practices as applied to all metal and engineering workplaces. Competencies to be demonstrated must be associated with performance of duties and use of specialist skills. This unit and these standards do not cover the skills of emergency teams such as fire fighting, first aid officer etc

Emergency procedures may include but not limited to the isolation of the following equipment as appropriate.

- electrical,
- mechanical
- hydraulic
- pneumatic
- emergency
- steam and water
- oxy fuel

Quality Assurance requirements may include:

- working environment/fellow workers
- adverse weather conditions
- protection of work personnel
- protection of public

Personal protective equipment may include but is not limited to:

- overalls, safety glasses/goggles, hard hat cap
- dust masks/respirator, gum boots
- ear plugs/muffs

Emergency procedures include:

- fire fighting
- medical and first aid
- evacuation

Power connections include:

- ELCB systems
- isolation transformer (safe-T-pack)
- power pole/B4
- switch board area

Ladders and work platforms include:

- extension ladders
- step ladders
- trestle ladders
- simple work platforms

Safety responsibilities apply to:

- personal protection
- safe interactive work practices (duty of care)
- Occupational Health and Safety (OHS) regulations
- Relevant environment regulations as required

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively carrying out safe work practices within the range of variables statement relevant to the work orientation

(1) Critical Aspects of Evidence

It is essential that competence is observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- demonstrate application of organizational policies and procedures including Quality Assurance requirements where applicable.
- carry out correct procedures prior to and during work activities.
- safe and effective operational use of tools, plant and equipment.
- carry out appropriate applications in accordance with regulatory and legislative requirements

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading & writing English
- workplace and equipment safety requirements
- material handling requirements
- relevant acts, regulations and codes of practice
- company policy

Skills
The ability to:

- work safely to instructions
- use tools and equipment safely
- select and use material equipment and tools to standards
- communicate effectively

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. Aspects of this unit will need to be assessed in a work situation.

The context in which the OH & S principles are applied should be consistent with the individual's field of work. The competencies covered by this unit would be demonstrated by an individual working lone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0161A: Plan to undertake a routine task

Competency Descriptor: This unit deals with the skills and knowledge required to effectively plan to undertake a routine task and applies to all individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify task requirements	1.1	Instructions as to procedures are obtained, understood and where necessary clarified.
		1.2	Relevant specifications for task outcomes are obtained, understood and where necessary clarified.
		1.3	Task outcomes are identified.
		1.4	Task requirements such as completion time and quality measures are identified.
2.	Plan steps required to complete task	2.1	Based on instructions and specifications provided, the individual steps or activities required to undertake the task are understood and where necessary clarified.
		2.2	Sequence of activities required to be completed is identified in plan.
		2.3	Planned steps and outcome are checked to ensure conformity with instructions and relevant specifications.
3.	Review plan	3.1	Outcomes are identified and compared with (planned) objectives, task instructions, specifications and task requirements.
		3.2	If necessary, plan is revised to better meet objectives and task requirements.

RANGE STATEMENT

This unit applies to the activities related to planning to undertake a routine task. The task and associated planning activity are carried out under supervision. The plan may or may not be documented. The task involves one or more steps or functions carried out routinely on a regular basis. The planning activity does not require the exercise of judgement as to priorities or time limitations, it requires that precise information provided in the instructions be accurately followed, steps in the process be completed in the appropriate sequence and that the time limits specified are met.

Instructions may include but not limited to:

- standard operation sheets
- clear specifications and requirements
- quality and time allowances
- standard operating procedures

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of planning activities relating to instructions, information sources and meeting procedures listed within the range statement relative to the work orientation

(1) Critical Aspects of Evidence

This unit should be assessed in conjunction with other specialisation or core units and not in isolation. The assessment should be linked with performance of normal workplace activities where the competency covered by this unit is demonstrated concurrently with other core or elective competencies. The assessment of this competency may be associated with the assessment of core or elective units that require planning for undertaking a routine task in the individual's field of work.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to plan to undertake a routine task
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- task requirements
- work place operating procedures
- the use of work schedules, charts, work bulletins and memos

Skills
The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions
- apply quality procedures
- read and interpret simple drawings, and specifications
- plan a routine task
- undertake a routine task

Basic numeracy means the ability to perform simple arithmetic using whole numbers applying the four basic rules of addition, subtraction, multiplication and division. The unit however does not refer to competence in English but in communication. English language ability should be professionally assessed

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The communication Activities undertaken should be consistent with the individual's field of work and be based on Interaction with others related to workplace tasks and procedures, tools, equipment, materials and Documentation relevant to that field of work. The competencies covered by this unit would be Demonstrated by an individual working alone or as part of a team. Assessment should be Conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0171A: Use graduated measuring devices

Competency Descriptor: This unit deals with the skills and knowledge required to effectively measure with graduated devices, and applies to all individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Use a range of graduated devices to measure/determine dimensions or variables	1.1 Selected appropriate device or equipment to achieve required outcome.
	1.2 Used correct and appropriate measuring technique.
	1.3 Measured accurately to finest graduation of instrument. As appropriate to field or area.
2. Maintain graduated devices	2.1 Carried out routine care and storage of devices to manufacturer's specification or standard operating procedure
	2.2 Checked and made routine adjustments to devices eg "zeroing".

RANGE STATEMENT

This unit applies to work undertaken in field, workstation and workshops. Work can be undertaken under supervision or part of team environment. This unit covers measurement skills requiring straightforward application of the measuring device and may utilise the full range of graduations of measuring device.

Measuring devices may include but not limited to:

- verniers,
- feeler gauges
- pressure gauges
- squares
- levels
- micrometers,
- dial indicators
- thermometers
- measuring tapes
- protractors

Measurements undertaken may include but not limited to:

- length /width/depth
- roundness
- squareness
- flatness angle
- angles
- clearances
- measurements that can be read off antilog, digital or other graduated device
- plumb ness

Electrical/electronic devices used are those not requiring the connection or disconnection of circuitry. Measurements may include metric and imperial measurement. All measurements undertaken to standard operating procedures. Adjustment of measuring devices is through external means and includes zero and linear adjustment.

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use graduated measuring devices in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling recording and reporting associated with the use of graduated measuring devices or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- Demonstrate safe working practices at all times
- Demonstrate the ability to use graduated measuring devices
- Communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- Take responsibility for the quality of their own work
- Perform all tasks to specification
- Use accepted engineering techniques, practices, processes and workplace procedures.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(2) Pre-requisite Relationship of Units

For straightforward use of comparison or basic measuring devices Unit MEMCOR0041A (Use comparison and basic measuring devices) should be accessed.

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- comparison devices
- comparison measurements
- comparative measurements
- electrical/electronic devices
- basic measuring devices
- reading
- writing English
- basic numeracy

Skills
The ability to:

- follow safely to instructions
- use power tools and hand tools
- use measuring devices
- adjust measurements
- handle materials
- select material
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0191A: Use hand tools

Competency Descriptor: This unit deals with skills and knowledge required to competently select and use appropriate hand tools of the metal engineering and maintenance trades, and applies to all individuals in the industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Use hand tools	1.1 Selected appropriate hand tools according to the task requirements.
	1.2 Hand tools used to produce desired outcomes to job specifications which may include finish, tension, size or shape.
	1.3 Adhered to all safety requirements before, during and after use.
	1.4 Unsafe or faulty tools identified and marked for repair according to designated procedures before, during and after use.
	1.5 Carried out routine maintenance of tools, including hand sharpening according to standard operational procedures, principles and techniques.
	1.6 Hand tools are stored safely in appropriate location according to standard operational procedures and manufacturer's recommendations.

RANGE STATEMENT

Work undertaken under supervision or in a team environment using predetermined standards of quality, safety and workshop procedures involving the use of various hand tools for applications, maintenance tasks and the finishing of items or components metallic and non-metallic material to size and shape using engineering principles, tools, equipment and procedures.

Hand tools may include but not limited to:

- hacksaws
- hammers
- punches
- screwdrivers
- sockets
- wrenches
- scrapers
- chisels
- gouges
- wood planes
- files of all cross-sectional shapes and types.

Applications may include hand tools used for

- adjusting,
- dismantling
- assembling
- finishing
- cutting
- scraping
- cleaning,
- lubricating,
- tightening
- simple tool repairs
- hand sharpening
- adjustments

EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective use of particular hand tools listed within the range of variables statement relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the use of hand tools or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to use hand tools
- take responsibility for the quality of their own work
- plan tasks in all situations and review task requirements as appropriate
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

This unit should not be selected if the hand tool is dedicated to a single operation or machine and if only a machine specific/customised tool is used. For using power tools used for hand held operations see Unit MEMCOR0111A (Use power tools).

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements and OH&S guidelines
- work shop procedures
- technical applications
- hand tools and equipment
- materials
- materials handling whilst operating tools

Skills
The ability to:

- work safely to instructions
- apply appropriate hand-eye co-ordination in the use of tools
- handle/hold materials during operation of tools
- select appropriate tools for material usage
- communicate effectively
- use tools correctly

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

MEMMAH0071A: Perform manual handling and lifting

Competency Descriptor: This unit deals with the skills and knowledge required to effectively manually handle materials as applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Material handling

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Lift materials manually	1.1 Material weight is determined correctly utilising most appropriate technique.
	1.2 Lifting techniques are undertaken to safe work standards, standard operating procedures. (Type of movement, methods of movement, storage condition, height and position).
2. Move/shift materials manually	2.1 Appropriate equipment are selected where required
	2.2 Material is placed safely and securely on moving equipment
	2.3 Material is relocated ensuring safety of personnel and security of material.
	2.4 Material is unloaded from moving equipment and placed in a safe and secure manner.

RANGE STATEMENT

Work undertaken under supervision or in a team environment. Material weight is determined utilising scales or interpreting signage. Maximum manual lifting weight limited to safe work standards. All work and work practices undertaken to regulatory and standard requirements and standard operating procedures where applicable.

Moving/shifting equipment may include but not limited to:

- hand trolleys
- wheelbarrows
- motorised/hand pallet trucks (not sit on),
- hand carts
- dedicated production or process lifting equipment
- baskets
- spreader bars
- cradles or the like attached to lifting equipment
- rope

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively manually handling materials in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to handling materials
- demonstrate safe and effective operational use of lifting equipment, tools, and attachments
- demonstrate correct procedures in manual handling
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations demonstrate effective handling technique to produce designed outcome

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling recording and reporting associated with manual handling or other units requiring the exercise of the skills and knowledge covered by this unit.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- basic reading
- basic numeracy
- material classification
- manual handling technique(s)/methods
- handling processes
- material identification, transportation and storage
- handling tools and equipment
- materials preparation
- manual handling
- weight determination
- drawings, sketches, signage and instructions

Skills
The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings signage and instructions
- use handling tools and equipment
- identify/select material
- identify/select handling method
- handle material, tools and equipment
- determine weights
- identify/select materials relative to transportation and storage methods
- manual handle material/equipment efficiently

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMAH0081A: Perform housekeeping duties

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform housekeeping duties. It applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan and prepare work	1.1	OH&S requirements associated with application tasks and workplace environment are recognized and adhered to.
		1.2	Appropriate personal protective equipment is selected, correctly fitted and used.
		1.3	Quality Assurance requirements associated with company's operations is recognized and adhered to.
		1.4	Tools and equipment for handling materials/goods, non-toxic waste is selected and is consistent with job requirements.
		1.5	Tools and equipment for handling materials/goods is checked for serviceability and any faults reported to supervisor.
2.	Correctly manual handle, sort and stack engineering /construction material	2.1	Common engineering materials is recognized and selected for sorting and stacking/stockpiling to supervisor's instructions and/or specifications.
		2.2	Handling characteristics of materials are identified and appropriate handling techniques applied.
		2.3	Specific handling requirements for hazardous materials are applied.
		2.4	Materials are stored, stacked/stockpiled and protected clear of traffic ways so they can be easily identified and retrieved
		2.5	Appropriate signage and barricades are erected where applicable in order to isolate stored materials from workplace traffic or access.
		2.6	Correct manual handling techniques are used.

3.	Prepare for mechanical handling of materials	3.1	Materials are stacked/banded for mechanical handling in accordance with type of material and plant/equipment to be used.
		3.2	Rigger is assisted with the loading, unloading, moving, locating and/or installing materials.
		3.3	Materials are safely handled with assistance of pallet trolley, forklift or hoist.
4.	Handle and remove waste safely	4.1	Waste materials are handled correctly and safely according to OH&S and requirements of regulatory authorities.
		4.2	Hazardous materials are identified for separate handling.
		4.3	Non-toxic materials are removed using correct procedures.
		4.4	Dust suppression procedures are used to minimise health risk to work personnel and others.
5.	Clean up	5.1	Tools and equipment are cleaned, maintained, and stored.
		5.2	Unused materials are safely stacked/stockpiled stored.
		5.3	Waste materials are disposed of safely.
		5.4	Site is cleaned and cleared of debris and unwanted material.

RANGE STATEMENT

Competency is to be demonstrated by the effective use of techniques relating to instructions, information sources and meeting procedures listed within the range statement relative to the work orientation.

Tools and equipment includes but is not limited to:

- Brooms
- hoses
- shovels
- rakes
- wet and dry industrial vacuum cleaners
- wheelbarrows
- pallet trolley
- materials hoists
- forklifts
- buckets

- Engineering materials include but are not limited to:

- bricks and concrete masonry
- mortar components – cement, coarse aggregate, sand
- timber
- structural steel sections/components
- concrete
- scaffolding components, pipe sections
- plywood and particle board
- metal sheeting
- steel reinforcement
- insulation
- glass
- paints and sealants
- plaster sheeting

Protection of stacked/stored materials may include:

- covering
- tying or banding
- barricades
- signs
- locked away (hazardous materials)

Dust suppression procedures may include:

- spraying with water
- covering
- use of vacuum cleaner

Removal of materials to include processes of recycling and salvage where applicable.

OH&S requirements to be in accordance with (company/industry) guidelines and regulations.

Work to be undertaken as part of a team or individually under supervision of appropriately certificated persons where applicable.

Reporting of faults may be verbal or written.

EVIDENCE GUIDE

Competency is to be demonstrated by the effective handling and storing/stacking of appropriate construction materials listed within the range of variables statement, relevant to the work orientation.

(1) Critical Aspects and Evidence

It is essential that competence is observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations and Industry guidelines applicable to workplace operations
- indicate compliance with organisational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of materials handling processes
- demonstrate safe and effective operational use of tools and equipment
- demonstrate safe application in the process of cleaning up
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant codes and regulations
- hand tools and equipment
- materials
- materials handling
- Quality Assurance
- range of communication mediums (verbal and non-verbal)

Skills
The ability to:

- work safely to instructions
- use hand and portable tools
- handle materials
- identify/select material
- measure
- communicate effectively
- dispose of material safely
- use disposal equipment and tools as required

(4) Resource Implications

The following resources should be made available:

- general engineering and construction materials relative to construction processes
- plant and equipment appropriate to handling processes
- hand tools appropriate to handling processes
- suitable work area appropriate to construction process
- OHSA information

(5) Method of Assessment

Competency shall be assessed while work is being done under direct supervision with regular checks, but may include some autonomy when working as part of a team.

Competency in this unit may be determined concurrently, based on integrated project work.

Assessment may be by intermittent checking at the various stages of the job application in accordance with the performance criteria, or may be at the completion of each process.

(6) Context of Assessment

Competency shall be assessed in the workplace or simulated workplace environment in accordance with work practices and safety procedures.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMFAB0011A: Perform manual soldering/de-soldering – electrical/electronic components

Competency Descriptor: This unit deals with the skills and knowledge required to perform manual soldering/de-soldering – electrical/electronic components and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare materials for soldering	1.1 Materials preparation instructions understood and followed.
	1.2 Materials are prepared using correct soldering tools, equipment, materials and procedures.
	1.3 Materials are prepared to specifications using instruction or standard operating procedures.
2. Solder materials	2.1 Correct soldering techniques, procedures, materials and soldering tools is selected.
	2.2 Materials are jointed, mounted and shaped to specification using standard operating procedures.
	2.3 Solder is applied using correct and appropriate techniques.
	2.4 Where appropriate, excess material is removed using correct and appropriate tools and techniques.
	2.5 Procedures for the protection of components are observed according to standard operating procedure.
3. Inspect solder joints	3.1 Inspection procedure is undertaken to standard operating procedures.
	3.2 Inspection results are reported/recorded to standard operating procedures as required.
4. Undertake de-soldering	4.1 Correct and appropriate techniques, procedures, de-soldering tools and equipment are selected.
	4.2 Materials/components are de-soldered using correct procedure minimising damage to materials, components.
	4.3 Material/device are removed and cleaned to specifications using standard operating procedures.

RANGE STATEMENT

This unit covers manual soldering/de-soldering for the installation and fabrication of electrical/electronic components. Work undertaken in a production or maintenance environment using predetermined standards of quality, safety and work procedures. Component protection procedures are predetermined. All materials and procedures specified via job instructions. All work undertaken to standard requirements.

Correct and appropriate soldering tools and equipment may include but not limited to:

- all types of soldering irons
- cutters
- brushes,
- files
- soldering tips
- solder syringes
- holding devices

Correct and appropriate materials may include but not limited to:

- solder (solid resin core and paste)
- flux (resin or powder)

Inspections carried out using with pre set-up equipment which may include but not limited to:

- visual
- mechanical
- electric techniques

EVIDENCE GUIDE

Competency is to be demonstrated by effectively performing manual soldering/de-soldering of electrical/electronic components in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with manual soldering and de-soldering or other competencies requiring the exercise of the skills and knowledge covered by this unit. This unit could be assessed in conjunction with any other units

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to use soldering tools and equipment
- demonstrate the ability to manual soldering/de-soldering – electrical/electronic components efficiently
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

Unit MEMCOR0191A (Use hand tools)

Where soldering and de-soldering is limited to the straightforward termination, disconnection or reconnection of electrical wiring then see Unit MEMINS0011A (Terminate and connect electrical wiring).

Advanced specification and high reliability soldering associated with the installation of electrical/electronic components, in areas where reliability of connections is critical, is covered by Unit MEMFAB0012A (High reliability soldering and de-soldering).

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- standards of quality
- safety and work procedures
- soldering tools and equipment
- material used in soldering
- procedures via job instructions
- inspections used in soldering operations
- electrical/electronic components for soldering
- regulatory requirements

Skills
The ability to:

- safely to instructions
- select appropriate tools equipment and supplies
- use soldering tools and equipment
- handle materials
- select material
- apply quality assurance
- manual soldering/de-soldering – electrical/electronic components efficiently

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials
-

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0011A: Install, terminate and connect electrical wiring

Competency Descriptor: This unit deals with the skills and knowledge required to install, terminate and connect electrical wiring applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare for electrical wiring installation, termination and connection	1.1 All work is undertaken safely and to workplace procedures and standard requirements.
	1.2 Materials are checked for correct specifications.
	1.3 Preparation of work is undertaken or checked/inspected for correct location and specifications eg: cable trays, brackets, trenches etc.
2. Install electrical wiring	2.1 Installations are made to specifications, manufacturers requirements and to safety and industry regulations
	2.2 All conduit, and wiring are fixed to specifications.
	2.3 All cables, wires, conductors and installations are marked/tagged and labelled to specification.
	2.4 All completed installations are tested for compliance.
	2.5 All reports, documentation are completed correctly to required specifications.
3. Connect electrical wiring	3.1 Terminations/connections are made to specifications manufacturers' requirements and to safety and industry requirements.
	3.2 All brackets, clamps, holders etc. are adjusted and fixed to specifications.
	3.3 All cables, wires, conductors and connections etc. are marked/tagged and labelled to specification

3.4 All completed wiring and connections are tested for compliance with specifications.

3.5 All reports and documentation are completed correctly to required specifications.

RANGE STATEMENT

This unit applies to installing, joining terminating and connecting electrical wiring. Work generally undertaken as part of team or under supervision. Work is to be undertaken in accordance with relevant regulations and/or legislation. .

Installation may include but not limited to:

- surface mount
- flush mount
- in PVC conduits up to 32mm
- in metal not exceeding 25mm
- using mechanical connectors
- clamping
- pin connection

Termination and connection includes the utilisation of a range of methods including

- plugs sockets
- clamping of cables and wires, sealing entry points where required
- soldered joints
- crimping
-

Types of joint may include:

- twist joints
- straight twist joints
- tee twist joints
- tee joints
- married joints
- straining point joints
- mechanical joints

Tools and equipment to include:

- combination pliers
- long nose pliers
- side cutting pliers
- solder ions
- crimping tools

All testing undertaken on completed circuits using appropriate methods include but not limited to:

- continuity and resistance checks.
- insulation test
- polarity test
- specifications obtained from electrical/electronic circuit drawings and data sheets.

Connection of wiring includes but is not limited to:

- termination and connection of cords
- termination and connection of cables
- excluding specialist cables, of all types, sizes and materials

Electrical services include but not limited to:

- power supplies
- control, wiring
- 0 - 220V ac/dc

EVIDENCE GUIDE

Competency is to be demonstrated by effectively terminating and connecting electrical wiring in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling recording and reporting associated with the termination and connection of electrical wiring, or other units requiring the exercise of the skills and knowledge covered by this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to select and use appropriate tools and equipment
- demonstrate the ability to terminate and connect electrical wiring
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

Termination and connection of specialist cables such as mineral insulated, steel wire, armoured cables etc, is covered in Unit MEMINS0062A (Terminate and connect specialist cables).

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures
- industry standards
- standards of quality
- installation tools and equipment
- materials used in installation
- connection of wiring
- bonding methods
- types of joints
- termination and connection methods
- installation methods

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- use soldering tools and equipment
- handle materials
- select material and supplies
- join electrical wiring
- terminate electrical wiring
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication,

- answer questions put by the assessor.
- identify supervisors/colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0051A: Cut, bend and install electrical conduit

Competency Descriptor: This unit deals with the skills and knowledge required to effectively cut, bend and install electrical conduit associated with electrical installation instrumentation, refrigeration, and air conditioning systems or other related area in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for installation	1.1 Installation is planned and prepared for, to ensure OH&S policies and procedures are followed
	1.2 The work is appropriately sequenced in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Conduits are obtained in accordance with established procedures and comply with requirements.
	1.5 Location in which conduits are to be installed is determined from job requirements.
	1.6 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.7 Tools and equipment needed to carry out the installation work are obtained in accordance with established procedures.
	1.8 Preparatory work is checked to ensure no unnecessary damage has occurred.
2. Install conduits	2.1 OH&S policies and procedures for installing conduits are followed.
	2.2 Conduits are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
	2.3 Conduits are terminated and connected in accordance with requirements.

		2.4	Unplanned events or conditions are responded to in accordance with established procedures.
		2.5	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.6	On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Inspect and notify completion of work	3.1	Final inspections are undertaken to ensure the installed conduits conforms to requirements.
		3.2	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation.

In order to maintain currency in this unit on-going competency development is to occur. This would include keeping abreast of any changes in legislation, regulations, procedures, technology and the like related to the scope and application of this unit, IEEE standards or any approved standards

Identification and application of tools for:

- marking out
- measuring
- cutting
- shaping
- drilling
- installing
- threading;
- tapping
- finishing
- dismantling
- assembling
- reaming

Fabrication techniques may include but not limited to:

- marking out
- cutting
- bending
- clamping
- plugging
- drilling/punching
- screwing/bolting
- cutting mitres
- adhesion
- concreting
-

Representative range of applications may include such things as

- apparatus
- wiring systems
- plant,
- plugs
- lighting and switch boxes
- equipment
- power tools
- accessories
- components
- meter panels
- draw boxes
- distribution panels

Installation techniques:

- surface mount
- flush mount
- PVC conduits up to 32mm
- PVC trunking
- metal not exceeding 25mm
- on masonry
- on steel
- with clamps
- with saddles
- on walls
- on floors
- on roofs
- access ways
- wood

Tools/equipment to include:

- electric hand drill
- drill bits
- cold chisel & files
- ball pein hammer
- reamers
- benders
- hole saws
- hack saw
- screwdrivers
- spirit level
- pipe dies
-

Type of site and working conditions to include

- domestic new and existing
- at height as per industry standards
- in confined space
- temperature variation
- damp and wet conditions
- indoors and out doors
- pipes- PVC/metal
- pipe vices
- ladders
- combination squares

EVIDENCE GUIDE

This Evidence guide is intended to include components defined within the range statement

(1) Critical Aspects of Evidence

Assessors must be satisfied that the candidate can competently and consistently performs all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to cut bend and install electrical conduits

- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures:
- regulations and other relevant codes
- standards of quality
- installation tools and equipment
- materials used in installation
- materials used for conduits
- fabrication techniques
- installation techniques
- assembly/disassembly techniques

Skills
The ability to:

- handle ladders
- identify potential workplace hazards preventative measures
- work with electrically operated tools and equipment
- read and interpret simple freehand sketches
- measure accurately
- communicate effectively
- bend 90^0 ,and offsets in conduits
- cut, thread and ream conduits
- install PVC and metal conduits

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication,

- answer questions put by the assessor
- identify supervisors/colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

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MEMINS0071A: Prepare for electrical conduits/wiring installation

Competency Descriptor: This unit deals with the skills and knowledge required to effectively prepare for the installation of electrical conduits/wiring and applies to individuals working in metal engineering and maintenance industry.

Competency Field: Metal Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan for installation process	1.1 Quality Assurance requirements of engineering /maintenance operations are recognized and adhered to.
	1.2 Preparation and planning requirements are identified from drawings/work location and/or supervisor's instructions.
	1.3 OH&S requirements identified and adhered to in accordance with application tasks and workplace environment.
	1.4 Safety hazards are identified and correct procedures adopted to minimise risk to self and others.
	1.5 Materials are selected according to supervisor's instructions
	1.6 Appropriate personal protective equipment selected, correctly fitted and used.
	1.7 Tools and equipment selected consistent with the job requirements,
	1.8 Tools and equipment are checked for serviceability and any faults reported to supervisor.
	1.9 Fixtures/components selected consistent with the job requirements where applicable and checked for damage.
2. Prepare materials selected for installation process	2.1 Activities for material preparation are identified from specifications or supervisor's instructions.
	2.2 Material preparation is carried out to satisfy requirements of installation process.

3.	Prepare work area suitable for installation process	3.1	Activities to be carried out in work area are identified from installation technique, method of installation and access to area.
		3.2	Work area is prepared for installation process according to supervisor's instructions.
4.	Use tools, plant and equipment appropriate for installation process	4.1	Regular tools/measuring devices suitable for application processes are identified to job requirements.
		4.2	Correct tools/measuring devices are used safely and effectively to carry out processes where applicable.
5.	Prepare background of surfaces/environment for electrical conduits/wiring installation	5.1	Surfaces/environment are identified for preparation.
		5.2	Surface where appropriate is chassed/chopped/prepared.
		5.3	Excavations where appropriate are carried out.
6.	Handle material	6.1	Materials are obtained as per instruction.
		6.2	Correct manual handling techniques are used to move and place materials.
		6.3	Materials are safely moved to work area.
		6.4	Techniques used to accurately cut/bent/fabricate/secure components to same length or to given instruction.
7.	Store material	7.1	Components are distributed and stacked to suit job location and sequence.
8.	Clean up	8.1	Materials are stacked/stored for re-use or disposed of.
		8.2	Work area is cleared.
		8.3	Tools and equipment are cleaned, maintained and stored.

RANGE STATEMENT

This unit applies to the preparation processes carried out in preparing for the installation of electrical conduits/wiring as per instructions.

Identification and application of tools for:

- marking out
- measuring
- cutting
- shaping
- drilling
- installing
- threading;
- tapping
- finishing
- dismantling
- assembling
- reaming

Fabrication techniques may include but not limited to:

- marking out
- cutting
- bending
- clamping
- plugging
- drilling/punching
- screwing/bolting
- cutting mitres
- adhesion
- concreting

Representative range of applications may include such things as:

- apparatus
- wiring systems
- plant,
- plugs
- lighting and switch boxes
- transfer boxes
- equipment
- power tools
- accessories
- components
- meter panels
- draw boxes
- distribution panels

Installation techniques:

- surface mount
- flush mount
- PVC conduits up to 32mm
- PVC trunking
- metal not exceeding 25mm
- on masonry
- on steel
- with clamps
- with saddles
- on walls
- on floors
- on roofs/ceilings
- access ways
- wood
- underground

Tools/equipment to include:

- electric hand drill
- drill bits
- cold chisel & files
- ball pein hammer
- reamers
- benders
- hole saws
- knock out/hole saw
- hack saw
- screwdrivers
- spirit level
- pipe dies
- pipes- PVC/metal
- pipe vices
- ladders
- combination squares

Type of site and working conditions to include

- domestic new and existing
- at height as per industry standards
- in confined space
- temperature variation
- damp and wet conditions
- indoors and out doors

Work is to be undertaken either as part of a team or individually, under supervision with instruction being as part of the supervisor's directions either verbal or written.

Reporting of faults may be verbal or written.

OH&S requirements to be in accordance with the regulations.

EVIDENCE GUIDE

Competency is to be demonstrated by carrying out the safe and effective preparation for electrical conduits/wiring installation in accordance with performance criteria using any of the range of materials and processes listed within the range of variables statement.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- indicate compliance with organisational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of installation processes
- demonstrate safe and effective operational use of tools, measuring devices and equipment
- interactively communicate with others to ensure safe and effective workplace operations

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to prepare for electrical conduits/wiring installation
- demonstrate the ability to apply appropriate principles/techniques to installation environment
- demonstrate the ability to carry out specific measurement and preparation procedures
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Apply principles of Occupational Health and safety (OH&S) in work environment
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements
- drawings and specifications
- measuring devices
- hand tools and equipment
- materials relative to installation process
- materials handling
- measurement relative to installation process
- installation techniques consistent with solid plastering
- workplace communications

Skills
The ability to:

- work safely to instructions
- use hand tools
- use measuring devices
- handle material
- select material
- communicate effectively
- measure relative to process
- prepare for conduit/wiring installation

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activity

(6) Context of Assessment

Competency should be assessed in the workplace or simulated workplace environment in accordance with work practices and safety procedures.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0091A: Terminate signal and data cables – (basic)

Competency Descriptor: This unit deals with the skills and knowledge required to terminate signal and data cables and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify and mark conductors/cables	1.1	Cables and conductors are identified using appropriate technique.
		1.2	Cables and conductors are labelled in accordance with specification.
2.	Prepare cable	2.1	Termination requirements and specifications are obtained and understood.
		2.2	Cable ends are prepared to specifications utilising appropriate tools and techniques.
3.	Terminate cables	3.1	Cables are terminated to specifications utilising appropriate tools and techniques.
		3.2	Terminations are tested/examined for compliance with specifications utilising appropriate test equipment and techniques.
4.	Fix/secure cables	4.1	Cables are fixed/secured in accordance with standard operating procedures and specifications, utilising appropriate fixing/securing techniques.

RANGE STATEMENT

Work undertaken under supervision or as part of team environment. Work undertaken in field or workshop environment. All work and work practices undertaken to regulatory and standard requirements. This unit covers basic signal and data cables, excluding specialist cables.

Termination techniques may include:

- solder
- crimp
- wire wrap non-insulated and pre-insulated
- connectors
- multi-terminal plugs and sockets
- co-axial
- terminal blocks

Types of cables covered include:

- signal cables;
- communication cables;
- extra low voltage power and control cables

Specifications and procedures are obtained from:

- circuit drawings
- data sheets
- instructions

Fixing and securing include:

- the use of clamps,
- cable ties,
- bolting, screwing

EVIDENCE GUIDE

Competency is to be demonstrated by effectively terminating signal and data cables in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, addressing the safety, quality, communication, materials handling, data cables or other units requiring the exercise of the skills and knowledge covered by this unit. Competency in this unit cannot be claimed until all prerequisite knowledge has been satisfied.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to select and use appropriate tools and equipment
- demonstrate the ability to terminate signal and data cables
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard procedures
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMFAB0011A Manual soldering/de-soldering - electrical/electronic components
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0191A Use hand tools

For termination and connection of specialist cables, see Unit MEMINS0062A (Install specialist cables).

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures:
- standards of quality
- installation tools and equipment
- types of signal and data cables
- materials used in installation
- connection of wiring
- fixing methods
- types of joints
- termination and connection methods
- installation methods

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- use terminating tools and equipment
- handle materials
- select material and supplies
- join signal and data cables
- terminate signal and data cables
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify supervisors/colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working under supervision or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0121A: Perform basic repair to electrical/electronic apparatus

Competency Descriptor: This unit deals with the skills and knowledge required to undertake basic repairs to electrical/electronic apparatus by following routines described in work instructions or apparatus manuals, and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare work to carry out basic repair	1.1 Repair work is prepared to ensure OH&S policies and procedures are followed.
	1.2 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved.
	1.3 Given maintenance schedules and specifications are checked against requirements.
	1.4 Materials needed to complete the work are obtained in accordance with established procedures.
	1.5 Tools and testing devices needed to carry out the work are checked for correct operation and safety.
2. Carry out basic repair work	2.1 OH&S policies and procedures are followed.
	2.2 Circuits are checked as being isolated where necessary using specified testing procedures.
	2.3 Apparatus is repaired in accordance with established procedures and repair routines.
	2.4 On-going checks of the quality of the work are undertaken in accordance with established procedures.
3. Inspect and notify completion of work	3.1 Final inspections are undertaken to ensure the repair of apparatus conforms to given requirements.
	3.2 Work completion is notified in accordance with established procedures.

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RANGE STATEMENT

Competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation. Candidate should be able to effect basic repairs to any one of the following systems

- computer systems
- electrical appliance
- electronics appliance
- refrigeration and air conditioning control systems
- data communications systems

Appliance and apparatus may include:

- electrical fans
- vacuum cleaners
- food mixers and food blenders
- electric irons
- modular appliances
- electric toasters and toaster ovens
- microwave ovens
- gas appliances/apparatus
- household/freezing apparatus
- dish washers
- laundry equipment
- ranges and ovens

Basic repairs may include:

- repairs to wiring systems
- repairs to circuits
- repairs to components
- removal and replacement of components
- removal and replacement of printed circuit boards
- installation and set up of system components
- using test equipment to locate and isolate causes of problems
- cleaning and restoring unit to specification
- repairing broken appliances cases

EVIDENCE GUIDE

Competency will be demonstrated by having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence under supervision and to requirements.

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit in the related category and specialisation which is to be exhibited across a representative range of applications under supervision and to requirements
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for each of the categories and areas of specialisation undertaken from those listed in the Range statement or Evidence guide
- demonstrating an understanding of the underpinning knowledge and skills identified for the categories and related specialisation undertaken in the section, of this unit titled 'Underpinning knowledge'

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to perform basic repair to electrical/electronic apparatus efficiently
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all repair tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMFAB0011A Manual soldering/de-soldering - electrical/electronic components
- MEMCOR0091A Draw and Interpret sketches and simple drawings
- MEMCOR0071A Use Electrical/electronic measuring devices
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures
- safety precautions three wire line plugs, cords and receptacles
- standards of quality
- maintenance schedules and specifications
- tools and testing equipment
- basic testing techniques
- basic electrical test
- basic electronic apparatus
- basic electronic circuits
- basic electronic components
- connection of wiring
- bonding/fixing methods
- appliance connectors
- types of cords, wire sizes and plugs
- termination and connection types
- termination and connection methods
- basic electrical/electronic faults (short circuit, open circuit, defective resistors etc)

Skills
The ability to:

- work safely to instructions
- follow maintenance schedules and specifications
- select and use appropriate tools and equipment
- use tools and testing devices
- handle materials
- select material parts and supplies
- perform basic repair to electrical/electronic apparatus

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant standard specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of related activities to which applicant has contributed, or worked on
- training courses on material related to range of variables and or knowledge requirement
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence, under supervision and to requirements. Equivalent evidence from other sources is also acceptable.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0161A: Disconnect and reconnect fixed wired electrical machinery, appliances and fixtures

Competency Descriptor: This unit deals with skills and knowledge required to competently disconnect and reconnect fixed wired electrical machinery appliances and fixtures and applies to individuals in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare to disconnect electrical equipment	1.1	Disconnection is planned to ensure OH&S policies and procedures are followed.
		1.2	Appropriate personnel are consulted to ensure work is co-ordinated effectively with others involved in the work site.
		1.3	Electrical characteristics of electrical equipment and electrical supply are determined and recorded in accordance with established procedures.
		1.4	The point of isolation of electrical equipment to be disconnected is determined.
		1.5	Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
2.	Disconnect electrical equipment	2.1	OH&S policies and procedures are followed.
		2.2	Electrical equipment is isolated in accordance with established procedures. (see range statement).
		2.3	Conductor connection sequence is recorded and labelled in accordance with established procedures.
		2.4	Electrical equipment is disconnected from fixed wiring without damage to other components.
		2.5	Disconnected conductors/cables are terminated in accordance with requirements to ensure they are safe and present no potential hazard.

3.	Prepare to reconnect electrical equipment	3.1	Reconnection is planned to ensure OH&S policies and procedures are followed.
		3.2	Appropriate personnel are consulted to ensure work is co-ordinated effectively with others involved in the work site.
		3.4	Replacement electrical equipment is selected on the basis of rating and characteristics being the same as that of the original electrical equipment.
		3.5	Appropriate personnel are consulted in the event that appropriate replacement electrical equipment is not available.
		3.6	Original and/or replacement electrical equipment is tested to ensure it is safe to connect to the electrical supply and use.
		3.7	Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
4.	Reconnect electrical equipment	4.1	OH&S policies and procedures are followed.
		4.2	Measurements are taken to ensure circuit to which electrical equipment is to be connected remains isolated in accordance with established standards.
		4.3	The continuity of protective earthing conductor is tested to determine whether it is sufficiently low.
		4.4	The resistance between the protective earthing conductor and the neutral conductor is tested to determine whether it is sufficiently low.
		4.5	The insulation resistance of active conductors is tested to confirm that it is greater than 1M Ω.
		4.6	An appropriate qualified person is engaged to rectify any non-compliance condition revealed by the testing.
		4.7	Continuity between exposed conductive parts of the electrical equipment and the main earth or metal switchboard enclosure is confirmed.
		4.8	Electrical equipment is connected to comply with requirements.

		4.9	Connections to the electrical equipment are checked to confirm they are correct.
5.	Test the reconnected electrical equipment for safe operation	5.1	OH&S policies and procedures, and established procedures for the reinstatement of isolated circuits and electrical equipment are followed.
		5.2	Arrangements are made with appropriate personnel to test the operation of the electrical equipment.
		5.3	Operational non-conformances are identified and reported in accordance with established procedures.
		5.4	Status report(s) are completed and notified in accordance with established procedures.

RANGE STATEMENT

This unit applies to the disconnecting and reconnecting of fixed wired electrical equipment using engineering principles, tools, equipment and procedures to standard requirements.

The following aspects must be demonstrated:

- prepare to disconnect electrical equipment
- disconnect electrical equipment
- prepare to reconnect electrical equipment
- test the reconnected electrical equipment for safe operation
- provide status reports
- testing to ensure safety, including earth continuity and insulation integrity
- OH&S practice
- determining electrical characteristics of equipment
- identifying point of installation
- isolating equipment
- disconnection techniques
- selecting replacement equipment
- reconnection techniques
- applying techniques, procedures, information and resources relevant to performance

Electrical characteristics refers to:

- voltage
- current rating
- power rating
- direction of rotation
- phase sequence/polarity
- name plates information and duty

Electrical equipment refers to

- composite equipment
- pre-assembled
- control devices
- electrical heaters
- motors
- lighting

EVIDENCE GUIDE

Competency shall be demonstrated in relation to the endorsement for which competency is sought. The following critical aspects of competency shall be demonstrated:

- preparation to disconnect electrical equipment
- disconnecting of electrical equipment
- preparation to reconnect electrical equipment
- reconnection of electrical equipment; and
- testing of the reconnected electrical equipment for safe operation

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit across a representative range of specified electrical equipment in the scope of work and for which endorsement of competency for the specified electrical equipment is being sought; under supervision and to requirements
- To requirements means meeting all relevant safe working practices, manufacturers specifications, codes of practice, regulatory requirements and industry standards
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for the endorsement sought and scope of work in the Range Statement
- demonstrating an understanding of the underpinning knowledge and skills identified for the scope of work undertaken in the section of this unit titled Underpinning knowledge

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to disconnect and reconnect fixed wired electrical equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures to return equipment to service

(2) Pre-requisite Relationship of Units

- MEMCOR0141A (Follow principles of Occupational Health and safety (OH&S) in work environment)
- MEMCOR0161A (Plan to undertake a routine task)
- MEMCOR0171A (Use graduated measuring devices)
- MEMCOR0091A Draw and interpret sketches and simple drawings)
- MEMCOR0191A (Use hand tools)
- MEMINS0011A (Terminate and connect electrical wiring)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- hazards in the (electrical) work environment: shock hazards; fire hazards; chemical hazards
- hazardous areas
- special situations
- procedures for dealing with fires associated with electrical equipment
- procedures for dealing with related situations
- basic electrical circuit(s): source; control; protection; load
- circuit diagrams: symbols; conventions; interpretations; free sketches
- circuit connections and functions: open circuit; closed circuit; short circuit
- basic electrical measurement: use of multimeters; use of ammeter; use of voltage measuring and indicating devices; testing of measuring instruments; care of measuring instruments; voltage, current and resistance measurement; estimating values of voltage, current and resistance; using ohms law
- fundamental electrical concepts: effects of current; practical resistors; sources of emf; simple practical circuit; series, parallel and series-parallel circuits; electrical measurement; capacitors; inductors; magnetism
- insulation resistance measurement and requirements
- earthing principles and systems
- methods for testing insulation resistance; continuity of prospective earthing conductor; continuity between exposed conductive parts and the earthing system

Knowledge
Knowledge of: (cont'd)

- cable types and conductor termination methods and techniques: conductors solid, stranded and flexible; colour codes
- single and three phase systems and loads: number of active and live conductors required; line and phase voltage; typical loads
- general appliances: appliance identification; appliance ratings
- single and three phase induction motors: motor identification; motor ratings; direction of rotation
- single and three phase heaters: types of heaters; heater identification; heater ratings
- electrical distribution arrangement: power systems; within a premises; purpose of switchboards/distribution boards (residual current devices)
- circuit isolation and protection devices
- isolation procedures: work clearance; testing for voltage; lock-off and tagging; techniques, regulation, codes of practice and procedures
- disconnection procedures, practices and requirements
- replacement equipment
- reconnection procedures, practices and requirements

Skills

The ability to:
- work safely to instructions
- use tools and plant
- use of ladders and elevated work platforms
- ensuring equipment is safe to connect to supply
- return equipment to service

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication,

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working under supervision or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0181A: Attach flexible cables & plugs to electrical machinery appliances and fixtures

Competency Descriptor: This unit deals with skills and knowledge required to competently attach flexible cables & plugs to electrical equipment and fixtures and applies to individuals in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare to attach flexible cable(s) and plug(s)	1.1 Work is planned and prepared to ensure OH&S policies and procedures are followed, and the work is appropriately sequenced in accordance with requirements.
	1.2 Condition and ratings under which the flexible cable(s) and plug(s) is to operate is determined from requirements and in consultation with appropriate personnel followed by written instruction.
	1.3 Flexible cable(s) and plug(s) are selected to comply with standards and requirements for the condition and rating to be determined.
	1.4 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.5 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.6 Flexible cable(s) is prepared without damage to insulation and conductors and in accordance with requirements.
2. Attach flexible cable(s) and plug(s)	2.1 OH&S policies and procedures are followed.
	2.2 Single insulated metal-framed equipment is earthed in accordance with requirements.
	2.3 The integrity of double insulated equipment is maintained in accordance with requirements.
	2.4 Conductors are connected to terminals in accordance with requirements to ensure the required polarity is affected.

3.	Test equipment for operation and safety	3.1	Appropriate tests of the cables(s) and plug(s) connected to the electrical equipment are conducted in accordance with requirements and to established procedures to ensure safe installation and operation.
4.	Provide status report(s)	4.1	Status report(s) are completed and notified in accordance with established procedures.

RANGE STATEMENT

This unit applies to the attaching of flexible cable & plugs to electrical equipment using engineering principles, tools, equipment and procedures to regulatory requirements

The following aspects must be demonstrated:

- prepare to disconnect electrical equipment
- disconnect electrical equipment
- prepare to reconnect electrical equipment
- test the reconnected electrical equipment for safe operation
- provide status reports
- testing to ensure safety, including earth continuity and insulation integrity
- OH&S practice
- determining electrical characteristics of equipment
- identifying point of installation
- isolating equipment
- disconnection techniques
- selecting replacement equipment
- reconnection techniques
- applying techniques, procedures, information and resources relevant to performance

Electrical equipment refers to:

- composite equipment
- pre-assembled
- control devices
- electrical heaters
- motors
- lighting

Electrical characteristics refers to:

- voltage
- current rating
- power rating
- direction of rotation
- phase sequence/polarity
- name plates information and duty

EVIDENCE GUIDE

Competency is to be determined on evidence of having consistently performed across a representative range of specified electrical equipment for the endorsement and scope of work for which competency is being sought; autonomously and to requirements.

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit across a representative range of specified electrical equipment in the scope of work and for which endorsement of competency for the specified electrical equipment is being sought; under supervision and to requirements. To requirements means meeting all relevant safe working practices, manufacturers specifications, codes of practice and regulatory requirements, Standards both Grenadian and International and OH&S Standards
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for the endorsement sought and scope of work in the Range Statement
- demonstrating an understanding of the underpinning knowledge and skills identified for the scope of work undertaken in the section of this unit titled Underpinning knowledge

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge

During assessment the individual will:

- Demonstrate safe working practices at all times
- Demonstrate the ability to attach flexible cable & plugs to electrical equipment to 1,000 Vac/1,500 Vdc
- Communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- Take responsibility for the quality of their own work
- Plan tasks in all situations and review task requirements as appropriate
- Perform all tasks in accordance with standard operating procedures
- Perform all related tasks to specification

Use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0141A (Follow principles of Occupational Health and safety (OH&S) in work environment)
- MEMCOR0161A (Plan to undertake a routine task)
- MEMCOR0171A (Use graduated measuring devices)
- MEMCOR0091A (Draw and interpret sketches and simple drawings)
- MEMCOR0191A (Use hand tools)
- MEMINS0011A (Terminate and connect electrical wiring)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- hazards in the (electrical) work environment: shock hazards; fire hazards; chemical hazards
- procedures for dealing with fires associated with electrical equipment
- procedures for dealing with PCBs
- fundamental electrical concepts: current; voltage; resistance
- circuit isolation and protection devices
- isolation procedures: work clearance; testing for voltage; lock-off and tagging; techniques, regulation, codes of practice and procedures Up to 1,000Volts A.C./1,500Volts D.C.
- appliance/electrical equipment applications:
- basic principles of appliance/electrical equipment (non mathematical); appliance/electrical
- equipment identification; appliance/electrical equipment ratings;
- basic principles of operation of control equipment and protection devices; fault conditions and symptoms;
- test equipment;
- safe testing procedure, including continuity; fault types in appliances/electrical equipment; fault-finding procedures (prescriptive)
- circuit connections and functions: open circuit; closed circuit; short circuit
- basic voltage, current and resistance measurement and calculation
- insulation resistance measurement and requirements
- cable types and conductor termination methods and techniques:
- colour codes
- cable ratings Up to 1,000Volts A.C. 1,500Volts D.C. flexible cords/cables for use with single phase appliances/apparatus:
- types and loading
- service duty Up to 1,000Volts A.C. 1,500Volts D.C.
- plugs for use with single phase applications/apparatus:
- types and loading;
- IP rating
- continuity testing
- connection requirements and techniques
- safety testing

Skills
The ability to:

- work safely to instructions
- use tools and plant
- use of ladders and elevated work platforms
- ensuring equipment is safe to connect to supply
- return equipment to service
- position and fix fixtures in place
- connect wires to terminals, plugs and electrical equipment

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working under supervision or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKIILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0012A: Plan a complete activity

Competency Descriptor: This unit deals with the skills and knowledge required to effectively plan a complete activity to required objectives/guidelines and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify activity requirements	1.1	Instructions as to objectives and performance required are identified.
		1.2	Relevant specifications for activity outcomes are obtained, understood and where necessary clarified.
		1.3	Activity outcomes are identified.
		1.4	Activity requirements, including overall timeframe for activity, quality requirements and criteria for acceptable completion are identified.
2.	Plan process to complete activity	2.1	Based on instructions as to objectives, performance requirements and specifications, the individual components of the activity are identified and prioritised.
3.	Modify plan	3.1	Plan if necessary may be modified to overcome unforeseen difficulties or developments that occur as work progresses.

RANGE STATEMENT

Instructions may include timeframe, quality requirements, outcome requirements and performance requirements. Instructions carried out in accordance with established procedures. However, the activities may require a response and modification of procedures or choice of different procedures to deal with unforeseen developments.

The activity may require prioritising of the individual components to facilitate the meeting of the objectives. Examples of activities to be planned may include: fault diagnosis and repair of an item of equipment, a modification of an established sequence of assembly tasks.

Activities are normally performed by the individual undertaking the planned activity and associated reports are completed as required. Instructions refer to either formal or informal information about the task required.

Planning will be related to familiar work tasks and environments and be performed to standard operating procedures.

EVIDENCE GUIDE

Competency is to be demonstrated by individuals planning a complete activity in accordance with the performance criteria and as related to the work environment.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with other units addressing the safety, quality, communication, materials handling recording and reporting associated with hand forging or other units requiring the exercise of skills and knowledge covered by this unit.

During assessment the individual will:

- take responsibility for the quality of their own work
- carry out instructions in accordance with established procedures
- plan a complete task in accordance with standard principles
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- quality systems in a workplace
- typical loss and damage control systems
- environmental standard framework and environmental licence provisions.
- work planning processes
- OH&S regulations/requirements,
- equipment, material and personal safety requirements processes at the worksite
- enterprise quality systems and processes
- operations environmental procedures and key constraints
- operations environment control measures
- research and interpretative skills
- plain English literacy and communication techniques
- technical literacy and communication skills
- basic problem solving skills

Skills
The ability to:

- to locate, interpret and apply relevant operational quality and environmental information
- question and actively listen, for example when obtaining information of quality and environmental working practices
- communication in plain English skills in relation to dealing with others involved in the work.
- to interpret and apply common industry terminology, and interpret symbols used for quality and environmental signage
- to assess quality and environmental issues
- to plan a complete activity

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0022A: Perform related computations

Competency Descriptor: This unit deals with the skills and knowledge required to perform related computations and effectively carry out measurements of work to required tolerance, and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Estimates approximate answers	1.1	Answers are checked by using estimating techniques.
		1.2	Simple rounding off operations is performed when estimating.
2.	Performs basic calculations involving percentages	2.1	Simple calculations are performed to obtain percentages from information expressed in either fractional or decimal format.
3.	Applies the four basic rules to algebraic expression	3.1	Simple calculations on algebraic expressions are performed using the four basic rules - addition, subtraction, multiplication, and division.
4.	Performs basic calculations involving proportions	4.1	Simple calculations involving ratios and proportion are performed using whole numbers, fractions and decimal fractions.
		4.2	Information extracted from charts and graphs are used as a basis for decision-making.
5.	Interpret charts and graphs	5.1	Interpret information extracted from charts and graphs are interpreted correctly.
		5.2	Information extracted from charts and graphs are used as a basis for decision-making.
6.	Produces charts and graphs from given information	6.1	Information is used to produce simple charts and graphs as required.
7.	Perform basic calculation involving geometry	7.1	Calculations are performed to determine angles and linear dimensions.

RANGE STATEMENT

Calculations may be performed using pen and paper or on a calculator. All problems should have appropriate applications depending on the workplace. Interpretation of charts and graphs would usually extend to simple histograms, control charts, pie charts, etc. Data may be generated from readings taken or computer generated. Applications can include computation of pressure, volume, temperature, heat, speed, density, mass, force, efficiency etc.

Areas for discussion may include but not limited to:

- fraction, decimals and percentages
- costing and pricing
- ratio and proportion
- measurements and mensuration
- performing algebraic operation
- statistics
- geometry
- trigonometry

EVIDENCE GUIDE

Competency is to be demonstrated by individual performing computations in accordance with the performance criteria and as related to the work environment.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the computations being performed or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- take responsibility for the quality of their own work
- perform computations in accordance with standard principles
- perform computations accurately
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0051 Perform computations basic

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- numbers and basic arithmetic operations
- drawings and specifications
- basic operations in simple geometry,
- algebra
- costing and pricing
- ratio and proportion
- basic statistics (charts, tables scales and graphs)
- interpretation of measurement and calculations
- trigonometry
- geometry
- statistics
- data relative to the metal engineering and maintenance trade processes
- applications relevant to engineering skills trades e.g. pressure, volume, temperature, mass efficiency circuit computations, perimeters and areas etc.

Skills
The ability to:

- read and interpret drawings
- measure and calculate manually
- interpret measurements and calculations
- relate to and or perform calculations on related applications.
- communicate effectively

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. An individual working alone should demonstrate the competencies covered by this unit or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0042A: Interpret standard specifications and manuals

Competency Descriptor: This unit deals with the skills and knowledge required to effectively interpret quality specifications and manuals to achieve required objectives/guidelines and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify and access all documentation	1.1	Documentation covering all of the tiers of quality within the company are identified and used.
2.	Interpret documentation	2.1	Quality specification for specific processes and related systems are interpreted.
		2.2	The company quality improvement system related to the formal documentation are understood and used according to standard operating procedures.
3.	Explain documentation	3.1	Documentation relating to quality control/assurance is explained to appropriate personnel.
		3.2	Instructions based on documentation are given to appropriate personnel.
4.	Monitor quality processes/systems	4.1	Quality improvement systems are monitored and maintained.

RANGE STATEMENT

This standard covers a wide range of processes/systems and enterprises. It covers the interpretation of all of the tiers of quality documentation from the national factory act through to manuals, procedures and work instructions.

EVIDENCE GUIDE

Competency is to be demonstrated by individual interpreting quality specifications and manuals in accordance with the performance criteria and as related to the work environment.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the supervision and maintenance of the application of quality procedures or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- take responsibility for the quality of their own work
- Interpret quality specifications and manuals to achieve required objectives
- perform interpretation accurately
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMCOR0091 Interpret sketches and technical drawings

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- design theory and its application to the workplace
- common engineering terminology and maintenance safety requirements
- relevant OH&S regulations/requirements
- equipment, material and personal safety requirements
- engineering drawing procedures and interpretative techniques
- plain English literacy and communication techniques
- technical literacy and communication skills
- basic problem solving skills

Skills
The ability to:

- to locate, interpret and apply relevant operational quality and environmental information.
- Question and actively listen, for example when obtaining information of quality and environmental working practices.
- communication in plain English skills in relation to dealing with others involved in the work
- to interpret and apply common industry terminology, and interpret symbols used for quality and environmental signage.
- to assess quality and environmental issues.
- to interpret quality specifications and manuals

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor
- present evidence of credit for any off-job training related to this unit

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 1	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0052A: Operate in an autonomous team environment

Competency Descriptor: This unit deals with the skills and knowledge required to effectively operate in an autonomous team environment to achieve required objectives and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Determine work roles of team members	1.1	Team role and scope are determined and understood using standard operating procedure.
		1.2	Role of self and team members are understood and where appropriate clarified by all team participants.
2.	Participate in team planning	2.1	Appropriate methods are used to plan team activity or a number of related team activities.
		2.2	Planning activity is undertaken on an individual or shared basis, incorporating individual's technical skills, knowledge and competence.
		2.3	Effective and appropriate contributions are made to the total planning process.
3.	Operate as team member	3.1	Effective and appropriate forms of communication are used to liaise with team members.
		3.2	Contributed to the determination of time lines, quality standards and production requirements for the team.
		3.3	Real or perceived issues are resolved by effective and appropriate contributions from team member.
		3.4	Effective and appropriate contributions are made by team member to achieve team objectives, based on member's own technical skills, knowledge and competence.
4.	Monitor and review team performance	4.1	Participated effectively in the planning and development of team review process.

		4.2	Appropriate data is collected on an individual and team basis using standard operating procedure.
		4.3	Data collected, is analysed and used by team and individual team members to evaluate team performance and determine future strategies.
5	Implement team performance improvements	5.1	Performance improvement processes appropriate to team activities are implemented on a collective and individual basis using standard operating procedure.

RANGE STATEMENT

This unit applies the skills necessary for effective participation by an individual in an autonomous team environment. Team parameters, constraints and objectives are determined by sources external to the team. Where as a result of team discussions or planning, team parameters require adjustment, then appropriate authorisation and approvals are established using standard operating procedures. Individual team participants would be already competent with technical aspects of team activities.

EVIDENCE GUIDE

Competency is to be demonstrated by

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with working in an autonomous team environment or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- take responsibility for the quality of their own work
- operate in an autonomous team environment to achieve required objectives
- demonstrate safe working practices at all times
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- plan tasks in all situations and review task requirements as appropriate
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0031A Operate in a work based team environment

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- operation work procedures.
- group dynamics and the impact of working effectively with others on individual and group performance.
- enterprise work systems, equipment, management and facility operating systems.
- enterprise policies and procedures and standard requirements in regard to workplace ethics
- basic analytical, problem solving, negotiation and conflict management techniques in relation to working with others.
- plain English and communication techniques

Skills
The ability to:

- communicate in relation to reading and understanding workplace documents.
- do basic analytical, problem solving, negotiation and conflict management tasks in relation to working with others.

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. The individual would already be competent with the technical aspects of team activities.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0122A: Write technical reports (basic)

Competency Descriptor: This unit applies to the skills and knowledge necessary to write reports effectively in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Communicate concepts in writing	1.1 Reports are written using appropriate terminology where required.
	1.2 Reports discussed alternatives, difficulties and suggestions when required.
	1.3 Reports are coherent and based on any analysis or research undertaken.
	1.4 Conclusions are based on the facts in the report and recommendations are made if required.
	1.5 Reports are completed within specified time.
	1.6 References are acknowledged as required.

RANGE STATEMENT

Report is used to denote any required written communication that goes beyond a simple recording of facts (such as completion of a pro forma shift production schedule) to include level of analysis and/or research.

Reports may be of a technical or non-technical nature. If the report is technical, it should be based on the writer having technical knowledge.

Conclusions and/or recommendations where required are based on research or analysis of data

Reports include graphs, charts, tables, etc. as required.

The analysis and conclusions should be consistent with the level of skill and knowledge of an employee working at that level. Simple analysis and work would be required

Grammar and usage may include:

- types and functions of sentences
- phrases and there functions
- subordinate clauses (adverbial adjectival, noun)
- subject and verb (focus on compound subjects, indefinite pronoun as subject collective noun as subject)
- pronouns and there antecedents
- verbs – action, linking, regular, irregular
- tenses- present, past, future, present perfect, past perfect, future perfect.
- adjectives and adverbs
- sentence faults – fragments and run-on

Communication skills may include:

- good listening skills
- effective listening skills (eliciting feedback, developing objectivity, learning to empathize
- kinds of communication barriers
- clear logical reasoning
- identification and evaluation of propaganda techniques
- formal report/speech

Mechanics, vocabulary and spelling may include:

- rules governing the use of capitalization, punctuation and abbreviation
- punctuation marks – end marks, commas, semi-colon and colon, quotation marks, dashes and parentheses, hyphen, apostrophes.
- Abbreviations – symbols, measurements, time, number
- Spell words and interpret meanings through context clues and word analysis, prefixes, suffixes, root (focus on words used in skill area)

Writing skills may include:

- Methods of paragraph development – chronological, order of importance, spatial order, comparison or contrast
- Paragraphs with – topic sentences and supporting sentences, unity and coherence, linking expressions and connectives, sentence length and structure
- Different types of reports

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of report writing skills in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units applicable to the individual's work.

During assessment the individual will:

- demonstrate the ability to write technical reports
- demonstrate effective writing style
- demonstrate the ability to identify main points
- demonstrate the ability to expand main points
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- use accepted engineering communication techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive work place communication

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- grammar and mechanics
- spelling
- writing styles (technical or non-technical)
- communication skills
- information systems
- reports including graphs, charts, tables

Skills
The ability to:

- communicate concepts in writing
- identify main points
- expand main points
- write technical and non-technical reports

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination both.

The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0062A: Terminate and connect specialist cables

Competency Descriptor: This unit deals with the skills and knowledge required to terminate and install armoured cables and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare for termination and connection of specialist cables	1.1 All work is undertaken safely and to workplace procedures and industry regulations and standard requirements.
	1.2 Correct cables and materials are selected in accordance with job requirements.
	1.3 Preparation of work is undertaken or checked/inspected for correct location and specifications eg: cable trays, brackets, trenches etc.
	1.4 Certification documentation are obtained where appropriate.
2. Install specialist cables	2.1 Installations are made to specifications manufacturers' requirements and to safety and regulations and standard requirements.
	2.2 All cables are fixed to specifications
	2.3 All cables, wires, conductors and installations are marked/tagged and labelled to specification.
	2.4 All completed installations are tested for compliance.
	2.5 All reports, documentation are completed correctly to required specifications.
	2.6 Equipment and wiring are installed in a manner that does not reduce the type of protection afforded by the equipment design.
3. Connect electrical armoured cables	3.1 Terminations/connections are made to specifications, manufacturers' requirements and to safety and regulations and standard requirements.
	3.2 All brackets, clamps, holders etc. are adjusted and fixed to specifications.

3.3 All cables, wires, conductors and connections etc. are marked/tagged and labelled to specification.

3.4 All completed wiring and connections are tested for compliance with specifications.

3.5 All reports, documentation are completed correctly to required specifications.

RANGE STATEMENT

Work undertaken autonomously or as part of a team environment. Work undertaken in the field or workshop environment. Work undertaken in accordance with relevant regulations and standard specifications.

All testing undertaken on completed circuits where not connected to main supply using appropriate methods eg: continuity and resistance checks.

Specifications obtained from electrical/electronic circuit drawings, data sheets and manufacturers' manuals. Special fittings must be used for each type of specialist cable. The cables are often rigid and require the use of bending tools and techniques that do not deform the cable, thus causing damage to the insulation etc.

Also compounds such as resins may be required for seali ng purposes. Most types of specialist cable are designed to either exclude or minimise the ingress of gas or liquids, or to minimise the danger of flash. Termination and connection therefore requires particular techniques, and, in some cases testing.

All specifications and procedures are obtained from circuit drawings, data sheets, instructions and standard requirements.

Installation may include but not limited to:

- surface mount
- flush mount
- in PVC conduits up to 32mm
- in metal not exceeding 25mm
- using mechanical connectors

Termination and connection includes the utilisation of a range of methods including

- clamping
- pin connection
- soldered joints
- crimping
- plugs sockets
- clamping of cables and wires, sealing entry points where required

Types of joint may include:

- twist joints
- straight twist joints
- tee twist joints
- tee joints
- married joints
- straining point joints
- mechanical joints

All testing undertaken on completed circuits where not connected to main supply using appropriate methods include but not limited to:

- continuity and resistance checks.
- specifications obtained from electrical/electronic circuit drawings and data sheets

Specialist cables include, but not confined to:

- mineral insulate cables (MIMS)
- steel wire (SWA - normally described as steel Wire Armoured cables)
- other sheathed cables such as piloted cables, composite screened cables, braided cables
- cable installations requiring specialised glands, fittings and enclosures

Tools and equipment to include;

- combination pliers
- long nose pliers
- side cutting pliers
- solder ions
- crimping tools

Connection of wiring includes but is not limited to:

- termination and connection of cords
- termination and connection of cables
- excluding specialist cables, of all types, sizes and materials

Electrical services include but not limited to:

- power supplies
- control, wiring

EVIDENCE GUIDE

Competency is to be demonstrated by effectively terminating and connecting electrical wiring in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling recording and reporting associated with the termination and connection of electrical wiring, or other units requiring the exercise of the skills and knowledge covered by this unit.
Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to select and use appropriate tools and equipment
- demonstrate the ability to terminate and connect specialist cables
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures .

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Follow principles of Occupational Health and Safety (OH&S) in work environment
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMINS0011A Install terminate and connect electrical wiring

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures:
- standards of quality
- installation tools and equipment
- materials used in installation
- connection of cables
- bonding methods
- types of joints
- termination and connection methods
- installation methods

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- use soldering tools and equipment
- handle materials
- select material and supplies
- join specialist cables
- terminate specialist cables
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify supervisors/colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0092A: Install electrical/electronic apparatus, machinery, fixtures and secondary wiring

Competency Descriptor: This unit deals with the skills and knowledge required to install electrical/electronic machinery appliances fixtures and secondary wiring and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for installation	1.1 Installation is planned and prepared to ensure OH&S policies and procedures are followed.
	1.2 The work is appropriately sequenced in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Apparatus, machinery, fixtures and secondary wiring are checked against job requirements.
	1.5 Apparatus, machinery, fixtures and secondary wiring are obtained in accordance with established procedures and to comply with requirements.
	1.6 Location in which apparatus, machinery, fixtures and secondary wiring is to be installed is determined from job requirements.
	1.7 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.8 Tools, equipment and testing devices needed to carry out the installation work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.8 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.

2.	Install apparatus to prepared electrical panels	2.1	OH&S policies and procedures for installing electrical apparatus are followed.
		2.2	Apparatus are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		2.3	Variation to installation is carried out in accordance to customer/client requirements.
		2.4	Apparatus are terminated and connected in accordance with requirements.
		2.5	Unplanned events or conditions are responded to in accordance with established procedures.
		2.6	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.7	On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Install and connect motors and machines	3.1	OH&S policies and procedures for installing and connecting motors and machines are followed.
		3.2	Motors and machines are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		3.3	Motors are positioned and fixed according to the installation specification using safe and approved work methods to meet electricity regulatory requirement or other relevant codes.
		3.4	Variation to installation is carried out in accordance to customer/client requirements.
		3.5	Motors and machines are terminated and connected in accordance with requirements. (hold down bolts, couplings, pulleys, cable ends, suitable seals and shrouds).
		3.6	Unplanned events or conditions are responded to in accordance with established procedures.

		3.7	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		3.8	On-going checks of the quality of the work are undertaken in accordance with established procedures.
4.	Install and connect connectors and relays	4.1	OH&S policies and procedures for installing connect connectors and relays are followed.
		4.2	Connect connectors and relays are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		4.3	Variation to installation is carried out in accordance to customer/client requirements.
		4.4	Connectors and relays are installed and connected in accordance with requirements. (knock out holes, ends, cables, remote control circuits and interfacing circuits)
		4.5	Unplanned events or conditions are responded to in accordance with established procedures.
		4.6	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		4.7	On-going checks of the quality of the work are undertaken in accordance with established procedures.
5.	Install secondary wiring	5.1	OH&S policies and procedures for installing secondary wiring are followed.
		5.2	Secondary wiring is installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		5.3	Variation to installation is carried out in accordance to customer/client requirements.
		5.4	All apparatus are correctly identified and labelled appropriately. The wiring is routed neatly and tidily and allows for ease of repair or replacement of apparatus. Where appropriate, the wiring is safely anchored along route and at entry into equipment/apparatus.

		5.5	Unplanned events or conditions are responded to in accordance with established procedures.
		5.6	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		5.7	On-going checks of the quality of the work are undertaken in accordance with established procedures.
6.	Inspect and notify completion of work	6.1	Final inspections are undertaken to ensure the installed apparatus machinery, fixtures and secondary wiring conforms to requirements.
		6.2	Work is completed within acceptable time.
		6.3	Work area is left clean and tidy.
		6.4	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge.

Sources of information:

- working drawing/sketches
- oral/written work instruction
- relevant health and safety regulations
- manufacturers recommendations
- relevant technical information

Safety:

- personal safety
- IEE/IEEE regulation governing installation
- other relevant codes
- manual lifting and handling
- protective clothing
- relevant electrical and safety practices

Type of site/condition/structures:

- commercial
- farming-indoor and outdoor
- occupied, unoccupied
- walls,
- floors,

Electrical systems/ equipment/ components to include:

- range of starters
- contactors
- relays
- switch gears
- single and three phase-AC and DC All-not exceeding 440 volts

Apparatus to include:

- protection relays
- alarm devices
- control devices
- metering equipment
- current and potential
- transformers
- fixed voltmeter
- ammeters
- power factor regulators

Metering instrumentation to include:

- voltage,
- current
- resistance
- power factor
- reactance cycle
- speed
- energy
- fluid level sensing device
- triggering devices
- pressure sensing devices
- electronic sensing devices
- limit switch
- whole current
- wave form

Controllers/motors to include:

- control and instrumentation
- protection - distribution panels
- fuse panels
- fuses
- circuit breakers
- relays (current transformers and voltage transformers)
- earth leakage devices
- the range of AC and DC motors up to 25hp to include - 3 leads, 6 leads - star and delta connections
- pliers
- screwdrivers
- electric hand drill
- drill bits

Tools and equipment to include:

- appropriate electrical hand tools
- voltmeter
- ammeter
- ohmmeter
- tachometer
- lifting device
- spanners
- files
- spirit level
- knife
- wire stripper
- hole saw
-

Type of wiring/connection to include:

- P.V.C single core
- armoured to include - P.V.C., SWA,
- M.I.C.C, up to 440 volts
- twisting
- crimping
- clamping
- compression and non-compression
- mechanical
- switches
- isolators
- relays

Materials to include;

- appropriate size wire
- rawl bolts/shims
- screws
- nuts and bolts
- sheathed cable
- armoured cable
- multi-paired cable,
- P.V.C and coaxial
- mineral insulated
- fibre optic cables

Secondary wiring activities to include:

- Installing PVC and metal conduits and wiring circuits
- installing PVC SWA cables
- installing M.I.C.C. cables
- preparing and connecting circuit wires
- labelling cables and apparatus

Install and connect connectors and relays activities to include:

- measuring, marking, drilling,
- fitting and fixing panels and cases in position
- mounting and securing contactors and relays in position
- installing and anchoring cables
- routing, preparing and terminating wires to terminals

Install and connect motors, machines and apparatus activities to include:

- identifying types of motors, apparatus and machines
- boring, drilling and preparing base for installing motor
- fitting, aligning and securing motor to machine drive mechanism and base
- securing motor to pulley drive mechanism, clutch drive mechanism, straight drive mechanism and gear drive mechanism
- checking and identifying motor leads, connecting motor to circuit wires, testing and reversing motor rotation
- Fitting, aligning, fixing and securing ancillary apparatus in panels
- checking installed apparatus

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively install electrical/electronic apparatus, machinery, fixtures and secondary wiring.

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence; autonomously and to requirements. Equivalent evidence from other sources is also acceptable

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to Install apparatus to prepared electrical panels
- demonstrate correct procedures in Installing and connect motors and machines
- demonstrate correct procedures of installing and connect connectors and relays
- demonstrate correct procedures in Installing secondary wiring
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR01911A Use hand tools
- MEMFAB0011A Perform manual soldering/de-soldering - electrical/electronic components
- MEMINS0051A Install terminate and connect electrical wiring
- MEMMRD0161A Disconnect and reconnect fixed wired electrical machinery appliance and fixtures
- MEMMRD0181A Attach flexible cables & plugs to electrical machinery appliance and fixtures

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational Health and Safety regulations
- IEE/IEEE regulations
- basic tools/equipment for installing electrical/electronic apparatus, machinery, fixtures and secondary wiring
- electrical systems
- ancillary apparatus
- metering instrumentation
- controllers, contactors and relays
- type of wring and motor types
- anchoring/supporting methods
- The concept of work activities carried out in installing electrical/electronic apparatus, machinery, fixtures and secondary wiring
- writing basic English
- basic numeracy

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- install and connect connectors and relays
- installing secondary wiring
- Install apparatus to prepared electrical panels
- Installing and connect motors and machines
- handle materials
- select material and supplies
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0162A: Cut fit and install trunking systems

Competency Descriptor: This unit deals with the skills and knowledge required to effectively cut fit and install trunking systems associated with electrical installation instrumentation, refrigeration, plumbing and air conditioning systems or other related area in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan and prepare for installation	1.1	Installation is planned and prepared to ensure OH&S policies and procedures are followed.
	1.2	The work is appropriately sequenced in accordance with requirements
	1.3	Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4	Trunking are checked against job requirements.
	1.5	Trunking are obtained in accordance with established procedures and to comply with requirements.
	1.6	Location in which trunking are to be installed is determined from job requirements.
	1.7	Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.8	Tools, equipment and testing devices needed to carry out the installation work are obtained in accordance with established procedures.
	1.9	Tools, equipment and testing devices needed to carry out the installation work are checked for correct operation and safety.
	1.10	Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.

2.	Install trunking	2.1	OH&S policies and procedures for installing trunking are followed.
		2.2	Trunking are installed in accordance with requirements, without causing damage or distortion to the surrounding environment or services.
		2.3	Trunking are terminated and connected in accordance with requirements.
.		2.4	Unplanned events or conditions are responded to in accordance with established procedures.
		2.5	Approval is obtained in accordance with established procedures before any contingencies are implemented.
		2.6	On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Inspect and notify completion of work	3.1	Final inspections are undertaken to ensure the installed trunking conforms to requirements.
		3.2	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation.

In order to maintain currency in this unit on-going competency development is to occur. This would include keeping abreast of any changes in legislation, regulations, procedures, technology and the like related to the scope and application of this unit

Use identification and application of tools for:

- marking out
- measuring
- cutting
- shaping;
- drilling
- threading;
- tapping
- finishing
- dismantling
- assembling

Representative range of applications may include such things as

- apparatus
- circuits
- wiring systems
- plant,
- plugs
- lighting and switch boxes
- equipment
- tools
- accessories
- components
- meter panels
- draw boxes
- 24 way distribution panels

Fabrication techniques may include but not limited to:

- marking out
- cutting
- bending
- clamping
- plugging
- drilling/punching
- screwing/bolting
- cutting mitres
- adhesion
- concreting

Installation techniques:

- surface mount
- flush mount
- in PVC trunking up to 32mm
- in metal not exceeding 25mm
- on masonry
- on steel
- with clamps
- with saddles
- on walls
- on floors
- on roofs
- access ways
- wood

Tools/equipment to include:

- electric hand drill
- drill bits
- cold chisel & files
- ball pein hammer
- reamers
- benders
- hole saws
- hack saw
- screwdrivers
- spirit level
- pipe dies
- pipes- PVC/metal
- pipe vices
- ladders

Type of site and working conditions to include

- domestic new and existing
- at height
- in confined space
- temperature variation
- damp and wet conditions
- indoors and out doors

EVIDENCE GUIDE

Competency is to be demonstrated by effectively install trunking systems in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- Demonstrating consistent performance for each element of the unit in the related category and specialisation that is to be exhibited across a representative range of applications autonomously and to requirements.
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for each of the categories and areas of specialisation undertaken from those listed in the Range statement or Evidence guide
- demonstrating an understanding of the underpinning knowledge and skills identified for the categories and related specialisation undertaken in the section, of this unit titled 'Underpinning knowledge'

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to install trunking systems
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- plan tasks in all situations and review task requirements as appropriate;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Follow principles of Occupational Health and Safety (OH&S) in work environment
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMINS0051A Cut bend and install electrical conduits

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures:
- IEE/IEEE regulations and other relevant codes
- standards of quality
- installation tools and equipment
- materials used in trunking
- fabrication techniques
- installation techniques
- assembly/disassembly techniques

Skills
The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with electrically operated tools and equipment
- read and interpret simple freehand sketches
- measure accurately
- communicate effectively
- bend 90^0 ,and offsets in trunking
- cut, thread and ream trunking
- install PVC and metal trunking

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) The candidate will be required:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0172A: Prepare and install basic cable trays

Competency Descriptor: This unit deals with the skills and knowledge required to effectively prepare and install cable trays associated with electrical installation instrumentation, refrigeration, plumbing and air conditioning systems or other related area in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan and prepare for installation	1.1	Installation is planned and prepared to ensure OH&S policies and procedures are followed.
	1.2	The work is appropriately sequenced in accordance with requirements.
	1.3	Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4	Cable trays are checked against job requirements.
	1.5	Cable trays are obtained in accordance with established procedures and to comply with requirements.
	1.6	Location in which trunking are to be installed is determined from job requirements.
	1.7	Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.8	Tools, equipment and testing devices needed to carry out the installation work are obtained in accordance with established procedures.
	1.9	Tools, equipment and testing devices needed to carry out the installation work are checked for correct operation and safety.
	1.10	Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.

2.	Install cable trays	2.1	OH&S policies and procedures for installing cable trays are followed.
		2.2	Cable trays are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		2.3	Cable trays are terminated and connected in accordance with requirements.
		2.4	Unplanned events or conditions are responded to in accordance with established procedures.
.		2.5	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.6	On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Inspect and notify completion of work	3.1	Final inspections are undertaken to ensure the installed cable trays conforms to requirements.
		3.2	Work is completed within acceptable time.
		3.3	Work area is left clean and tidy.
		3.4	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation.

In order to maintain currency in this unit on-going competency development is to occur. This would include keeping abreast of any changes in legislation, regulations, procedures, technology and the like related to the scope and application of this unit

Use identification and application of tools for:

- marking out
- measuring
- cutting
- shaping;
- drilling
- threading;
- tapping
- finishing
- dismantling
- assembling

Fabrication techniques may include but not limited to:

- marking out
- cutting
- bending
- clamping
- plugging
- anchoring
- drilling/punching
- screwing/bolting
- cutting mitres
- adhesion
- concreting

Representative range of applications may include such things as

- apparatus
- circuits
- wiring systems
- plant,
- plugs
- lighting and switch boxes
- equipment
- tools
- accessories
- components
- meter panels
- draw boxes
- 24 way distribution panels

Installation techniques:

- surface mount
- flush mount
- in PVC trucking up to 32mm
- in metal not exceeding 25mm
- on masonry
- on steel
- with clamps
- with saddles
- on walls
- on floors
- on roofs
- access ways
- wood

Tools/equipment to include:

- electric hand drill
- drill bits
- cold chisel & files
- ball pein hammer
- reamers
- benders
- hole saws
- hack saw
- screwdrivers
- spirit level
- pipe dies
- pipes- PVC/metal
- pipe vices
- ladders

Type of site and working conditions to include

- domestic new and existing
- at height
- in confined space
- temperature variation
- damp and wet conditions
- indoors and out doors

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively prepare and install cable trays

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence; autonomously and to requirements. Equivalent evidence from other sources is also acceptable

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to prepare basic cable trays
- demonstrate correct procedures of installing prepared electrical panels in final location
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures:
- regulations and other relevant codes
- standards of quality
- installation tools and equipment
- materials used in installation
- materials used for cable trays
- fabrication techniques
- installation techniques
- assembly/disassembly techniques

Skills
The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with electrically operated tools and equipment
- read and interpret simple freehand sketches
- measure accurately
- communicate effectively
- fabricate 90^0 ,and offsets in cable trays
- install cable trays

(4) Resource Implications

The following resources should be made available:

- All tools, equipment, materials and documentation required.
- Any relevant workplace procedures.
- Any relevant product and manufacturing specifications.
- Any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0262A: Install distribution panels, metering sockets, terminal mains and meter earthing systems

Competency Descriptor: This unit deals with the skills and knowledge required to install distribution panels, metering sockets, terminal mains and meter earthing systems and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for installation	1.1 Installation is planned and prepared to ensure OH&S policies and procedures are followed.
	1.2 The work is appropriately sequenced in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Distribution panels, metering sockets, terminal mains and metering earthing systems are checked against job requirements.
	1.5 Distribution panels, metering sockets, terminal mains and metering earthing systems are obtained in accordance with established procedures and to comply with requirements.
	1.6 Location in which distribution panels, metering sockets, terminal mains and metering earthing systems are to be installed is determined from job requirements.
	1.7 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.8 Tools, equipment and testing devices needed to carry out the installation work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.9 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.

2.	Prepare electrical panels for fixing ancillary apparatus	2.1 OH&S policies and procedures for installing ancillary apparatus are followed.
		2.2 Apparatus are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		2.3 Variation to installation is carried out in accordance to customer/client requirements.
		2.4 Panels are prepared according to specifications and cut metal edges are filed or bushed to prevent damage to wiring or injury to personnel
		2.5 Unplanned events or conditions are responded to in accordance with established procedures.
		2.6 Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.7 On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Install prepared electrical panels in final location	3.1 OH&S policies and procedures for installing prepared electrical panels in final location are followed.
		3.2 Electrical panels are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
		3.3 Panel support is adequate, accurately and firmly fixed and free from vibration and positioned and fixed according to the installation specification.
		3.4 Building structure is prepared to receive panel without excessive damage.
		3.5 Hinged panel moves freely within prescribed limits.
		3.6 The panel door is accurately positioned, levelled and plumbed according to specification,
		3.7 Variation to installation is carried out in accordance to customer/client requirements.

		3.8 Unplanned events or conditions are responded to in accordance with established procedures.
		3.9 Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
4.	Inspect and notify completion of work	4.1 Final inspections are undertaken to ensure the installed apparatus machinery, fixtures and secondary wiring conforms to requirements.
		4.2 Work is completed within acceptable time.
		4.3 Work area is left clean and tidy.
		4.4 Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge.

Sources of information:

- working drawing/sketches
- oral/written work instruction
- relevant health and safety regulations
- manufacturers recommendations
- relevant technical information

Safety:

- personal safety
- IEE/IEEE regulations governing installation
- other relevant codes
- manual lifting and handling
- protective clothing
- relevant electrical and safety practices

Type of site/condition/structures:

- commercial
- farming-indoor and outdoor
- occupied, unoccupied
- walls,
- floors,

Apparatus and equipment to include:

- fixed ammeters
- voltmeters
- current and potential transformers

Types of panels:

- distribution, control, instrument, not exceeding 440 volts
- for fitting the range of ancillary - control, distribution and metering devices

Tools and equipment to include:

- pliers
- screwdrivers
- electric hand drill
- drill bits
- spirit level
- knife
- wire stripper
- hole saw

- pliers
- screwdrivers
- electric hand drill
- drill bits
- spirit level
- knife
- wire stripper
- hole saw

Type of wiring/connection to include:

- P.V.C single core
- armoured to include - P.V.C., SWA, M.I.C.C, up to 440 volts
- twisting
- crimping
- clamping
- compression and non-compression
- mechanical
- switches
- isolators
- relays

Materials to include;

- appropriate size wire
- rawl bolts/shims
- screws
- nuts and bolts
- sheathed cable
- armoured cable
- multi-paired cable,
- P.V.C and coaxial
- mineral insulated
- fibre optic cables

Secondary wiring activities to include:

- Installing PVC and metal conduits and wiring circuits
- installing PVC SWA cables
- installing M.I.C.C. cables
- preparing and connecting circuit wires
- labelling cables and apparatus

Install metering sockets, terminal mains and metering earthing systems activities to include:

- measuring, marking, drilling,
- fitting and fixing panels and cases in position
- mounting and securing contactors and relays in position
- installing and anchoring cables
- routing, preparing and terminating wires to terminals

Work activities to include:

- boring,
- filing/knocking-out access holes in panels
- fitting and securing bushings/glands to panels
- marking -out and drilling holes
- measuring and marking out locations for installing panels
- preparing locations (brackets, fixing holes, base etc.) for mounting panels
- mounting levelling, plumbing, aligning and securing panels in position

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively install distribution panels, metering sockets, terminal mains and metering earthing systems

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence; autonomously and to requirements. Equivalent evidence from other sources is also acceptable

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to prepare electrical panels for fixing ancillary apparatus
- demonstrate correct procedures Installing prepared electrical panels in final location
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Follow principles of Occupational Health and Safety (OH&S) in work environment
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMFAB0011A Perform manual soldering/de-soldering - electrical/electronic components
- MEMINS0051A Install terminate and connect electrical wiring
- MEMMRD0161A Disconnect and reconnect fixed wired electrical machinery appliance and fixtures
- MEMMRD0181A Attach flexible cables & plugs to electrical machinery appliance and fixtures

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational Health and Safety regulations
- IEE/IEEE regulations
- basic tools/equipment for installing electrical/electronic apparatus, machinery, fixtures and secondary wiring
- electrical systems
- ancillary apparatus
- metering instrumentation
- controllers, contactors and relays
- type of wring
- anchoring/supporting methods
- the concept of work activities carried out in demonstrating the correct procedures in installing prepared electrical panels in final location
- writing basic English
- basic numeracy

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- Install apparatus to prepared electrical panels
- demonstrate correct procedures Installing prepared electrical panels in final location
- handle materials
- select material and supplies
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0072A: Shut down/isolate machines/equipment

Competency Descriptor: This unit deals with skills and knowledge required to shut down/isolate machines/equipment and applies to individuals working in the metal engineering and maintenance trades.

Competency Field: Metal, engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Shut down machine/equipment	1.1 Machine/equipment operation and function are determined and understood.
	1.2 Shut down sequence is undertaken safely and to standard operating procedures.
	1.3 Machine/equipment are de-pressured/emptied/de-energised bled to standard operating procedures.
	1.4 Safe shut down of machine/equipment is verified.
	1.5 Safety/security lock off devices and signage are installed to standard operating procedure.
	1.6 Machine/equipment is left in clean and safe state.
2. Isolate machine/equipment	2.1 Machine/equipment operation and function are determined and understood.
	2.2 Isolation methods and points are recognised and identified.
	2.3 Isolation is undertaken safely and to standard operating procedures.
	2.4 Safe isolation of machine/equipment is verified.
	2.5 Safety/security lock off devices and signage are installed to standard operating procedure.
	2.6 Machine/equipment are left in clean and safe state.

RANGE STATEMENT

Shut down/isolation is undertaken autonomously or as part of team.

Machines/equipment range includes manual, semi automatic and automatic machines of a stand alone, continuous production or process nature.

Shut down/isolation means and includes isolation of mechanical, electrical drives, pipe-work (pressure) rotating equipment etc.

Shut down/isolation utilises electrical lock off isolators, mechanical and power driven valves etc. Relevant regulations, Standards and legislative requirements governing isolation and shutdown are complied with.

This unit requires system knowledge that excludes the straightforward starting/stopping of machinery/equipment through the use of simple switching, including use of emergency switches.

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively shutting down/isolating machines/equipment in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the isolation and shut down of machines and equipment or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to shut down/isolate machines equipment effectively
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication)
- MEMCOR0141A Follow principles of occupational health and safety (OH&S) in work environment
- MEMOR0161A Plan and undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- drawings, sketches and instructions
- machines/equipment range includes manual, semi automatic and automatic machines of a stand alone, continuous production or process nature
- equipment/machine systems being shut down/isolated
- basic electrical principles
- basic mechanical drives systems
- electrical lock off isolators
- mechanical and power driven valves etc.
- relevant regulations, standards and legislative requirements governing isolation and shutdown

Skills
The ability to:

- work safely to instructions
- communicate effectively
- interpret relative drawings and instructions
- shut down/isolate machines equipment

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0182A: Locate and repair/rectify basic electrical circuits and secondary wiring

Competency Descriptor: This unit deals with the skills and knowledge required to effectively locate and repair/rectify basic electrical circuits and secondary wiring and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan and prepare for repairs	1.1	Task are planned and prepared to ensure OH&S policies and procedures are followed.
	1.2	The work is appropriately sequenced in accordance with requirements.
	1.3	Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4	Electrical circuits and secondary wiring are checked against job requirements.
	1.5	Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.6	Tools, equipment and testing devices needed to carry out the repair work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.7	Preparatory work is checked to ensure that no unnecessary damage has occurred and complies with requirements.
2. Locate fault	2.1	Circuit/system function and characteristics are determined and understood by reference to circuit diagrams, and technical adviser.
	2.2	Built-in fault indicators, error codes examined and correctly interpreted and results recorded to standard operational procedures where appropriate.
	2.3	Circuit/s correctly isolated from power supply where appropriate.

		2.4	Faults are verified or localised using correct and appropriate techniques, procedures, tools and appropriate test equipment.
		2.5	Faults are recorded to standard operating procedures.
3.	Repair/rectify fault/s	3.1	Circuit/system is repaired, replaced or adjusted to specifications or manufacturer's requirements using correct and appropriate techniques, procedures, tools and equipment.
		3.2	Circuit/system is checked and tested using correct and appropriate techniques, procedures, tools and equipment for compliance with site or manufacturer's specifications.
		3.3	Repair/rectification are reported are recorded to standard operating procedures.
4.	Inspect and notify completion of work	4.1	Final inspections are undertaken to ensure the repairs to electrical circuit and secondary wiring conforms to requirements.
		4.2	Work is completed within acceptable time.
		4.3	Work area is left clean and tidy.
		4.4	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge.

Work undertaken autonomously or in a team environment using predetermined standards of quality, safety and work procedures.

Circuits and systems cover industrial control systems for supply, switching, lighting, motor control, etc. using AC and DC power supplies incorporating a range of components, e.g.: switches, fuses, circuit breakers, relays, transformers, regulators, motors, etc.

This may include controls or switching via contactors, relays, programmable controllers or other electronic switching devices.

Fault finding techniques may include testing for voltage, current, frequency, polarity, phase, circuitry continuity, insulation resistance, earth continuity etc.

Correct and appropriate tools and equipment may include continuity testers, ammeters, voltmeters, multimeters, tong testers, wattmeters, cathode ray oscilloscopes, etc.

A range of hand and hand held power tools such as pliers, screwdrivers, spanners, etc.

All specifications and procedures gained from schematics, circuit diagrams/drawings, engineering data sheets and manufacturers' handbooks.

All work and work practices undertaken to relevant statutory authorities where required.

Circuit can be defined as one made up of more than one interdependent circuit. A complex circuit is made up of more than one circuit, controlling and processing inputs or outputs.

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively fault find and repair/rectify basic electrical circuits and secondary wiring

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence; autonomously and to requirements. Equivalent evidence from other sources is also acceptable

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the fault finding of interconnected electrical circuits, or other units requiring the exercise of the skills and knowledge covered by this unit.

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to fault find basic electrical circuits and secondary wiring
- demonstrate correct procedures of repairing/rectifying secondary wiring
- demonstrate correct procedures in repairing/rectifying basic electrical circuits
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- hazards in the (electrical) work environment: shock hazards; fire hazards; chemical hazards
- hazardous areas
- special situations
- procedures for dealing with fires associated with electrical equipment
- procedures for dealing with related
- basic electrical circuit(s): source; control; protection; load
- circuit diagrams: symbols; conventions; interpretations; free sketches
- circuit connections and functions: open circuit; closed circuit; short circuit
- basic electrical measurement: use of multimeters; use of ammeter; use of voltage measuring and indicating devices; testing of measuring instruments; care of measuring instruments; voltage, current and resistance measurement; estimating values of voltage, current and resistance; using ohms law
- fundamental electrical concepts: effects of current; practical resistors; sources of emf; simple practical circuit; series, parallel and series-parallel circuits; electrical measurement; capacitors; inductors; magnetism
- insulation resistance measurement and requirements
- earthing principles and systems
- methods for testing insulation resistance; continuity of prospective earthing conductor; continuity between exposed conductive parts and the earthing system
- cable types and conductor termination methods and techniques: conductors solid, stranded and flexible; colour codes
- single and three phase systems and loads: number of active and live conductors required; line and phase voltage; typical loads
- general appliances: appliance identification; appliance ratings
- single and three phase induction motors: motor identification; motor ratings; direction of rotation
- single and three phase heaters: types of heaters; heater identification; heater ratings
- electrical distribution arrangement: power systems; within a premises; purpose of switchboards/distribution boards (residual current devices)
- circuit isolation and protection devices
- isolation procedures: work clearance; testing for voltage; lock-off and tagging; techniques, regulation, codes of practice and procedures
- disconnection procedures, practices and requirements
- replacement equipment
- reconnection procedures, practices and requirements

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- install apparatus to prepared electrical panels
- demonstrate correct procedures in fault finding and repairing/rectifying basic electrical circuits and secondary wiring
- handle materials
- select material and supplies
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0402A: Check/identify/isolate/rectify malfunctioning electrical machinery appliance and fixtures

Competency Descriptor: This unit applies to the skills and knowledge necessary to perform functional checks on machinery, appliance and fixtures in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for functional apparatus checks	1.1 Functional apparatus checks are planned and prepared to ensure OH&S policies and procedures are followed.
	1.2 The work is appropriately sequenced in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Functional apparatus checks are checked against job requirements.
	1.5 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.6 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.7 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.
2. Perform functional apparatus checks	2.1 OH&S policies and procedures for performing functional apparatus checks are followed.
	2.2 Functional apparatus checks are performed in accordance with requirements, without damage or distortion to the surrounding environment or services.
	2.3 Unplanned events or conditions are responded to in accordance with established procedures.

	2.4	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
	2.5	On-going checks of the quality of the work are undertaken in accordance with established procedures.
3. Inspect and notify completion of work	3.1	Final inspections are undertaken to ensure the functional apparatus checks conform to requirements.
	3.2	Work is completed within acceptable time.
	3.3	Work area is left clean and tidy.
	3.4	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation:

- computer systems
- electrical
- electronics
- refrigeration and air conditioning
- data communications

Sources of information:

- working drawing/sketches
- oral/written work instruction
- relevant health and safety regulations
- manufacturers recommendations
- relevant technical information

Safety:

- personal safety
- other relevant codes
- manual lifting and handling
- protective clothing
- relevant electrical and safety practices

Type of site/condition/structures:

- commercial
- farming-indoor and outdoor
- occupied, unoccupied
- walls,
- floors,

Electrical systems/ equipment/ components to include:

- range of starters
- contactors
- relays
- switch gears
- single and three phase-AC and DC all-not exceeding 440 volts

Apparatus to include:

- protection relays
- alarm devices
- control devices
- metering equipment
- current and potential
- transformers
- fixed voltmeter
- ammeters and power factor regulators

Metering instrumentation to include:

- voltage,
- current
- resistance
- power factor
- reactance cycle
- speed
- energy
- fluid level sensing device
- triggering devices
- pressure sensing devices
- electronic sensing devices
- limit switch
- whole current
- wave form

Controllers/motors to include:

- control and instrumentation
- protection - distribution panels
- fuse panels
- fuses
- circuit breakers
- relays (current transformers and voltage transformers)
- earth leakage devices
- The range of AC and DC motors up to 25hp to include - 3 leads, 6 leads - star and delta connections

Tools and equipment to include:

- pliers
- screwdrivers
- electric hand drill
- drill bits
- spirit level
- knife
- wire stripper
- hole saw
- appropriate electrical hand tools
- voltmeter
- ammeter
- ohmmeter
- tachometer
- lifting device
- spanners
- files

The following aspects must be demonstrated:

- prepare to disconnect electrical equipment
- disconnect electrical equipment
- check electrical equipment, appliance or fixture
- prepare to reconnect electrical equipment
- test the reconnected electrical equipment for safe operation
- provide status reports
- testing to ensure safety, including earth continuity and insulation integrity
- OH&S practice
- determining electrical characteristics of equipment
- identifying problem
- isolating equipment
- disconnection techniques
- selecting replacement equipment
- reconnection techniques
- applying techniques, procedures, information and resources relevant to performance

Electrical characteristics refers to:

- voltage
- current rating
- power rating
- direction of rotation
- phase sequence/polarity
- name plates information and duty

Electrical equipment refers to

- composite equipment
- pre-assembled
- control devices
- electrical heaters
- motors
- lighting

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively checking/identifying/isolating/rectifying malfunctioning electrical machinery appliance and fixtures.

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence; autonomously and to requirements. Equivalent evidence from other sources is also acceptable

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit.
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace.
- demonstrating an understanding of the underpinning knowledge and skills identified in the section, of this unit titled ‘Underpinning knowledge’.

During assessment the individual will:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to identify malfunctioning electrical machinery, appliance and fixtures
- demonstrate correct procedures of checking malfunctioning electrical machinery appliance and fixtures
- demonstrate correct procedures in isolating/rectifying malfunctioning electrical machinery appliance and fixtures
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMFAB0011A Perform manual soldering/de-soldering - electrical/electronic components
- MEMINS0051A Install terminate and connect electrical wiring
- MEMMRD0161A Disconnect and reconnect fixed wired electrical machinery appliance and fixtures
- MEMMRD0181A Attach flexible cables & plugs to electrical machinery appliance and fixtures

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- hazards in the (electrical) work environment: shock hazards; fire hazards; chemical hazards
- hazardous areas
- special situations
- procedures for dealing with fires associated with electrical equipment
- procedures for dealing with related
- basic electrical circuit(s): source; control; protection; load
- circuit diagrams: symbols; conventions; interpretations; free sketches
- circuit connections and functions: open circuit; closed circuit; short circuit
- basic electrical measurement: use of multimeters; use of ammeter; use of voltage measuring and indicating devices; testing of measuring instruments; care of measuring instruments; voltage, current and resistance measurement; estimating values of voltage, current and resistance; using ohms law
- fundamental electrical concepts: effects of current; practical resistors; sources of emf; simple practical circuit; series, parallel and series-parallel circuits; electrical measurement; capacitors; inductors; magnetism
- insulation resistance measurement and requirements
- earthing principles and systems
- methods for testing insulation resistance; continuity of prospective earthing conductor; continuity between exposed conductive parts and the earthing system
- cable types and conductor termination methods and techniques: conductors solid, stranded and flexible; colour codes
- single and three phase systems and loads: number of active and live conductors required; line and phase voltage; typical loads
- general appliances: appliance identification; appliance ratings
- single and three phase induction motors: motor identification; motor ratings; direction of rotation
- single and three phase heaters: types of heaters; heater identification; heater ratings
- electrical distribution arrangement: power systems; within a premises; purpose of switchboards/distribution boards (residual current devices)
- circuit isolation and protection devices
- isolation procedures: work clearance; testing for voltage; lock-off and tagging; techniques, regulation, codes of practice and procedures
- disconnection procedures, practices and requirements
- replacement equipment
- reconnection procedures, practices and requirements

Skills

The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- identify malfunctioning electrical machinery, appliance and fixtures
- demonstrate correct procedures of checking malfunctioning electrical machinery appliance and fixtures
- demonstrate correct procedures in isolating/rectifying malfunctioning electrical machinery appliance and fixtures
- handle materials/equipment
- select material and supplies
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0872A: Install and maintain electrical equipment

Competency Descriptor: This unit refers to the skills and knowledge required for the installation of electrical equipment including, but not limited to, rotating and static machines, appliances, luminaries and associated control equipment, but excludes H.V. equipment.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
	1.2	Occupational health and safety standards, statutory requirements are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications.
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.9	Work area is prepared in accordance with work requirements and site procedures.
	1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.

2.	Install the equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		2.2	Equipment is assembled, positioned and secured in accordance with appropriate plans, drawings and texts.
		2.3	Equipment is installed in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		2.4	Cables, wires and busbars are identified and appropriately labelled/colour coded in accordance with the work plan.
		2.5	Cables, wires and busbars are secured, glanded and terminated to appropriate specifications in accordance with the work plan.
		2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3.	Carry out maintenance	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		3.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan.
		3.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		3.4	Reset and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan.
		3.5	Maintenance and resets/adjustments are carried out, mindful of effects on, or unnecessary loss of, other equipment.
		3.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
4.	Complete the work	4.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
		4.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.

4.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.

4.4 Work completion details are finalised in accordance with site/enterprise procedures.

RANGE STATEMENT

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements

Equipment may include:

- AC motors
- Alternators
- DC motors
- Generators
- Pumps
- electro/mechanical motor starters
- low voltage transformers/switchgear and associated control panels
- motor operated valves
- hoists and cranes
- arc welders
- resistive heaters
- hot water units
- exhaust fans
- luminaries
- batteries
- metal detectors
- general low voltage lighting
- power circuits
- control/indication and alarm circuits
- electrical tools/appliances
- workshop machinery and compressors

Materials may include:

- masonry anchors
- bolts
- nuts
- washers
- screws
- rivets
- saddles
- clips
- brackets
- solvents
- adhesives
- insulation tapes
- heat shrink
- sleeving
- spiral binding
- cable ties
- solder
- lubricants
- oils, greases
- sealants
- lugs
- connectors
- terminal
- blocks
- cable markers and identification labels

Components may include:

- fuses/circuit breakers
- earth leakage breakers
- timers
- contactors
- contacts
- coils
- relays
- resistors
- ballasts
- capacitors
- solenoids
- overloads
- switches
- plugs
- busbar
- cable
- fans
- thermostats
- seals
- motor bearings and brushgear

Test and measurement instruments may include:

- tong testers
- insulation resistance/continuity tester
- multimeters

Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

Work site environment may be affected by:

- nearby plant or process, e.g. heat, noise, dust, oil, water and chemical

Isolations can refer to electrical/mechanical or other associated processes

Operating mechanisms may include:

- electrical solenoids
- electrical motorised
- spring assisted devices

Motors to include:

- shunt
- series
- compound wound
- squirrel cage
- slip ring
- single phase
- three phase induction
- variable speed commutator
- movable brush, gear type

Types of plant/ equipment may include:

- AC, DC motors - fixed and variable speed, including resistance and induction devices
- Sizes - ranges from fractional horse power to those working at voltages up to and including 415 volts, AC 250 VDC
- enclosure - Fan cooled, drip proof, totally enclosed fan cooled

Generators may include:

- DC up to and including 250 volt
- AC main generating sets up to 415Vwith hydrogen and water cooling systems

Starting systems to include

- direct on line star-delta
- auto-transformer
- primary resistor
- rotor resistor

Work processes for refurbishing/maintaining switchgear may include:

- determining job requirements
- reading and interpreting electrical diagrams
- selecting tools and equipment
- determining type of switchgear
- visually examining operating mechanism of switch gear
- identifying components of switchgear
- removing and replacing defective components of switchgears
- reassembling switchgears
- testing operation of switchgear
- preparing and updating service records
- cleaning and replacing lubricants

Work processes for refurbishing/maintaining motors may include:

- removing, lifting and handling motors
- dismantling motors
- repairing wire joints, terminations and terminals
- cleaning and applying insulating materials to motor winding
- removing and replacing bearings
- removing and replacing commutators and slip rings
- sanding, cleaning and polishing commutator and slip rings
- replacing brush gears; brushes and adjusting spring tension
- removing and replacing capacitors
- removing, replacing/repairing centrifugal switches
- testing current drawn by motor
- measuring terminal voltage
- measuring motor speed
- checking temperature of motor
- checking rotation of motor and reversing where appropriate
- listening to bearings and bushings for possible defects
- reassembling motors
- lubricating bearings, bushes, etc.

Work processes for servicing rotating electrical plant and equipment may include:

- reading and interpreting drawings and diagrams
- determining job requirements
- identifying and selecting tools and equipment
- identifying types of rotating electrical plant and equipment
- dismantling AC and DC motors
- dismantling AC and DC generators
- dismantling:
- direct on-line starters
- auto-transformer starters
- primary resistors starters
- rotor resistor starters
- re-establishing levels of insulation
- maintaining the effectiveness of continuity
- restoring surface finish to commutators and slip rings, bedding of brushes,
- restoring the effectiveness of enclosures
- cleaning component
- observations and measurements to include:
- measuring resistance of insulation
- measuring continuity of wires and cables
- assessing winding balance
- checking pressure and resistance of contacts
- checking condition of brushes, commutators and slip rings
- checking coil winding and winding security
- checking contactors and operating mechanisms
- checking terminals and terminations
- checking conductors
- checking circuit protection
- checking bearings and seals
- checking mechanical covers and fixing devices and slip rings

Work processes for servicing rotating electrical plant and equipment may include: (Cont'd)

- maintaining the effectiveness of component parts of cooling system
- maintaining the effectiveness of electrical components
- maintaining the effectiveness of bearings and seals
- replacing commutators and slip rings
- preparing surface finish of commutators and slip rings
- re-coating and baking coil windings
- replacing and bedding brushes
- replacing bearings, bushings and seals
- repairing/replacing cooling system components
- tightening fastening devices and terminations
- replacing brush holders and springs
- lifting and manipulating motors and generators
- mounting and securing motors and generators in position

EVIDENCE GUIDE

It is essential that competence is assessed in the critical aspects of the knowledge and application of relevant sections of occupational, health and safety guidelines, industry regulation, company/site safety procedures and company/site emergency procedures

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- attain electrical licence, where appropriate, deeming competency associated with electrical work
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to identify electrical equipment
- demonstrate correct procedures for checking electrical equipment
- demonstrate the ability to perform routine test on electrical equipment
- demonstrate correct procedures servicing electrical equipment
- demonstrate correct procedures for maintaining electrical equipment
- demonstrate correct procedures in removing and replacing electrical equipment components
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0051A Use graduated measuring devices
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry, IEE/IEEE standards
- equipment and material required to perform the work
- isolation procedures
- general layout of plant/work site and operation of its equipment
- installation requirements of the equipment
- electrical equipment
- regulatory aspects
- electrical fundamentals
- levelling and aligning procedures
- test and measurement instruments
- electrical installation practice
- circuit plan appreciation
- engineering and workshop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- apply relevant industry IEE/IEEE standards
- use and update plans
- drawings and text
- level and align
- use tools and relevant equipment
- use test and measurement instruments
- use correct termination procedures
- use correct installation procedures for the equipment
- identify and select materials for the job
- apply regulatory procedures
- communicate effectively
- apply data analysis techniques and tools

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of installation activities to which applicant has contributed, or worked on
- training courses on performing installation and maintenance of electrical equipment
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0892A: Install and maintain electronic electrical equipment and distribution circuits

Competency Descriptor: This unit refers to skills and knowledge required for the installation and maintenance of electronic electrical equipment containing solid state components, complex control panels and complex control equipment.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan and prepare for the work	1.1	Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
	1.2	Occupational health and safety standards, statutory requirements are identified, applied and monitored throughout the work procedure.
	1.3	Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4	Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications.
	1.6	Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8	Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.9	Work area is prepared in accordance with work requirements and site procedures.

		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2.	Install the equipment	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		2.2	Equipment is assembled, positioned and secured in accordance with appropriate plans, drawings and texts.
		2.3	Equipment is installed in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		2.4	Cables, wires and busbars are identified and appropriately labelled/colour coded in accordance with the work plan.
		2.5	Cables, wires and busbars are secured, glanded and terminated to appropriate specifications in accordance with the work plan.
		2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3.	Carry out maintenance	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		3.2	Equipment is maintained using appropriate plans, drawings and texts in accordance with the work plan.
		3.3	Equipment is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		3.4	Resets and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan.
		3.5	Resets and/or adjustments required are carried out to ensure equipment operates within requirements in accordance with the work plan.
		3.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.

4.	Complete the work	4.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
		4.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
		4.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
		4.4 Work completion details are finalised in accordance with site/enterprise procedures.

RANGE STATEMENT

Source of information:

- circuits diagrams
- schematic diagram
- manufacturer's technical information
- maintenance schedules
- service log
- oral/written work instructions

Equipment may refer to:

- PLCs
- I/O module
- VDUs
- soft start motor starters
- alarms
- stabilised power supply units and uninterrupted power supply units

Materials may refer to:

- insulation tapes
- heat shrink
- sleeving
- spiral binding
- cable ties
- solder
- lubricants
- oil, greases
- sealants
- lugs
- connectors
- terminal block
- cable markers and identification labels

Voltage range:

- Up to 451V AC
- 250V DC - line-to earth

Components may include:

- fuses/circuit breakers
- timers
- contactors
- contacts
- coils
- relays
- resistors
- inductors
- capacitors
- bridge rectifiers
- diodes
- heat sinks
- solenoids
- overloads
- plug in printed circuit boards
- switches
- plugs
- cable and thermistors

Test and measurement instruments may include:

- multimeters
- tong testers
- insulation resistance/continuity tester
- ductor tester
- overload injection tester
- growlers
- phase rotation tester
- cathode ray oscilloscope
- variac
- hand held programmer and frequency generator

Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

Protective clothing and safety devices:

coverall
safety boots
safety helmets
goggles
rubber mats
gloves
warning signs

Work site environment may be affected by:

- nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical

Isolations can refer to electrical/mechanical or other associated processes

Servicing and repairing distribution circuits may include:

- selecting tools and equipment
- setting up equipment
- examining circuits
- cleaning burnt/corroded contact points and components,
- applying lubricants
- re-tightening loosened parts
- replacing damaged or worn parts
- wiping and cleaning components
- isolating and testing devices
- analysing results
- recording and reporting cause of problems
- loosening/opening/removing fastening devices
- removing and replacing defective coil, springs wires etc.
- grinding and cleaning burnt or damaged contacts
- adjusting and resetting components
- replacing and tightening fastening devices
- cleaning system component
- testing insulation resistance
- measuring voltage
- measuring current
- testing for open and close circuit
- testing continuity of phase, neutral and earthing conductors
- testing for earth leakage

Servicing and repairing circuit protection devices may include:

- selecting tools and equipment
- setting up equipment
- examining circuits
- cleaning burnt/corroded contact point and components
- applying lubricants
- re-tightening loosened parts
- replacing damaged or worn parts
- wiping and cleaning components
- setting up instruments
- testing devices
- analysing results
- recording and reporting cause of problems
- testing instrument and safety devices
- loosening/opening/removing fastening devices
- removing and replacing defective parts and wires
- grinding and cleaning burnt or damage contacts
- adjusting and resetting components
- replacing and tightening fastening devices
- cleaning system component
- testing insulation resistance
- measuring voltage
- measuring current
- testing for open and close contact points
- testing continuity of phase(s), neutral and earthing conductors
- testing for earth leakage
- testing operation of triggering mechanisms - electromagnet thermal, electronic

EVIDENCE GUIDE

It is essential that competence is assessed in the critical aspects of the knowledge and application of relevant sections of occupational, health and safety guidelines, industry regulation, company/site safety procedures and company/site emergency procedures

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- attain electrical licence, where appropriate, deeming competency associated with electrical work
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to identify electronic electrical equipment
- demonstrate the ability to identify distribution circuits
- demonstrate correct procedures for checking equipment and distribution circuits
- demonstrate the ability to perform routine test on equipment and distribution circuits
- demonstrate correct procedures servicing equipment and distribution circuits
- demonstrate correct procedures for maintaining equipment and distribution circuits

Critical Aspects of Evidence (Cont'd)

- demonstrate correct procedures in removing and replacing equipment and distribution circuits components
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0051A Use graduated measuring devices
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry standards IEE/IEEE
- equipment and material required to perform the work
- isolation procedures
- general layout of plant/work site and operation of its equipment
- installation requirements of the equipment
- electrical equipment Regulatory aspects
- electrical fundamentals
- levelling and aligning procedures
- test and measurement instrument
- electrical installation practice
- circuit plan appreciation
- engineering and electronic workshop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- apply relevant industry standard IEE/IEEE
- use and update plans
- drawings and texts
- level and align
- use tools and relevant equipment
- use test and measurement instruments
- use correct termination procedures
- use correct installation procedures for the equipment
- identify and select materials for the job
- apply regulatory procedures; communicate effectively
- apply data analysis techniques and tools
- apply engineering and electronic workshop practices

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of installation activities to which applicant has contributed, or worked on
- training courses on performing installation and maintenance of electronic electrical equipment and distribution circuits
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMQUA0012A: Perform inspection (basic)

Competency Descriptor: This unit applies to the skills and knowledge necessary to perform basic inspection in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Inspect completed task	1.1 Job is tested for conformance to specifications in accordance with standard engineering/maintenance procedures.
2. Keep records	2.1 Test status identification is made on conforming and non-conforming products and records accurately kept using standard operating procedures.
3. Provide feedback	3.1 Job is tested/inspected/measured after rework or repair.
	3.2 Deficiencies or deviations are reported to standard operating procedures.

RANGE STATEMENT

This unit applies to those whose duties include the basic inspection of completed or partly completed engineering and maintenance task completed by others. These may include but not limited to:

- installation applications
- maintenance applications

Inspection is carried out in accordance to engineering/maintenance standards or specifications, and applies to a range of metal engineering and maintenance techniques. These may include but not limited to the use of:

- specialized tools/equipment
- measuring equipment/devices/tools

Inspection/verification process may include but not limited to:

- visual inspection
- daily maintenance checks
- production run
- in service test and monitoring

Inspection may involve "first piece inspection", fixed interval, sample etc. Depending on the inspection process other technical units may need to be accessed, for example, appropriate measurement units.

EVIDENCE GUIDE

This unit should be assessed in the workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the inspection process, or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to perform basic quality inspection
- demonstrate the ability to interpret instructions manuals quality specifications and/or technical drawings
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- plan tasks in all situations and review task requirements as appropriate;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0141A Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- task requirements
- work place operating procedures
- the use of work schedules, charts, work bulletins and memos
- basic inspection methods

Skills
The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions
- apply quality procedures
- read and interpret instructions manuals quality specifications and/or technical drawings
- plan a routine task
- undertake a routine task
- perform basic quality inspection

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities
Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMAH0073A: Purchase materials

Competency Descriptor: This unit applies to the skills and knowledge necessary to purchase materials in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Determine purchasing requirements	1.1 Consulted with client, customer or user as appropriate.
	1.2 Material specifications are determined from orders, instructions and/or technical drawings.
	1.3 Quantities, price limitations and delivery requirements are determined from orders/instructions.
2. Prepare purchase order/list	2.1 Purchase order/list is developed to standard operational procedure.
3. Purchase material	3.1 Standard operational procedures are followed.
	3.2 Supplier/vendor is informed of requirements and specifications.
	3.3 Purchasing schedules are adjusted where required to standard operational procedures.
	3.4 Appropriate paperwork/contracts are exchanged to standard operational procedure.
	3.5 Records/files are maintained accurately using standard operating procedures.

RANGE STATEMENT

Purchasing schedules developed to operating procedures and for pre-contracted suppliers/vendors.

Contracts/paperwork generated manually or electronically utilising on-site system.

Purchasing can cover one-off or multiple quantities of raw materials, components, equipment etc.

Purchasing specifications are determined from standard engineering drawings and data sheets, instructions written or verbal.

All work and work practices undertaken to regulations or standard requirements.

EVIDENCE GUIDE

Competency is to be demonstrated by purchasing materials within the range statement relative to the work orientation

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the purchasing of materials or other units requiring the exercise of the skills and knowledge covered other units requiring the exercise of the skills and knowledge.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0042A Interpret standard specifications and manuals
- MEMMAH0042A Order materials
- ICTCOR0011A Carry out data entry and retrieval procedures)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- written/oral communication techniques
- basic computation methods
- interpreting standard specifications and manuals
- documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate to ordering and purchasing of materials
- supplier/vendor/sources for required material
- purchase orders

Skills
The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- interpret orders, instructions manuals quality specifications and/or technical drawings
- purchase materials relevant to related area

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMPLN0063A: Coordinate and manage basic installation projects

Competency Descriptor: This unit applies to the skills and knowledge necessary to coordinate and manage basic installation projects in a wide range of different contexts in the metal engineering and maintenance industry

Competency Field: Planning

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare to manage projects	1.1 Management of projects OH&S policies and procedures are planned and prepared to ensure these are followed.
	1.2 Project schedules are managed in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure projects are managed effectively.
	1.4 Projects are managed against requirements.
	1.5 Contribution is made to determine human resource and procurement management plans for projects in accordance with established procedures and checked against requirements.
2. Manage projects	2.1 Mechanisms are used to measure, record and report progress of activities in relation to the agreed project schedules and plans.
	2.2 Projects are managed in accordance with established procedures and requirements to achieve designated objectives.
	2.3 Records and documentation of project activities are maintained in accordance with established procedures to facilitate quality management and to provide an audit trail.
	2.4 Results of project activities are documented and evaluated in accordance with established procedures to determine compliance with agreed quality standards.
	2.5 Shortfalls in quality outcomes are reported in accordance with established procedures to enable appropriate action to be initiated.

3.	Inspect and notify completion of work	3.1	Quality management issues and responses are reported in accordance with established procedures.
		3.2	Completion of projects are notified in accordance with established procedures.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation:

Project objectives may include:

- project manager responsibility
- behavioral aspect of project in terms of project personnel and coordinator
- work breakdown structure in coordinating projects
- tools and techniques for keeping the project on course
- pros and cons of working on projects

Nature of project may include:

- project plan
- project control
- project schedule (Gantt Chart/ Pert/CPM schedule network)
- the budget control

Projects may include:

- computer systems
- electrical equipment and systems
- electronics apparatus and systems
- instrumentation systems
- mechanical systems
- metal fabrication
- refrigeration and air conditioning systems

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of techniques to coordinate and manage basic installation projects within the range statement relative to the work orientation.

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit in the related category and specialisation which is to be exhibited across a representative range of applications; autonomously and to requirements
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for each of the categories and areas of specialisation undertaken from those listed in the Range statement or evidence guide
- demonstrating an understanding of the underpinning knowledge and skills identified for the categories and related specialisation undertaken in the section, of this unit titled 'Underpinning knowledge'

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- OH&S policies and procedures
- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- organizations policy and procedures
- project schedules
- mechanisms used to measure, record and report progress of activities in relation to the agreed project schedules and plans
- tools and techniques for keeping the project on course
- pros and cons of working on projects
- budget control

Skills
The ability to:

- listen effectively
- work safely to instructions
- convey information in simple English to invoke correct actions
- prepare project schedules
- perform project control activities
- Coordinate and manage basic installation projects

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication,

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both.

The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work.

The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

MEMPLN0113A: Plan for wiring and installation of electrical/ electronics machinery appliances and fixtures

Competency Descriptor: This unit applies to the skills and knowledge necessary to plan for wiring and installation of electrical/electronics machinery appliances and fixtures as required by engineering and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan and prepare to manage installation	1.1	Management of installation OH&S policies and procedures are planned and prepared to ensure these are followed.
		1.2	Installation schedules are managed in accordance with requirements.
		1.3	Appropriate personnel are consulted to ensure installations are managed effectively.
		1.4	Installations are managed against requirements.
		1.5	Contribution is made to determine human resource and procurement management plans for installation in accordance with established procedures and checked against requirements.
2	Plan and prepare for evaluation of electrical installation requirements	2.1	Drawings , blueprints , manuals and job sketches are obtained and interpreted
		2.2	Job location is examined in order to determine suitability and environmental condition.
		2.3	Occupational safety and Health requirements and also job hazards are identified
		2.4	Determine requirements of types , sizes and quantities of materials needed
		2.5	Determine tools , equipment and vehicles necessary to carry out the job
		2.6	Determine the levels and manpower requirements
		2.7	Determine the timeframe necessary to complete the job

		2.8	Provide reasonable accurate cost of labour/materials
		2.9	Identify source of materials and equipment.
3	Identify technical resources	3.1	Assist with the selection of Contractors/Workmen for the job.
		3.2	Assist with the interviewing and short listing of Contractors/Workmen
		3.3	Assist in conducting final interviews
		3.4	Assist with selecting the most suitable Contractor/Workmen
4	Obtain required work permit	4.1	Work policies and procedures are evaluated to ensure these instructions are followed.
		4.2	Permits are requested from appropriate personnel
		4.3	Permits are obtained from appropriate personnel

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of electrical installations in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with and Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Electrical installations to include:

- residential wiring
- commercial wiring
- industrial wiring
- installation of Motors
- installation of A.C. units
- appliance repairs
- trouble shooting
- installation repairs and modifications

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- various sizes of cables
- various types of cables
- various types of switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- knife
- wire stripper
- cable straps
- cable pins
- meter sockets
- distribution panels
- P.V.C. fittings
- Junction boxes
- Locknuts
- Connectors
- Insulating tapes
- protection controls
- nail bag
- shovels
- power saws
- power leads
- nails
- various types screw drivers
- nut and bolts
- rawl bolts
- wall bits

Tools and equipment to include:

- hammer
- spirit level
- various size spanners
- lifting device
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- lineman pliers
- side cutting pliers
- Amprobe meter
- Volt meter
- Ohmmeter

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- electrically insulated gloves, medium to high
- hard hat
- harness
- workman gloves

EVIDENCE GUIDE

This unit should be assessed in the workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

(1) Critical Aspects of Evidence

Competency is to be demonstrated by the co-ordination of activities, which result in determining the correct requirements for an electrical installation within a wide range.

It is essential that competence is observed in the following aspects:

- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within the context of determining and plan for electrical installation requirements
- identify and communicate location and details of electrical installation requirements .
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to determine and plan for electrical installation requirements to regulatory requirements
- demonstrate the ability to plan for wiring and installation of electrical/electronics machinery appliances and fixtures
- identify typical faults and problems that occur and necessary action taken to rectify them
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring
- advertising procedures
- contractor Listing
- electrical hardware
- industry work requirements

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of electrical wiring support system infrastructure
- communicate effectively
- conduct interviews
- communicate with media houses
- prepare reports
- short list Contractors
- make realistic and correct decision
- plan for wiring and installation of electrical/electronics machinery appliances and fixtures

(4) Resource Implications

The following resources should be provided:

- workplace location
- tools and equipment appropriate for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 3	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOM0023A: Perform internal/external customer service

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform internal/external customer service at the workplace, and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify customer requirements	1.1	Customer requirements are identified from verbal or written communication.
		1.2	Degree to which customer requirements can be met is clearly communicated including details such as cost, delivery date, quantity or quality.
		1.3	Alternatives are proposed for any inability to completely satisfy customer requirements.
2.	Action customer requirements	2.1	Appropriate action is taken to implement customer requirements.
		2.2	Customer requirements that cannot be met are recorded and followed up on.

RANGE STATEMENT

This unit covers the knowledge and skills required for the provision of assistance to internal/external customers across a range of products and services.

Situations covered would go beyond simple sales and enquiries and could include taking one-off or special orders requiring detailed descriptions or handling of complaints.

Customers liaison can be undertaken through telephone, written, e-mail or face to face contact.

Typical applications of this unit would be found in service and maintenance departments.

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively performing internal/external customer service duties in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with customer service or other units requiring the exercise of the skills and knowledge covered by this unit.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- organizations policy and procedures
- client services techniques
- the use of work schedules, charts, work bulletins and memos

Skills
The ability to:

- listen effectively
- work safely to instructions
- convey information in simple English to invoke correct actions
- perform internal/external customer service duties

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both.

The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work.

The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0093A: Plan and organise work

Competency Descriptor: This unit deals with the skills and knowledge required to effectively plan and organise tasks to be undertaken by the team and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify activity requirements	1.1	Instructions as to objectives and performance required are identified.
		1.2	Relevant specifications for activity outcomes are obtained, understood and where necessary clarified.
		1.3	Activity outcomes are identified.
		1.4	Activity requirements, including overall timeframe for activity, quality requirements and criteria for acceptable completion are identified.
2.	Plan process to complete activity	2.1	Based on instructions as to objectives, performance requirements and specifications, the individual components of the activity are identified and prioritised.
3.	Coordinate work	3.1	Permits are requested/received, interpreted, clarified and signed and conveyed to appropriate parties in accordance with enterprise procedures and job requirements
		3.2	Tasks are assigned and monitored to ensure compliance with plans, work requirements and enterprise procedures
		3.3	Work is conducted in accordance with sustainable energy principles
		3.4	Provision for the re-cycling or re-use of materials is undertaken where possible
		3.5	Job requirements are modified to meet unforeseen requirements, resources reallocated/rescheduled and the extent of change communicated promptly to all those affected in accordance with job requirements

4.	Modify plan	4.1	Plan if necessary may be modified to overcome unforeseen difficulties or developments that occur as work progresses.
5	Complete work	5.1	Finalisation of work and restoration of the site is monitored and ensured in accordance with enterprise procedures and job requirements
		5.2	Permits are signed off and appropriate parties are notified of work completion in accordance with enterprise procedures and job requirements
		5.3	Job records, costing data and necessary reports are prepared/finalised in accordance with enterprise procedures

RANGE STATEMENT

Instructions may include timeframe, quality requirements, outcome requirements and performance requirements. Instructions carried out in accordance with established procedures. However, the activities may require a response and modification of procedures or choice of different procedures to deal with unforeseen developments.

The activity may require prioritising of the individual components to facilitate the meeting of the objectives. Examples of activities to be planned may include: fault diagnosis and repair of an item of equipment, a modification of an established sequence of assembly tasks.

Activities are normally performed by the individual undertaking the planned activity and associated reports are completed as required. Instructions refer to either formal or informal information about the task required.

Planning will be related to familiar work tasks and environments and be performed to standard operating procedures.

Coordination issues may include team briefing, public notification, notice of intended work, safety coordination, fuel and rest stops, accommodation, liaison with other divisions/clients and preparing work plan

EVIDENCE GUIDE

Competency is to be demonstrated by individuals planning a complete activity in accordance with the performance criteria and as related to the work environment.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with other units addressing the safety, quality, communication, materials handling recording and reporting associated with hand forging or other units requiring the exercise of skills and knowledge covered by this unit.

During assessment the individual will:

- take responsibility for the quality of their own work
- carry out instructions in accordance with established procedures
- plan a complete task in accordance with standard principles
- coordinate a complete task in accordance with standard principles
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- quality systems in a workplace
- work planning and organisation theory
- team goals
- team resource acquisition processes and procedures
- Occupational health and safety
- enterprise permit procedures
- relevant plant and equipment
- relevant statutory requirements
- appropriate engineering and design practices and procedures
- enterprise recording procedures
- appropriate tools, equipment and materials required to do the work
- team communication process
- time management techniques

Skills
The ability to:

- develop and implement work plan
- co-ordinate/sequence work requirements
- assess team capabilities and capacities
- review job progress against agreed goals
- modify team work plan
- communicate information to others
- prepare and interpret work procedures
- estimate materials and resource requirements
- monitor team
- apply data analysis techniques and tools.

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of related activities to which applicant has contributed, or worked on
- training courses on material related to range of variables and or knowledge requirement.
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0103A: Maintain quality systems within a team

Competency Descriptor: This unit deals with the skills and knowledge required to effectively maintain quality systems within a team and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Formulate team aspects of the quality system	1.1	Team quality assurance requirements/targets are identified or modified from an analysis of enterprise needs
		1.2	Team performance indicators, identified during team consultations, are agreed or referred to the appropriate party for approval in accordance with job requirements
		1.3	Compatibility between total team and total individual indicators is effectively co-ordinated in accordance with job requirements
		1.4	Activity requirements, including overall timeframe for activity, quality requirements and criteria for acceptable completion are identified.
		1.5	Site and team quality systems documentation is obtained, edited and summarised as required and made available to all members in accordance with job requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified , where required, assist in the provision of the on-the-job training
2.	Facilitate team quality systems	2.1	Team members are provided with encouragement and training in team quality systems matters in accordance with job requirements
		2.2	The application of quality systems is monitored regularly both in the workplace and with customers in accordance with job requirements
		2.3	Instances of inability to satisfy key indicators are recorded, investigated and referred to team mechanisms and appropriate authorities for remedial in accordance with enterprise procedures

2.4 Quality systems are regularly reviewed with the team to ensure their currency and continuing relevance in accordance with enterprise procedures

2.5 Team quality systems records are maintained and made available to interested parties in accordance with enterprise procedures

RANGE STATEMENT

Instructions may include timeframe, quality requirements, outcome requirements and performance requirements. Instructions carried out in accordance with established procedures. However, the activities may require a response and modification of procedures or choice of different procedures to deal with unforeseen developments.

The activity may require prioritising of the individual components to facilitate the meeting of the objectives. Examples of activities to be planned may include: fault diagnosis and repair of an item of equipment, a modification of an established sequence of assembly tasks.

Activities are normally performed by the individual undertaking the planned activity and associated reports are completed as required. Instructions refer to either formal or informal information about the task required.

Planning will be related to familiar work tasks and environments and be performed to standard operating procedures.

Coordination issues may include team briefing, public notification, notice of intended work, safety coordination, fuel and rest stops, accommodation, liaison with other divisions/clients and preparing work plan

EVIDENCE GUIDE

Competency is to be demonstrated by individuals maintaining quality systems within a team in accordance with the performance criteria and as related to the work environment.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with other units addressing the safety, quality, communication, materials handling recording and reporting associated with hand forging or other units requiring the exercise of skills and knowledge covered by this unit.

During assessment the individual will:

- take responsibility for the quality of their own work
- carry out instructions in accordance with established procedures
- monitor and review quality systems
- maintain records and documentation
- plan a complete task in accordance with standard principles
- coordinate a complete task in accordance with standard principles
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- quality systems in a workplace
- work planning and organisation theory
- team goals
- team resource acquisition processes and procedures
- Occupational health and safety
- enterprise permit procedures
- relevant plant and equipment
- relevant statutory requirements
- appropriate engineering and design practices and procedures
- enterprise recording procedures
- appropriate tools, equipment and materials required to do the work
- team communication process
- time management techniques
- international standards related to quality
- industry standards related to quality
- quality management theory
- team quality systems and procedures including: responsibilities and prerogatives, documentation system including quality manual and quality plan, quality records processes, and achievement audits, elementary quality systems design processes
- communication procedures

Skills
The ability to:

- access, interpret and apply enterprise quality systems procedures and practices
- formulate elementary quality systems
- formulate quality practices for the team operations
- establish quality indicators for teams and site work
- conduct and analyse the results of quality systems audits
- co-ordinate the development and maintenance of team competency in quality systems
- co-ordinate the modification of team systems based on quality systems findings
- communicate effectively
- apply data analysis techniques and tools

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- present evidence of credit for any off-job training related to this unit.

Assessor must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of related activities to which applicant has contributed, or worked on
- training courses on material related to range of variables and or knowledge requirement .
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

All tasks involved must be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BSBFLM0023A Support leadership in the workplace

Competency Descriptor: This unit deals with the skills and knowledge required for the frontline supervisor to provide support for leadership in the workplace while working with teams and individuals.

Competency Field: Business Management Services

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Model high standards of management performance and behaviour	1.1 Management performance and behaviour meets the organisation's requirements.
	1.2 Management performance and behaviour serves as a positive role model for others.
	1.3 Performance plans are developed and implemented in accordance with the organisation's goals and objectives.
	1.4 Key performance indicators are established and used to meet the organisation's goals and objectives
2. Enhance the organisation's image	2.1 The organisation's standards and values are used in conducting business.
	2.3 Standards and values considered to be damaging to the organisation are questioned through established communication channels.
	2.3 Personal performance contributes to developing an organisation which has integrity and credibility.
3. Influence individuals and teams positively	3.1 Expectations, roles and responsibilities are communicated in a way which encourages individuals/teams to take responsibility for their work.
	3.2 Individual's/team's efforts and contributions are encouraged, valued and rewarded.
	3.3 Ideas and information receive the acceptance and support of colleagues.

4. Make informed decisions	4.1	Information relevant to the issue(s) under consideration is gathered and organised.
	4.2	Individuals/teams participate actively in the decision making processes.
	4.3	Options are examined and their associated risks assessed to determine preferred course(s) of action.
	4.4	Decisions are timely and communicated clearly to individuals/t eams.
	4.5	Plans to implement decisions are prepared and agreed by relevant individuals/teams.
	4.6	Feedback processes are used effectively to monitor the implementation and impact of decisions.

RANGE STATEMENT

The scope and context of this unit of competence allow for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Legislation, codes and national standards relevant to the workplace, which may include:

- award and enterprise agreements and relevant industrial instruments
- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- relevant industry codes of practice

NVQJ level 3, frontline management will normally be engaged in a workplace context where they:

- engage in short term planning within the department's business plans. For example, prepares a weekly schedule of outputs and/or outcomes to be achieved
- take responsibility for own outputs in work and learning. For example, assesses own performance and identifies the competencies which need to be upgraded/developed
- take limited responsibility for the output of others. For example, provides coaching support to assist individuals meet their performance requirements
- demonstrate some relevant theoretical knowledge. For example, explains the purpose of Key Performance Indicators to others
- perform a defined range of skills, usually within known routines, methods and procedures and within known time constraints. For example, provides services to internal customers within an agreed schedule

- apply known solutions to a variety of predictable problems. For example, within the or ganisation's standard procedures considers the options and, using some discretion and judgement, selects the preferred action to rectify faulty service to a customer
- interpret available information, using some discretion and judgement in work responsibilit ies. For example, interprets the continuous improvement processes, procedures and documentation used by the team and decides how to apply them to own work function

Frontline supervisor normally operate in a relatively simple and routine workplace enviro nment in which they use the organisation's:

- goals, objectives, plans, systems and processes
- business and performance plans
- access and equity principles and practice
- ethical standards
- quality and continuous improvement processes and standards
- defined resource parameters

Organisation's requirements will be

- expressed in written documentation and orally. They will normally be expressed in terms of goals, plans, processes and procedures. The requirements also include the culture and standards demonstrated by the organisation

The organisation's standards and values will be:

- stated or implied by the way the organisation conducts its business

Colleagues may include:

- team members, employees at the same level and more senior managers, and may include people from a wide variety of social, cultural and ethnic backgrounds

Feedback processes may be:

- formal or informal and may be from internal or external sources

OHS considerations may include:

- implement and monitor OHS procedures in area of responsibil ity
- leadership in OHS practice as an ethical standard
- OHS hazard identification, risk assessment and control approaches evident in decisions

EVIDENCE GUIDE

The critical aspects, underpinning knowledge and skills identified must be demonstrated to confir m competence for this unit.

(1) Critical Aspects of Evidence

- displays high standards of leadership
- demonstrates a positive influence on others
- uses effective consultative processes
- makes soundly researched decisions

(2) Pre-requisite Relationship of Units

Pre-requisites for this unit are:

- BSBCMN302A Organise personal work priorities and development
- BSBFLM304A Participate in work teams
- BSBFLM306A Provide workplace information and resourcing plans

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- the principles and techniques associated with:
  - leading people
  - preparing performance plans
  - establishing key performance
  - indicators
  - influencing others
  - establishing effective
  - consultative processes
  - making decisions
- the characteristics of a positive role model
- the types of actions which uphold the organisation's image

Skills

The ability to:

- use written and oral information about workplace requirements
- demonstrate communication skills including receiving and analysing feedback and reporting
- access and interpret the organisation's standards and values
- research and analytical skills to interpret data
- plan and organise to meet work priorities
- monitor and introduce practices to improve work performance
- influence colleagues positively
- use information systems to advantage
- use feedback to achieve positive outcomes
- use coaching and mentoring skills to provide support to colleagues
- relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities

(4) Resource Implications

The following resources should be provided:

- access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

- In order to achieve consistency of performance, evidence should be collected over a set period of time, which is sufficient to include dealings with an appropriate range and variety of situations

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statement

Assessment must take account of the endorsed assessment guidelines in the Business Services Competency Package

Assessment of performance requirements in this unit should be undertaken in an actual workplace or simulated environment

Assessment should reinforce the integration of the Critical Employability Skills and the Business Services Common Competencies for the particular NVQ Leve l.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0423A Diagnose and repair faults in electrical and electronic systems

Competency Descriptor: This unit refers to skills and knowledge required for the diagnosing and repairing of faults in electrical and electronic systems, and may involve the work to be carried out with systems online as applies to the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1 Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection
	1.2 Occupational health and safety standards, statutory requirements are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications.
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.

		1.9	Work area is prepared in accordance with work requirements and site procedures.
		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2	Verify the fault	2.1	Normal performance and function of the system is ascertained by consulting appropriate reference sources in accordance with the work plan.
		2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan
		2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3	Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements.
		3.3	System components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan.
		3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan.
		3.5	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of back-feed readings in accordance with the work plan.
		3.6	Test and measurement instruments are used in accordance with manufacturer's instructions and job requirements.
4	Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty systems as possible in accordance with the work plan.

		4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan.
		4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan.
5	Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan.
		5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan.
		5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan.
		5.6	All faults are repaired or rectified in accordance with the work plan.
		5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan.
6	Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
		6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
		6.3	Plant, tools and systems are maintained and stored in accordance with site/enterprise procedures.
		6.4	Work completion details are finalised in accordance with site/enterprise procedures.

RANGE STATEMENTS

Competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation. Candidate should be able to effect basic repairs to any one of the following systems.

- computer systems
- electrical appliance
- electronics appliance
- refrigeration and air conditioning control systems
- data communications systems

Systems, plant and/or equipment may include:

- high and low voltage switchboards/yards/ring mains
- supervisory, control and protection equipment
- circuit breakers, air, air blast, minimum oil, bulk oil, SF6, vacuum, transformers, oil natural air natural (ONAN), oil natural air forced (ONAF), oil forced air forced (OFAF), dry type, earthing and neutral, voltage and current
- isolators, load breaking, non-load breaking
- combined fuse switches (CFS), with or without contactor units
- low voltage equipment, fuses, mini circuit breakers, contactors
- switchboard/yard auxiliary supplies, control, supervision, protection, indication
- earthing systems, earthing circuit breakers, integral earths, earth switches
- portable earths and protection systems

Faults and abnormal operating conditions may include:

- switch yard protection operation
- switchboard protection operation
- transformer protection operation
- circuit/feeder protection operation
- transformer faults
- low oil level
- loss of fans/pumps
- circuit breaker faults
- loss of supervisory/control supplies
- low gas/oil/air pressure
- failure of pump/motors and fuse failure

Operating environment may be:

- during inclement or otherwise harsh weather conditions
- in wet/noisy/dusty/hot areas or during night periods

Test, fault finding and operating tools may include:

- voltage testers
- earth resistance tester
- power or hand tools
- multimeters
- various sizes screwdrivers
- various sizes spanners
- socket sets
- ball-pien hammer
- claw hammer
- lineman pliers

- wire stripper
- side cutting pliers
- bolt cutter
- level
- hack saw
- measuring tape
- knife

Materials may include :

- various sizes and types cables
- electrical accessories
- electrical fixtures
- electrical devices
- bolts
- screws
- fittings
- solvents
- conduits.

Safety standards may include:

- relevant sections of occupational health and safety legislation
- enterprise safety rules
- relevant state and federal legislation
- national standards for plant

EVIDENCE GUIDE

It is essential that competence is assessed in the critical aspects of the knowledge and application of relevant sections of occupational, health and safety guidelines, industry regulation, company/site safety procedures and company/site emergency procedures

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- attain electrical licence, where appropriate, deeming competency associated with electrical work
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to identify electrical/electronic components
- demonstrate correct procedures for checking electrical/electronic systems
- demonstrate the ability to perform routine test on electrical/electronic systems
- demonstrate correct procedures repairing electrical/electronic systems
- demonstrate correct procedures for diagnosing faults in electrical/electronic systems
- demonstrate correct procedures in removing and replacing electrical/electronic components
- give particular attention to safety and elimination of hazards

- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry standards
- equipment and material required to perform the work; Isolation procedures
- layout of plant/work site and operation of its equipment
- fault finding and diagnostic techniques repair techniques
- electrical/electronic systems; Regulatory procedures
- electrical principles
- test and measurement instruments Circuit plan appreciation
- engineering and workshop practice
- communication

Skill
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- apply relevant industry standards IEE/IEEE
- use and update plans, drawings and texts
- use tools and relevant equipment
- use test and measurement instruments
- verify and identify faults
- use appropriate fault finding and diagnostic techniques
- repair faults
- select materials for the job
- apply regulatory procedures
- apply electrical principles
- communicate effectively
- apply data analysis techniques and tools

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify supervisors or colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of related activities to which applicant has contributed, or worked on
- training courses on material related to range of variables and or knowledge requirement.
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with Work place procedures.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0663A Perform testing and inspection of electrical installations

Competency Descriptor: This unit applies to the skills and knowledge necessary to perform test and inspection in a wide range of electrical works in the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Test completed task	1.1	Conduct insulation resistance test in accordance with industry standards
		1.2	Conduct earth continuity test in accordance with industry standard
		1.3	Conduct verification of polarity test in accordance with industry standard.
		1.4	Conduct earth resistance test in accordance with industry standard
2	Inspect completed task	2.1	Fittings and fixtures are examined to ensure that they are mechanically and electrically sound
		2.2	Fittings and fixtures are of the correct type , material and size
		2.3	All electrical devices , fittings and fixtures are installed in accordance with approved standard
		2.4	Circuit breakers , fuses and all other protective devices are of the correct ratings and type
		2.5	Cables and conductors are of the correct size and type
		2.6	Terminations are electrically and mechanically sound and are in accordance with government approved standard

3	Prepare inspection reports	3.1	Prepare electrical inspection reports in accordance with standard specification and government regulations
		3.2	Reports are submitted to the required personnel , relevant department and relevant agencies
4	Keep records	4.1	Accurate records are kept at the appropriate location and are made accessible to the relevant personnel in accordance with job requirement
5	Provide feedback	5.1	Findings are reported to the relevant personnel , department /agencies and corrective actions if any, suggested

RANGE STATEMENTS

This unit applies to those whose duties include the inspection and testing of completed or partly completed electrical installation and maintenance tasks completed by others.

These may include but not limited to:

- installation applications
- maintenance applications

Inspection and testing is carried out in accordance to engineering/maintenance standards or specifications, and applies to a range of electrical installation and maintenance techniques.

These may include but not limited to the use of:

- specialized tools/equipment
- measuring equipment/devices/tools

Inspection/verification process may include but not limited to:

- visual inspection
- daily maintenance checks
- production run
- in service test and monitoring

Inspection and testing may involve "first piece inspection", fixed interval, sample etc. Depending on the inspection and examination process other technical units may need to be accessed, for example, appropriate measurement units.

EVIDENCE GUIDE

This unit should be assessed in the workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the inspection process or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to perform quality inspection
- demonstrate the ability to interpret instructions manuals quality specifications and/or technical drawings
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- plan tasks in all situations and review task requirements as appropriate;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures
- demonstrate the ability to perform quality testing

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- ability to perform advance calculations
- task requirements
- work place operating procedures
- the use of work schedules, charts, work bulletins and memos
- advance inspection methods
- Industry standards
- Types of protective devices
- Types of electrical tests

Skill
The ability to:

- work safely to instructions
- convey information in English to invoke correct actions
- apply quality procedures
- read and interpret instructions manuals quality specifications , technical drawings and blueprints
- plan a routine task
- undertake a routine task
- perform quality inspection
- perform quality testing
- read complex testing instruments
- prepare complex reports
- to speak clearly
- to read properly

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities
Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0673A: Coordinate the installation of electrical wiring support system infrastructure

Competency Descriptor: This unit covers the skills and knowledge required for the coordination of installation of electrical wiring support systems infrastructure as related to the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Job instructions/specifications accurately interpreted and purpose for carrying out the work is confirmed with the relevant personnel.
	1.2	Occupational Health & Safety requirements for workplace environment and installation of electrical wiring support system infrastructure recognised and communicated to work team(s).
	1.3	Site plans, electrical wiring support systems designs and drawings interpreted in accordance with IEE/IEEE and approved industry practices
	1.4	Work specifications interpreted in conjunction with drawings as necessary.
	1.5	Potential hazards identified from plans, drawings and specifications.
	1.6	Types, quantities and sizes of materials and components for the task are determined in accordance with standard specifications.
	1.7	Site information obtained as necessary. Potential hazards identified and prevention/control measures selected.
	1.8	Job method developed to include hazard prevention, control measures and safety procedures.
	1.9	Materials and components are inspected to ensure that there are no damages, corrosion or wear.

		1.10	Transporting of equipment, materials and tools co-ordinated and stored in sequenced to suit job method
2	Co-ordinate the installation of electrical wiring support system infrastructure	2.1	Appropriate action taken to ensure that the necessary isolation of electricity supply is carried out in accordance with approved standard
		2.2	Checks are carried out to ensure that safety procedures are implemented, including log – out , tag - out in accordance with approved standard
		2.3	Electrical wiring support system infrastructure components fixtures and equipment are installed in accordance with acceptable safe work practices, and approved electrical Standards.
		2.4	Electrical wiring support system infrastructure inspected for safety and compliance with design and approved standards.
		2.5	Checks carried out to ensure that site is left clear of all surplus components, equipment, tools and debris.
3	Co-ordinate cleaning-up	3.1	Instructions given/appropriate follow-up actions taken place to ensure: • Unused material stacked/stored for re-use. • Work area cleared. • Tools and equipment cleaned, maintained and stored.
		3.2	Waste disposal conforms to organisational and the relevant environmental regulations as required.

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to the range of electrical wiring support system infrastructures used in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Electrical wiring support system infrastructure and equipment type to include:

- trunking
- ducting
- cable trays
- cable rack
- conduit

.Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves
- cover hauls
- overhauls

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- metal brackets

Tools and equipment to include:

- hammer
- spirit level
- spanners
- lifting device (hoist)
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- nail bag
- shovels
- power saws
- power leads
- nails
- screw drivers
- nut and bolts
- rawl bolts
- wall bits

EVIDENCE GUIDE

Competency is to be demonstrated by the co-ordination of activities, which result in the installation of electrical wiring support system infrastructure within a wide range of electrical Installation and maintenance industry.

(1) Critical Aspects of Evidence

It is essential that competence is observed in the following aspects:

- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within context of installing of electrical wiring support system infrastructure
- identify and communicate location and details of installing electrical wiring support systems and infrastructure.
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to install electrical wiring support system infrastructure to regulatory requirements
- identify typical faults and problems that occur and necessary action taken to rectify same
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of electrical wiring support system infrastructure
- communicate effectively

(4) (4) Resource Implications

The following resources should be provided:

- workplace location
- Wiring support system infrastructure components appropriate for the tasks
- tools and equipment appropriate to for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria.

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skill

MEMMRD0683A: Coordinate the installation of electrical cable and accessories

Competency Descriptor: This unit covers the skills and knowledge require for coordinating the installation of electrical cable and accessories as related to the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Job instructions/specifications accurately interpreted and purpose for carrying out the work is confirmed with the relevant personnel.
	1.2 Occupational Health & Safety requirements for workplace environment and installation of electrical cable and accessories recognised and communicated to work team(s).
	1.3 Site plans, installation of electrical cable and accessories designs and drawings interpreted in accordance with IEE/IEEE and approved industry practices
	1.4 Work specifications interpreted in conjunction with drawings as necessary.
	1.5 Potential hazards identified from plans, drawings and specifications.
	1.6 Types, quantities and sizes of materials and components for the task are determined in accordance with standard specifications.
	1.7 Site information obtained as necessary. Potential hazards identified and prevention/control measures selected.
	1.8 Job method developed to include hazard prevention, control measures and safety procedures.
	1.9 Materials and components are inspected to ensure that there are no damages, corrosion or wear.

		1.10	Transporting of equipment, materials and tools co-ordinated and stored in sequenced , to suit job method
2	Co-ordinate the installation of electrical cable and fixture	2.1	Appropriate action taken to ensure that the necessary isolation of electricity supply is carried out in accordance with approved standard
		2.2	Checks are carried out to ensure that safety procedures are implemented, including log – out , tag - out in accordance with approved standard
		2.3	Installation of electrical cable, accessories and equipment are carried out in accordance with, acceptable safe work practices, approved electrical Standards.
		2.4	Installation of electrical cable and accessories inspected for safety and compliance with design and approved standards.
		2.5	Checks carried out to ensure that site is left clear of all surplus components, equipment, tools and debris.
3	Co-ordinate cleaning-up	3.1	Instructions given/appropriate follow-up actions taken place to ensure: • Unused material stacked/stored for re-use. • Work area cleared. • Tools and equipment cleaned, maintained and stored.
		3.2	Waste disposal conforms to organisational and the relevant environmental regulations as required.

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of the installation of electrical cables and accessories in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Electrical cables and accessories and equipment type to include:

- trunking
- ducting
- cable trays
- cable rack
- conduit
- various sizes of cables
- various types of cables
- switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- P.V.C. fittings
- Junction boxes
- Locknuts
- Circuit breakers

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves
- cover hauls
- overhauls

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- various sizes of cables
- various types of cables
- switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- P.V.C. fittings
- Junction boxes
- Locknuts
- Connectors
- Insulating tapes

Tools and equipment to include:
- hammer
- spirit level
- spanners
- lifting device (hoist)
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- lineman pliers
- side cutting pliers
- multi-meter
- Volt meter
- Ohmmeter
- Insulation resistance tester
- nail bag
- shovels
- power saws
- power leads
- nails
- screw drivers
- nut and bolts
- rawl bolts
- wall bits
- knife
- wire stripper
- cable straps
- cable pins

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Competency is to be demonstrated by the co-ordination of activities, which result in coordinating the installation of electrical cables and accessories within a wide range.

It is essential that competence is observed in the following aspects:
- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within context of coordinating the installation of electrical cable and accessories.
- identify and communicate location and details of coordinating the installation of electrical cable and accessories.
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to coordinate the installation of electrical cable and accessories to regulatory requirements
- identify typical faults and problems that occur and necessary action taken to rectify same
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of electrical wiring support system infrastructure
- communicate effectively

(4) Resource Implications

The following resources should be provided:

- workplace location
- electrical cables , accessories and components appropriate for the tasks
- tools and equipment appropriate to for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria.

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0693A: Coordinate the installation of electrical equipment, ancillary apparatus and secondary wiring

Competency Descriptor: This unit covers the skills and knowledge require for coordinating the installation of electrical equipment , ancillary apparatus and secondary wiring as related to the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1 Plan and prepare work	1.1 Job instructions/specifications accurately interpreted and purpose for carrying out the work is confirmed with the relevant personnel.
	1.2 Occupational Health & Safety requirements for workplace environment and installation of electrical equipment, ancillary apparatus and secondary wiring recognised and communicated to work team(s).
	1.3 Site plans, installation of electrical equipment , ancillary apparatus and secondary wiring designs and drawings interpreted in accordance with IEE/IEEE and approved industry practices
	1.4 Work specifications interpreted in conjunction with drawings as necessary.
	1.5 Potential hazards identified from plans, drawings and specifications.
	1.6 Types, quantities and sizes of materials and components for the task are determined in accordance with standard specifications.
	1.7 Site information obtained as necessary. Potential hazards identified and prevention/control measures selected.
	1.8 Job method developed to include hazard prevention, control measures and safety procedures.

		1.9	Materials and components are inspected to ensure that there are no damages, corrosion or wear.
		1.10	Transporting of equipment, materials and tools co-ordinated and stored in sequenced to suit job method
2	Co-ordinate the installation of electrical equipment , ancillary apparatus and secondary wiring	2.1	Appropriate action taken to ensure that the necessary isolation of electricity supply is carried out in accordance with approved standard
		2.2	Checks are carried out to ensure that safety procedures are implemented, including log – out , tag - out in accordance with approved standard
		2.3	Installation of electrical equipment, ancillary apparatus and secondary wiring components and equipment are carried out in accordance with acceptable safe work practices, and approved electrical Standards.
		2.4	Installation of electrical cable equipment, ancillary apparatus and secondary wiring inspected for safety and compliance with design and approved standards.
		2.5	Checks carried out to ensure that site is left clear of all surplus components, equipment, tools and debris.
3	Co-ordinate cleaning-up	3.1	Instructions given/appropriate follow-up actions taken place to ensure: • Unused material stacked/stored for re-use. • Work area cleared. • Tools and equipment cleaned, maintained and stored.
		3.2	Waste disposal conforms to organisational and relevant environmental regulations as required.

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of the installation of electrical equipment, ancillary apparatus and secondary wiring in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves
- cover hauls
- overhauls

Electrical equipment, ancillary apparatus and secondary wiring type to include:

- AC motors
- Alternators
- DC motors
- Generators
- Pumps
- electro/mechanical motor starters
- low voltage transformers/switchgear and associated control panels
- Electric toasters and toasters ovens
- Microwave ovens
- Gas appliances / apparatus
- House hold / freezing apparatus
- Dishwashers
- Laundry equipment
- Switching Circuits
- Lighting Circuits
- Power Circuits
- Motor Control Circuits

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- various sizes of cables
- various types of cables
- switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- P.V.C. fittings
- Junction boxes
- Locknuts
- Connectors
- Insulating tapes
- Circuit breakers

Tools and equipment to include:
- hammer
- spirit level
- spanners
- lifting device (hoist)
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- lineman pliers
- side cutting pliers
- multi-meter
- Volt meter
- Ohmmeter
- Insulation resistance tester
- nail bag
- shovels
- power saws
- power leads
- nails
- screw drivers
- nut and bolts
- rawl bolts
- wall bits
- knife
- wire stripper
- cable straps
- cable pins

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Competency is to be demonstrated by the co-ordination of activities, which result in the installation of electrical equipment, ancillary apparatus and secondary wiring within a wide range.

It is essential that competence is observed in the following aspects:
- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within the context of installing of electrical equipment , ancillary apparatus and secondary wiring
- identify and communicate location and details of installing electrical equipment, ancillary apparatus and secondary wiring.
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to install electrical equipment , ancillary apparatus and secondary wiring to regulatory requirements
- identify typical faults and problems that occur and necessary action taken to rectify same
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of electrical wiring support system infrastructure
- communicate effectively

(4) Resource Implications

The following resources should be provided:

- workplace location
- Installation of electrical equipment , ancillary apparatus and secondary wiring components and equipment appropriate for the tasks
- tools and equipment appropriate to for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria.

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0101A: Prepare basic engineering drawing

Competency Descriptor: This unit deals with the skills and knowledge required to effectively prepare basic engineering drawing, and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify drawing requirements	1.1	Requirements and purpose of drawing are determined from customer and/or work specification and associated documents.
		1.2	Identified and collected all data necessary to produce the drawing.
		1.3	Drawing requirements are confirmed with relevant personnel and timeframes for completion established.
2.	Prepare or make changes to engineering drawing	2.1	Drafting equipment selected are appropriate to the drawing method chosen.
		2.2	Drafting principles is applied to produce a drawing that is consistent with standard operating procedures within the enterprise.
		2.3	All work safely is undertaken to prescribed procedure
		2.4	Completed drawing is approved in accordance with standard operating procedures.
3.	Prepare engineering parts list	3.1	Components and parts are identified and organised by component type and/or in accordance with organisation/customer requirements.
4.	Issue drawing	4.1	Completed drawings and or parts lists are in accordance with standard operating procedures.
		4.2	Copied/issued approved drawings and or parts lists to relevant personnel in accordance with standard operating procedures.
		4.3	Approved drawings and or parts lists are stored and catalogued in accordance with standard operating procedures.

RANGE STATEMENT

This unit applies to any of the full range of engineering disciplines;

- mechanical
- electrical/electronic
- fabrication

Consultations may include reference to appropriate personnel including

- technical supervisory
- manufacturers
- suppliers
- contractors
- customers

Drawing records may include

- cataloguing
- issuing security classifications
- filing
- preparing
- distribution lists
- drawings

Specifications may be obtained from

- design information
- customer deals/concepts/expectations/requirements
- sketches
- preliminary layouts

Copies may be issued as:

- hard copy
- photographic
- slide or transparency form
- presentation
- a single drawing and/or
- with other drawings
- support documentation as a package

Drawing instruments and supplies:

- drafting kit/instruments
- blue prints
- drawings/modules/photographs

Geometric construction to include:

- circles
- regular polygons with four, seven and eight sides
- pentagon inscribed within measured circle
- ellipse
- triangles with specified angles
- arcs thru three points; tangent to two circles

Alphabet of line:

- object line
- hidden line
- centre line
- section line
- dimension
- extension line
- cutting line
- short break line
- phantom line

Multi-view (orthographic 2-D) drawings:

- full scale (1:1) orthographic 3-view drawing using third angle projection with top, front and right side view – show all hidden features and center lines

Pictorial (3-D) drawing to include:

- isometric corner with left and right side lines each 30 degrees up from horizontal and third line at a vertical, with all three lines joining in a common intersection
- full scale (1:1) basic isometric drawing

Dimension reading:

- dimensioning styles and methods: co-ordinate, linear/datum
- dimensioning 2-D drawing
- dimensioning complex shapes: spheres, cylinders, tapers, pyramids

EVIDENCE GUIDE

Competency is to be demonstrated by developing and effectively preparing basic engineering drawings in accordance with the performance criteria and the range listed within the range statement.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the preparation of basic engineering drawings or other units requiring the exercise of the skills and knowledge covered by this unit.

It is essential that competence is observed in the following aspects:

- prepare and understand various types of drawings
- prepare alphabet of lines, scales, lettering, dimensions, symbols, abbreviations and key features
- prepare title panel and reference date of drawings
- prepare basic engineering drawings

(2) Pre-requisite Relationship of Units

- MEMCOR0091A Draw and interpret sketches and simple drawings

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- types and use of drawing instruments and supplies
- identification of alphabet of lines, line type variation, order of usage and application on drawings
- types of scale and proportion and how they are used for measurement
- symbols, dimensions and terminology
- types of engineering drawings and their applications
- constructing plane geometry, loci and ellipse

Skills
The ability to:

- estimate measurements
- read and interpret working drawings
- prepare basic engineering drawing
- measure accurately
- communicate effectively

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency should be assessed in a classroom environment in accordance with work practices and safety procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyze and organize information	Level 1	
Communicate ideas and information	Level 1	
Plan and organize activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills

MEMCOR0121A: Classify engineering materials – (basic)

Competency Descriptor: This unit deals with skills and knowledge required to competently select and use appropriate metals for operations and procedures in the metal engineering and maintenance trades, and applies to individuals in the industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Distinguish between the characteristics of engineering materials	1.1	Identified the characteristics of engineering materials.
		1.2	Demonstrated knowledge of the effect external factors has on engineering metals.
2.	Distinguish between the characteristics of metals	2.1	Identified the characteristics of engineering metals.
		2.2	Compared the properties and characteristics of engineering metals.
		2.3	Demonstrated the ability to carry out testing methods for engineering metals.
		2.4	Demonstrated the ability to carry out heat treatment process.
3.	Identify and select engineering metals for specific applications	3.1	Identified common applications of engineering metals.
		3.2	Identified ferrous and non-ferrous metals according to specific requirements.

RANGE STATEMENT

This unit applies to the knowledge of and skills required to classify identify, select and use engineering materials for various procedures and operations in the engineering and maintenance field.

Materials may include both ferrous and non-ferrous metals, plastics ceramics and metal alloys

EVIDENCE GUIDE

Competency is to be demonstrated by classifying engineering in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, maintenance and fabrication associated with the use of materials in engineering operations or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to identify and compare the properties and characteristics of engineering metals
- demonstrate the ability to apply appropriate principles/techniques to identify materials
- demonstrate the ability to carry out specific heat treatment and testing procedures
- Take responsibility for the quality of their own work
- Perform all tasks in accordance with standard operating procedures

Use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR01311A Undertake interactive workplace communication
- MEMCOR0141A Follow principles of occupational Health and Safety (OH&S) in work place

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements and OH&S legislation
- properties and nature of materials
- properties of plastics and ceramics
- properties of metals
- heat treatment procedures
- material testing procedures
- engineering application of metals
- ferrous and non-ferrous metals

Skills
The ability to:

- work safely to instructions
- compare the properties and characteristics of engineering metals
- apply appropriate principles/techniques to identify materials
- select appropriate material for usage
- carry out specific heat treatment and testing procedures
- communicate effectively

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

ITICOR0011A: Carry out data entry and retrieval procedures

Competency Descriptor: This unit deals with the skills and knowledge required to operate computer to enter, manipulate and retrieve data and to access information and communicate via the Internet.

Competency Field: Information Technology and Communications - Operations

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Initiate computer system	1.1	Equipment and work environment are correctly checked for readiness to perform scheduled tasks.
		1.2	The hardware components of the computer and their functions are correctly identified.
		1.3	Equipment is powered up correctly.
		1.4	Access codes are correctly applied.
		1.5	Appropriate software is selected or loaded from the menu.
2.	Enter data	2.1	Types of data for entry correctly identified and collected.
		2.2	Input devices selected and used are appropriate for the intended operations.
		2.3	Manipulative procedures of Input device conform to established practices.
		2.4	Keyboard/mouse is operated within the designated speed and accuracy requirements.
		2.5	Computer files are correctly located or new files are created, named and saved.
		2.6	Data is accurately entered in the appropriate files using specified procedure and format.
		2.7	Data entered is validated in accordance with specified procedures.
		2.8	Anomalous results are corrected or reported in accordance with specified procedures.
		2.9	Back-up made in accordance with operating procedures.

3.	Retrieve data	3.1	The identity and source of information is established.
		3.2	Authority to access data is obtained where required.
		3.3	Files and data are correctly located and accessed.
		3.4	Integrity and confidentiality of data are maintained.
		3.5	The relevant reports or information retrieved using approved procedure.
		3.6	Formats to retrieved report or information conform to that required.
		3.7	Copy of the data is printed where required.
4.	Amend data	4.1	Source of data/information for amendment is established.
		4.2	Data to be amended is correctly located within the file.
		4.3	The correct data/Information is entered, changed or deleted using appropriate input device and approved procedures.
		4.4	The Integrity of data is maintained.
5.	Use document layout and data format facilities	5.1	Requirements for document are verified where necessary.
		5.2	The given format and layout are appropriately applied.
		5.3	Facilities to achieve the desired format and layout are correctly identified, accessed and used.
		5.4	Data manipulating facilities are used correctly.
		5.5	Format reflects accuracy and completeness.
6.	Monitor the operation of equipment	6.1	The system is monitored to ensure correct operation of tasks.
		6.2	Routine system messages are promptly and correctly dealt with.
		6.3	Non-routine messages are promptly referred in accordance with operating requirements.

		6.4	Error conditions within level of authority are dealt with promptly, and uncorrected errors are promptly reported.
		6.5	Output devices and materials are monitored for quality.
7.	Access and transmit information via the Internet	7.1	Access to the Internet is gained in accordance with the provider's operating procedures.
		7.2	Evidence of the ability to negotiate web sites to locate and access specified information and other services is efficiently demonstrated.
		7.3	E-Mail is sent and retrieved competently.
8.	Close down computer system	8.1	The correct shut down sequence is followed.
		8.2	Problem with shutting down computer is reported promptly.
		8.3	All safety and protective procedures are observed.
		8.4	The system integrity and security are preserved.
9.	Maintain computer equipment	9.1	Cleaning materials and/or solutions used meet specified recommendation.
		9.2	The equipment is cleaned as directed.
		9.3	Wear and faults identified are promptly reported to the appropriate personnel.

RANGE STATEMENT

This unit applies to activities associated with essential operations linked to using and maintaining basic computer equipment.

Equipment:

- install supplied computer
- install supplied peripherals

Work environment:

- equipment
- furniture
- cabling
- power supply

Input devices:

- keyboard
- mouse
- scanner
- microphone
- camera

Software systems to include for:

- word processing
- spread sheet
- internet access

Files save on:

- network
- magnetic media
- personal PC

Data:

- textual
- numerical
- graphical

File operations:

Naming, updating, archiving, traversing field and records in database, use of search, sort, print

Maintenance:

- cleaning: enclosures, screen, input devices, output devices
- checking cables, etc

EVIDENCE GUIDE

Competency is to be demonstrated by the ability to accurately carry out basic data entry and retrieval operations on a computer system in accordance with the performance criteria and the range listed within the range of variables statement .

(1) Critical Aspects and Evidence

It is essential that competence be observed in the following aspects:

- Initiate the use on the equipment.
- Use document layout and data format facilities.
- Locate and access data.
- Use file operations.
- Manipulate input devices.
- Key-in and format reports.
- Access to the internet.

(2) Pre-requisite Relationship of Units

The pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
knowledge of:

- safety for working with and around computers
- computer hardware and software systems
- procedure for initiating and closing down computer
- the operation of the data entry management system
- methods of locating files
- organisation's standards applicable to accessing files
- files operations and their applications
- file operation in database setting
- creating, locating and saving files
- using input devices
- using data checking devices
- formatting functions of software
- layout function of software
- graphic productions and manipulation
- regard for accuracy and security of information
- functions on the internet

Skills
The ability to:

- identify computer hardware
- manipulate data input devices
- access data
- use file operations
- key-in and format reports and letters
- retrieve data
- amend data
- print data
- save data
- search and receive data from the internet
- send and receive E-Mail

(4) Resource Implications

Files saved on network, magnetic media, personal Computer

Input devices: Keyboard, mouse, other selection devices

(5) Method of Assessment

Competency shall be assessed while work is undertaken under direct supervision with regular checks, but may include some autonomy when working as part of a team.

Competencies in this unit may be determined concurrently. Assessment must be in accordance with the performance criteria.

(6) Context of Assessment

This unit may be assessed on or off the job. Assessment should include practical demonstration either in the workplace or through a simulation. A range of methods to assess underpinning knowledge should support this

CRITICAL EMPLOYABILITYSKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level -	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level -	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0191A: Assemble & Disassemble scaffolding to enable access to the work area

Competency Descriptor: This unit deals with the skills and knowledge required to effectively assemble & disassemble scaffolding to enable access to the work area and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for the assembly and disassembly of scaffolding	1.1 Assembly and disassembly of scaffolding is planned and prepared to ensure OH&S policies and procedures are followed.
	1.2 The work is appropriately sequenced in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Scaffold assembly and disassembly is checked against job requirements.
	1.5 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.6 Tools and equipment needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.7 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.
2. Assemble and disassemble scaffolding	2.1 OH&S policies and procedures for assembly and disassembly of scaffolding are followed.
	2.2 Scaffold is assembled and disassembled in accordance with requirements, without damage or distortion to the surrounding environment or services.
	2.3 Unplanned events or conditions are responded to in accordance with established procedures.

		2.4	Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.5	On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Inspect and notify completion of work	3.1	Final inspections are undertaken to ensure the work conforms to requirements.
		3.2	Work is completed within acceptable time.
		3.3	Work area is left clean and tidy.
		3.4	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit applies to the erection of scaffolding up to 4m in height, which must be constructed in accordance with:

Personal protective equipment may include:

- overalls
- jacket
- boots
- hard hat
- safety glasses
- gloves
- ear plugs/muffs
- dust masks

The range of scaffolding equipment associated with this unit includes:

- standing prefabricated tower scaffolds
- tube and fitting scaffolds to 4 metres height
- fall protection devices
- catch platforms
- bracket scaffolds

Work is to be undertaken in accordance with standard regulatory and legislative requirements for Occupational Health and Safety. Work must be supervised and undertaken in a team situation. Supervision instruction may involve:

- verbal direction/instruction
- written instruction
- provision of sketch/drawing and details
- reports of faults may be verbal or written

Tools and equipment may include:

- spanners
- shovels
- hammers
- picks
- crow bars
- ladders

In order to maintain currency in this unit on-going competency development is to occur. This would include keeping abreast of any changes in standards, regulations, procedures, technology and the like related to the scope and application of this unit.

EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective erection and dismantling of different types of restricted height scaffolding listed within the range of variables statement relevant to the work orientation.

(1) Critical Aspects of Evidence

It is essential that competence is observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- indicate compliance with organizational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of process
- demonstrate safe and effective operational use of scaffolding tools and equipment
- erect scaffolding plumb and brace for stability
- interactively communicate with others to ensure safe and effective erection and dismantling operations

(2) Pre-requisite Relationship of Units

- MEMCOR00141A Apply principles of Occupational Health and Safety OH&S in work environment
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- OH&S procedures and codes of practice
- workplace and equipment safety requirements
- materials and materials handling
- vertical and horizontal concepts
- applications of standards, regulations, specifications, procedures and other installation requirements
- characteristics, capabilities, uses and limitation of the type of scaffolding being used
- environmental and site management *requirements*
- procedures for working at heights
- basic engineering principles related to scaffolding
- permitted clearances from energised conductors and equipment and *apparatus*
- selection and use of hand and power tools related to scaffolding
- engineering practices related to scaffolding
- communication principles
- inspection techniques
- lifting and slinging techniques

Skills
The ability to:

- work safely to instructions
- use hand tools
- handle material
- select material
- communicate effectively
- assemble & disassemble scaffolding to enable access to the work area apply basic engineering principles relating to scaffolding

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedures
- any relevant product and manufacturing specifications
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor
- identify colleagues who can be approached for the collection of competency evidence where appropriate
- present evidence of credit for any off-job training related to this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with workplace procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BSBSBM0012A: Craft personal entrepreneurial strategy

Competency Descriptor: This unit deals with the skills and knowledge required to craft an entrepreneurial strategy that fits with the attitudes, behaviours, management competencies and experience necessary for entrepreneurs to meet the requirements and demands of a specific opportunity.

Competency Field: Small Business Operations

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Demonstrate knowledge of the nature of entrepreneurship	1.1 Concepts associated with entrepreneurship are clearly defined.
	1.2 Factors which influence entrepreneurship in and outside of Grenada are correctly identified and explained.
	1.3 The importance of entrepreneurship to economic development and employment is explained clearly.
	1.4 The findings of research conducted on entrepreneurial ventures and successes in the Caribbean region are clearly presented in an appropriate format.
	1.5 Differences between wage employment and entrepreneurial ventures are correctly stated.
2. Identify and assess entrepreneurial characteristics	2.1 Relevant research is carried out and required entrepreneurial characteristics identified.
	2.2 Entrepreneurial characteristics identified are assessed and ranked.
	2.3 An understanding of the process and discipline that enable an individual to evaluate and shape choices and to initiate effective action is correctly demonstrated.
	2.4 Factors that will help an entrepreneur to manage the risk and uncertainties of the future, while maintaining a future orientated frame of mind, are identified.

3.	Develop self-assessment profile	3.1	Self-assessment tools/methods to identify personal entrepreneurial potential are identified and properly used.
		3.2	The ability to apply creativity, problem-solving techniques and principles to solve business related problems are demonstrated.
		3.3	Feedback from others for the purpose of becoming aware of blind spots and for reinforcing or changing existing perceptions of strengths/ weaknesses is appropriately obtained.
4.	Craft an entrepreneurial strategy	4.1	A profile of the past that includes accomplishments and preferences in terms of life and work styles, coupled with a look into the future and an identification of what one would like to do is developed.
		4.2	Commitment, determination and perseverance; orientation towards goals; taking initiative and accepting personal responsibility; recognizing management competencies and identifying areas for development are determined.
		4.3	Written guidelines to obtain feedback that is solicited, honest, straightforward, and helpful but not all positive or negative are developed to facilitate reviews.
		4.4	Framework and process for setting goals which demand time, self-discipline, commitment, dedication and practice are developed.
		4.5	Goals established are specific and concrete, measurable, relate to time, realistic and attainable.
		4.6	Priorities, including identifying conflicts and trade-offs and how these may be resolved are established.
		4.7	Potential problems, obstacles and risks in meeting goals are identified.
		4.8	Specified action steps that are to be performed in order to accomplish goals are identified.
		4.9	The method by which results will be measured is indicated.

4.10 Milestones for reviewing progress and tying these to specific dates on a calendar are established.

4.11 Sources of help to obtain resources are identified.

4.12 Evidence of the ability to review process and periodically revise goals is demonstrated.

RANGE STATEMENT

At this stage of the entrepreneurial process the entrepreneur must be able to conduct a self-assessment profile, examine the frame work for self assessment, develop a personal entrepreneurial strategy, identify data to be collected in the self-assessment process and learn about receiving feedback and setting goals.

Concepts associated to include:

- risk
- entrepreneurship
- macro-screening
- micro-screening
- competition
- wage employment

Influencing factors to include:

- market conditions
- markets – demand/supply
- global trends
- level of economic activities
- funding
- economic stability
- social stability
- resources availability

The entrepreneur must be able to:

- understand the extreme complexity in predicting or aligning him/herself to specific careers in an environment of constant change
- determine the kind of entrepreneur he or she wants to become based on attitudes, behaviours, competencies, experience and how these fit with the requirements and demands for a specific opportunity
- evaluate thoroughly his or her attraction to entrepreneurship
- effectively develop personal plan
- utilize available information that will enhance his or her ability to achieve success

The entrepreneur may encounter setbacks if the planning process is not effectively pursued.

Pitfalls may include:

- proceeding without effective planning which may result in commitment to uncertainty
- commitment to a premature path with the desirability of flexibility can lead to disaster
- personal plans fail for the same reasons as business plans including frustration if the plan appears not to be working immediately and the challenges of changing behaviour from an activity-oriented routine to one that is goal oriented
- developing plans that fail to anticipate obstacles, and those that lack progress milestones and reviews

EVIDENCE GUIDE

Competency is to be demonstrated when the entrepreneur is able to undertake a personal entrepreneurial assessment exercise to determine if he or she possesses the necessary credentials to be a successful entrepreneur. This stage of the entrepreneurial process is critical since experience has shown that the founder is one of the deciding forces if the venture is to succeed and prosper.

(1) Critical Aspects of Evidence

The entrepreneur will be assessed by his/her action in developing an orchestrated plan in order to effectively pursue the business concept.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- personal entrepreneurial profile systems
- effective management systems: marketing, operations/productions, finance, administration, law
- how to measure feedback
- the method of developing a personal plan
  and a business plan
- understanding the difference between entrepreneurial culture and management culture

Skills
The ability to:

- determine barriers to entrepreneurship
- minimize exposure to risk
- exploit any available resource pool
- tailor reward systems to meet a particular situation
- effectively plan and execute activities
- use computer technology to undertake assessments

(4) Resource Implications

The following resources should be made available:

Personal computer with access to the internet and appropriate software that will enable one to conduct the necessary analysis using the internet

(5) Method of Assessment

A useful method of assessment is to determine if the venture can stand up to the test of critical evaluation.

(6) Context of Assessment

This stage of the entrepreneurial process is assessed when comparisons are made between actual outcomes and plans/projections.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1	Level 2	Level 3
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 1	
Communicate ideas and information	Level 1	
Plan and organise activities	Level 1	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMAH0042A: Order materials

Competency Descriptor: This unit deals with the skills and knowledge required to effectively order materials relevant to related trade and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare purchase order/list	1.1 Purchase order/list is prepared to standard operating procedure.
	1.2 Material specifications, price limitations, quantities and delivery requirements are determined from instructions, requisitions etc.
2. Order materials	2.1 Supplier/vendor is informed of requirements and specifications according to standard operating procedure.
	2.2 Supplier/vendor orders are followed up to achieve delivery as required.
	2.3 Where appropriate, goods are directly received and checked for damage.
	2.4 Records/files are completed accurately according to standard operating procedure.

RANGE STATEMENT

Competency is to be demonstrated by effectively performing routine ordering of materials in accordance with the range listed within the range of variables statement.

This unit applies to purchasing activities carried out by other than the purchasing officer eg: maintenance, service, stores and warehouse personnel. The work is undertaken autonomously or as part of team.

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the ordering of materials or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to order materials as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0161A Plan and undertake a routine task
- ICTCOR0011A Carry out data entry and retrieval procedures

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- written/oral communication techniques
- basic computation methods
- documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate to ordering materials
- supplier/vendor/sources for required material
- purchase orders

Skills
The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- prepare order for materials

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit should be assessed on the job. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMINS0122A: Install below ground communication cables

Competency Descriptor: This unit applies to the skills and knowledge necessary to install below ground communication cables in a wide range of different contexts in the metal engineering and maintenance industry

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for installation	1.1 Installation is planned and prepared to ensure OH&S policies and procedures are followed, the work is appropriately sequenced in accordance with requirements.
	1.2 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.3 Components necessary for undertaking installation are checked against job requirements.
	1.4 Accessories are obtained in accordance with established procedures and to comply with requirements
	1.5 Location in which specific items of accessories, apparatus and circuits are to be installed is determined from job requirements.
	1.6 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.7 Tools, equipment and testing devices needed to carry out the installation work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.8 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.
2. Install below ground communications cables	2.1 OH&S policies and procedures for installing communication cable systems are followed.
	2.2 Below ground cables are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.
	2.3 Accessories are terminated and connected in accordance with requirements.

		2.4 Unplanned events or conditions are responded to in accordance with established procedures.
		2.5 Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.6 On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Inspect and notify completion of work	3.1 Final inspections are undertaken to ensure the installed wiring systems conforms to requirements.
		3.2 Work is completed within acceptable time.
		3.3 Work area is left clean and tidy.
		3.4 Work completion is notified in accordance with established procedures.

RANGE STATEMENT

In order to maintain currency in this unit on-going competency development is to occur. This would include keeping abreast of any changes in regulations, procedures, technology and the like related to the scope and application of this unit

Source of information:

- working drawings/sketches
- oral/written work instructions
- manufacturer's recommendations
- mechanical and manual aids
- inspection

Locations/conditions:

- trenches/ man hole and pit
- confined spaces
- elevated positions
- ground level
- wet and damp areas
- in and through concrete work
- road way and footway guarding

Tools and equipment to include:

- hand and power hack saws
- stock dies
- pipe threading machine
- wrenches
- cutters
- cold chisels
- soldering and brazing equipment
- wenches
- tube cutter
- flaring tool
- screwdrivers
- masonry trowel
- shovels
- pickaxes
- hand drills
- pipe reamers
- swaging tools
- files
- heavy duty hammer drill
- hammers

Work Activities may include:

- identifying cable types (optical fibre, plastic, lead, CATV, other);
- identifying cable details (size, type, depth, duct and cable, amplifiers, existing joints)
- labelling cable
- identifying features of ducts: capacity (number of cables and size)
- identifying types of ducts (concrete, plastic, earthen ware, metallic)
- maintenance of working environment
- providing temporary cables/services

Hazards:

- dangerous gases
- toxic fumes
- sharp edges
- ventilation

Underground construction:

- man hole and pit
- location
- capacity
- purpose
- duct seal
- conduit

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively installing below ground communication cables.

Competency will be determined on evidence of having consistently performed across a representative range of applications which includes such things as apparatus, circuits, wiring systems, plant, equipment, tools, accessories, components and the like relative to that required for the category undertaken within and relevant to this unit of competence; autonomously and to requirements. Equivalent evidence from other sources is also acceptable.

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to plan for the installation of below ground communication cables
- demonstrate correct procedures in installing below ground communication cables
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR01911A Use hand tools
- MEMFAB0011A Perform manual soldering/de-soldering - electrical/electronic components
- MEMINS0051A Install terminate and connect electrical wiring

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- safety and work procedures:
- standards of quality
- communication cable installation tools and equipment
- communication cable installation techniques
- fittings and types systems
- use and selection of appropriate tools, materials and supplies
- working conditions
- Telecommunications underground cabling.

Skills
The ability to:

- work safely to instructions
- select and use appropriate tools and equipment
- Install below ground communication cables
- demonstrate correct procedures in planning for the installation of below ground communication cables
- select material and supplies
- apply quality assurance

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

This unit may be assessed on the job, off the job, or a combination of both. The competencies covered by this unit would be assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0132A: Use Industrial Instrumentation measuring devices

Competency Descriptor: This unit deals with the skills and knowledge required to use industrial instrumentation measuring devices and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Use equipment for measurement	1.1	Specifications are interpreted accurately from drawings instructions.
		1.2	Appropriate equipment are selected to achieve specified outcome.
		1.3	Correct and appropriate measuring technique is used.
		1.4	Readings and measurements are interpreted correctly and accurately.
2	Set measuring devices	2.1	Equipment is set up to specifications utilising manufacturers or standard operating techniques.
3	Maintain measuring equipment	3.1	Measuring equipment are adjusted and maintained to required accuracy, utilising manufacturer's specifications or standard operating techniques.
		3.2	Care and storage of equipment is undertaken to manufacturer's specifications or standard operating procedures.

RANGE STATEMENT

Work undertaken autonomously or as part of team environment. Work undertaken in field and/or workshop/laboratory environment.

This unit covers the definition of what needs to be measured, the selection of appropriate measuring devices and calibration and care of devices to obtain accurate, precision measurements.

Precision measuring/test equipment may include analog and digital meters, cathode ray oscilloscope, bridges and potentiometers, wattmeters and digital probes etc.

All specifications can be obtained from circuit drawings, engineering data sheets and/or manufacturer's instructions/data.

All measurement test procedures undertaken to standard operating procedures or manufacturer's recommended procedures. All work and work practices undertaken to standard requirements.

Measurements may include:

- peak and transient voltages
- transient frequencies
- digital wave form analysis etc

Measurements include a range of frequencies and may be undertaken on full range of electrical /electronic equipment including:

- A.C.
- D.C.
- analog and digital equipment
- microwave

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of electrical/electronic measuring devices in accordance with the range listed in the range of variables statement, relevant to the work orientation.

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with precision electrical/electronic measurement or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to measure and calculate manually
- demonstrate the ability to operate electrical/electronic measuring devices
- demonstrate the ability to record measurement
- take responsibility for the quality of their own work
- perform all related tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0071A Use electrical/electronic measuring devices

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- comparison measurements
- comparison devices
- comparative measurements
- measuring devices
- precision electrical/electronic measurements
- drawings and specifications
- writing basic English
- basic mathematical computations
- common terminology and engineering safety requirements
- types of non-specialist/specialist precision measuring equipment and their applications
- relevant occupational health and safety regulations/requirements, equipment, material and personal safety requirements
- knowledge of measuring procedures
- measuring equipment maintenance procedures.
- knowledge of reporting procedures.

Skills
The ability to:

- work safely to instructions
- use power tools and hand tools
- select equipment
- apply quality assurance
- read and interpret drawings and specifications
- measure and calculate manually
- record measurement
  operate precision electrical/electronic measurement calculating devices

(4) Resource Implications

The candidate will be provided with:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

(5) Method of Assessment (Cont'd.)

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of installation activities to which applicant has contributed, or worked on
- training courses on performing activities as listed in the range of variables
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge. The candidate will have access to: - All tools, equipment, materials and documentation

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 1	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0063A: Attend to breakdowns in hazardous areas

Competency Descriptor: This unit applies to the skills and knowledge necessary to attend to breakdowns in hazardous areas in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare to attend breakdown	1.1	Nature of the breakdown is confirmed with appropriate personnel to establish the need to enter the hazardous area.
		1.2	Safety plan to enter the hazardous area is established in accordance with established procedures and
		1.3	Relevant clearance to do the work is obtained.
		1.4	Testing devices and tools, anticipated as being needed for the work, are obtained and checked for correct operation and safety.
2.	Evaluate extent of work	2.1	OH&S policies and procedures for working in a hazardous area are followed.
		2.2	Other personnel required to determine cause and rectify breakdown is ascertained from available evidence and arrangements made for their attendance where applicable.
		2.3	Extent of repair work is ascertained from available evidence and confirmed with appropriate personnel.
		2.4	Limits of repair work that can be carried out in-situ are established with regards to explosion risk and in accordance with established procedures and requirements.
3.	Arrange repair work	3.1	Equipment is isolated in accordance with established procedures.
		3.2	Circuits of equipment being withdrawn from service are terminated or isolated safely and in manner approved for the classification of the area.

		3.3	Certification documentation for replacement equipment is sighted to ensure that it is identical with the equipment it replaces and is in accordance with the explosion-protection system design.
4	Confirm completion	4.1	Explosion-protected equipment and systems are inspected and tested after repairs are completed to ensure the integrity of the system.
		4.2	Appropriate personnel are notified of the completion of the repair work and details are documented in accordance with established procedures and requirements.

RANGE STATEMENT

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation.

In order to maintain currency in this unit on-going competency development is to occur. This would include keeping abreast of any changes in standards, regulations, procedures, technology and the like related to the scope and application of this unit

Source of information:

- Working drawings/sketches
- Oral/written work instructions
- Maintenance schedules
- Maintenance records

Locations/conditions:

- trenches
- confined spaces
- elevated positions
- hot cold
- damp and wet situations

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively attending to breakdown in hazardous areas in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit.
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace.
- demonstrating an understanding of the Underpinning knowledge and skills identified in the section, of this unit titled 'Underpinning knowledge'.

Competence must be demonstrated in relation to the technique for which competency is sought. It is essential that working safely in a potentially hazardous area is demonstrated in relation to:

- work permits and clearance
- hazard monitoring and evacuation procedures
- plant and electrical isolation
- evaluating extent of breakdown
- interpreting certification documentation in relation to repair and replacement
- following established breakdown procedures

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to attend to breakdown in hazardous areas as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0141A Follow principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0191A Use hand tools
- MEMCOR0062A Attend to break down

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Safe working requirements and procedures
- definition of a hazardous area;
- conditions that lead to an explosion meaning of the terms "combustion", "detonation" and "propagation"
- OH&S responsibilities;
- parties responsible for safety of hazardous areas;
- definition of classes and zones
- combustible properties of materials
- electrical protection devices
- temperature limitations of wiring and equipment
- limitations on non-metallic and specific alloy enclosures
- requirements for detailed initial/sample and close/visual inspections standards and procedures for terminating and connecting cables
- standards and requirements for the installation of equipment and wiring
- selection and application of sealing compounds
- standards for wiring systems in hazardous areas
- arrangements for approval for use of equipment in a hazardous area

Skills
The ability to:

- use company documentation and record systems including the use of computers, information systems and business equipment technologies
- operate plant and equipment associated with a given workplace
- attend to breakdown as related to the metal engineering and maintenance industry
- identify classes, zones and groups characteristics of a hazardous areas
- Identify the responsibilities of OH&S
- Attend to breakdowns in hazardous areas efficiently.

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities.

(6) Context of Assessment

Competency will be determined on evidence of having consistently performed across a representative range of activities and where required support the outcomes of other units within a qualification structure.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMCOR0013A: Assist in the provision of on the job training

Competency Descriptor: This unit applies to the skills and knowledge necessary to assist in the provision of on the job training in a wide range of different contexts in the metal engineering and maintenance industry

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan for delivery of on-the-job training	1.1	Objectives of training and competency to be achieved are identified.
		1.2	Role in provision of training is clarified.
2.	Deliver on-the-job training	2.1	Training objectives are explained to trainee.
		2.2	Training is carried out using appropriate techniques.
		2.3	Trainee progress is monitored and constructive feedback provided to trainee.
3.	Review training program	3.1	Training program is evaluated according to standard operating procedure.
		3.2	Training data is recorded according to standard operating procedure.
		3.3	Training is reported on according to standard operating procedure.
		3.4	Training is promoted according to standard operating procedure.

RANGE STATEMENT

Training is delivered in a one-to-one or small group situation.

The training may be structured or informal and based on co-operation between trainer and other training personnel.

The training covers both underpinning knowledge and practical skills.

Training may be applied to technical, orientation, OH&S, or other areas.

Techniques that could be used as the subject of training includes but is not limited to:

- sketches
- drawings
- charts and maps
- logical presentation
- feedback
- production schedules
- written machine or job instructions
- client instructions
- signage
- memos
- work schedules/work bulletins
- explanation
- sound communication methods
- demonstration/practice

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively assisting in the provision of on the job training in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

This unit should be assessed in conjunction with other specialisation or core units and not in isolation. The assessment should be linked with performance of normal workplace activities where the competency covered by this unit is demonstrated concurrently with other core or elective competencies. The communication tasks may be related to any aspect of the job, interacting with team members, receiving instructions, reporting and any other activity that requires communication with individuals or groups.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to assist in the provision of on the job training as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A undertake interactive workplace communication

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- the use of work schedules, charts, work bulletins and memos

Skills
The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions
- assist in the provision of on the job training

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities

(6) Context of Assessment

Competency will be determined on evidence of having consistently performed across a representative range of activities and where required support the outcomes of other units within a qualification structure

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0703A: Co-ordinate the installation of substation plant and apparatus

Competency Descriptor: This unit covers the skills and knowledge require for coordinating the installation of substation plant and apparatus as related to the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1 Plan and prepare work	1.1	Job instructions/specifications accurately interpreted and purpose for carrying out the work is confirmed with the relevant personnel.
	1.2	Occupational Health & Safety requirements for workplace environment and installation of substation plant and apparatus recognised and communicated to work team(s).
	1.3	Site plans, installation of substation plant and apparatus designs and drawings interpreted in accordance with IEE/IEEE and approved industry practices
	1.4	Work specifications interpreted in conjunction with drawings as necessary.
	1.5	Potential hazards identified from plans, drawings and specifications.
	1.6	Types, quantities, sizes of materials, equipment and components for the task are determined in accordance with standard specifications.
	1.7	Site information obtained as necessary. Potential hazards identified and prevention/control measures selected.
	1.8	Job method developed to include hazard prevention, control measures and safety procedures.
	1.9	Materials and components are inspected to ensure that there are no damages, corrosion or wear.
	1.10	Transporting of equipment, materials and tooling co-ordinated and unloading sequenced to suit job method

2	Co-ordinate the installation of substation plant and apparatus.	2.1	Appropriate action taken to ensure that the necessary isolation is carried out in accordance with approved standard
		2.2	Checks are carried out to ensure that safety procedures are implemented, including log – out , tag - out in accordance with approved standard
		2.3	Installation of substation plant and apparatus components and equipment are carried out in accordance with planned hazard prevention and control measures, acceptable safe work practices, and approved electrical Standards.
		2.4	Installation of substation plant and apparatus inspected for safety and compliance with design and approved standards.
		2.5	Checks carried out to ensure that site is left clear of all surplus components, equipment, tools and debris.
3	Co-ordinate cleaning-up	3.1	Instructions given/appropriate follow-up actions taken place to ensure: • Unused material stacked/stored for re-use. • Work area cleared. • Tools and equipment cleaned, maintained and stored.
		3.2	Waste disposal conforms to organisational and relevant environmental regulations as required.

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of the installation of substation plant and apparatus in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves

Substation plant and apparatus type to include:

- Generating plant
- Sewage plant
- Water treatment plant
- Motors
- Battery banks
- Electro/mechanical motor starters
- Low voltage transformers/switchgear and associated control panels
- Gas appliances / apparatus
- House hold / freezing apparatus
- Laundry equipment
- Switching Circuits
- Lighting Circuits
- Power Circuits
- Motor Control Circuits
- High Voltage switchgear

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- various sizes of cables
- various types of cables
- various types switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- P.V.C. fittings
- junction boxes
- locknuts
- connectors
- insulating tapes
- protection controls

Tools and equipment to include:
- Hammers (various sizes)
- spirit level
- spanners (various sizes)
- lifting device
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- lineman pliers
- side cutting pliers
- multimeter
- insulation resistance tester
- earth resistance tester
- nail bag
- shovels
- power saws
- power leads
- nails
- screw drivers
- nut and bolts
- rawl bolts
- wall bits
- knife
- wire stripper
- cable straps
- cable pins
- crowbar
- allen keys
- bolt cutter
- crimping tool
- power tools

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Competency is to be demonstrated by the co-ordination of activities, which result in the installation of substation plant and apparatus within a wide range.

It is essential that competence is observed in the following aspects:
- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within the context of installing of substation plant and apparatus.
- identify and communicate location and details of installing substation plant and apparatus.
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to install substation plant and apparatus to regulatory requirements
- identify typical faults and problems that occur and necessary action taken to rectify them
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of substation plant and apparatus
- communicate effectively

(4) Resource Implications

The following resources should be provided:

- workplace location
- Substation and apparatus equipment and components appropriate for the tasks
- tools and equipment appropriate for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria.

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMMRD0443A: Diagnose and repair faults in electrical equipment

Competency Descriptor: This unit refers to skills and knowledge required for the diagnosing and repairing of faults in electrical equipment, and may involve the work to be carried out with equipment online as applies to the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection.
	1.2 Occupational health and safety standards, statutory requirements are identified, applied and monitored throughout the work procedure.
	1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications.
	1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.7 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.
	1.9 Work area is prepared in accordance with work requirements and site procedures.

		1.10	Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training.
2.	Verify the fault	2.1	Normal performance and function of the equipment is ascertained by consulting appropriate reference sources in accordance with the work plan.
		2.2	Fault indicators and appropriate technical information/diagnostic techniques are used to verify reported symptoms/faults in accordance with the work plan.
		2.3	Symptoms are reproduced and monitored if possible, whilst due regard for personnel safety and plant security is observed in accordance with the work plan.
3.	Find the fault	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		3.2	Fault finding is carried out in conjunction with others involved in, or affected by, the work in accordance with enterprise/job requirements.
		33	Equipment components, wires, cables, terminations and support fixings are inspected for obvious faults in accordance with the work plan.
		3.4	All appropriate fault finding/diagnostic techniques are identified, selected and used to determine the fault in accordance with the work plan.
		3.4	All appropriate components are disconnected to enable accurate test measurements of suspected faulty components without the concern of back-feed readings in accordance with the work plan.
		3.5	Test and measurement instruments are used in accordance with manufacturers' instructions and job requirements.
4.	Determine cause of fault	4.1	All appropriate personnel are consulted in order to obtain as many details relating to the faulty equipment as possible in accordance with the work plan.
		4.2	Appropriate use is made of any information from fault indicators and maintenance records in accordance with the work plan.

		4.3	Valid conclusions about the nature and cause of the fault are reached from analysis of available evidence in accordance with the work plan.
5.	Repair or rectify the fault	5.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		5.2	Appropriate repair procedures are undertaken in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		5.3	Faulty, worn, damaged or unsecured components are replaced, repaired or secured in accordance with the work plan.
		5.4	Parts and components are selected and replaced as required in accordance with appropriate specifications and the work plan.
		5.5	Components disconnected for testing are reconnected having been proven free of faults and all terminations are then checked to ensure they are electrically and mechanically sound in accordance with the work plan.
		5.6	All faults are repaired or rectified in accordance with the work plan.
		5.7	Final job inspection is performed and permits are relinquished as required in accordance with the work plan.
6.	Complete the work	6.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
		6.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
		6.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
		6.4	Work completion details are finalised in accordance with site/enterprise procedures.

RANGE STATEMENT

Inspection should be planned with the appropriate parties to determine access, conditions and work requirements

Equipment may include:

- AC motors
- Alternators
- DC motors
- Generators
- Pumps
- electro/mechanical motor starters
- low voltage transformers/switchgear and associated control panels
- motor operated valves
- hoists and cranes
- arc welders
- luminaries
- batteries
- metal detectors
- resistive heater
- hot water units
- exhaust fans
- general low voltage lighting
- power circuits
- control/indication and alarm circuits
- electrical tools/appliances
- workshop machinery and compressors

Materials may include:

- masonry anchors
- bolts
- nuts
- washers
- screws
- rivets
- saddles
- clips
- brackets
- solvents
- cable markers and identification labels
- adhesives
- insulation tapes
- heat shrink
- sleeving
- spiral binding
- cable ties
- solder
- lubricants
- oils
- greases
- sealants
- lugs
- connectors
- terminal blocks

Components may include:

- fuses/circuit breakers
- earth leakage breakers
- timers
- contactors
- contacts
- coils
- relays
- brushgear
- resistors
- ballasts
- capacitors
- solenoids
- overloads
- switches
- plugs
- busbar
- cable
- fans
- thermostats
- seals
- motor bearings

Test and measurement instruments may include:

- multimeters
- tong testers
- insulation resistance/continuity tester
- ductor tester
- overload injection tester and growlers

Fault finding and diagnostic techniques may include:

- linear approach
- half split rule
- sensory detection
- loop test
- insulation/resistance and continuity tests

Fault indicators may include:

- indication lamps
- LEDs
- alarms and flag relays

Work may be performed with equipment online

Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

Work site environment may be affected by nearby:

- plant or processes, e.g. heat, noise, dust, oil, water and chemical

Isolations can refer to electrical/mechanical or other associated processes

Work processes for refurbishing/maintaining switchgear may include:

- determining job requirements
- reading and interpreting electrical diagrams
- selecting tools and equipment
- determining type of switchgear
- visually examining operating mechanism of switch gear
- identifying components of switchgear
- removing and replacing defective components of switchgears
- reassembling switchgears
- testing operation of switchgear
- preparing and updating service records
- cleaning and replacing lubricants
- visually examining and measuring switchgears for defects
- co-ordinating and supervising work activities, assigning work to and instructing workers
- reading and interpreting
- instrument scales
- meter scales - linear, non-linear
- voltage, current resistance and power measurement

Work processes for refurbishing/maintaining motors may include:

- removing, lifting and handling motors
- dismantling motors
- repairing wire joints, terminations and terminals
- cleaning and applying insulating materials to motor winding
- removing and replacing bearings
- removing and replacing commutators and slip rings
- sanding, cleaning and polishing commutator and slip rings
- replacing brush gears; brushes and adjusting spring tension
- removing and replacing capacitors
- removing, replacing/repairing centrifugal switches
- testing current drawn by motor
- measuring terminal voltage
- measuring motor speed
- checking temperature of motor
- checking rotation of motor and reversing where appropriate
- listening to bearings and bushings for possible defects
- reassembling motors
- lubricating bearings, bushes, etc.
- identifying and selecting testing instruments
- identifying type of motors
- preparing service records
- co-ordinating and supervising work activities, assigning work to and instructing workers

Work processes for servicing rotating electrical plant and equipment may include:

- reading and interpreting drawings and diagrams
- determining job requirements
- identifying and selecting tools and equipment
- identifying types of rotating electrical plant and equipment
- dismantling AC and DC motors
- dismantling AC and DC generators
- dismantling:
- direct on-line starters
- auto-transformer starters
- primary resistors starters
- rotor resistor starters
- re-establishing levels of insulation
- maintaining the effectiveness of continuity
- restoring surface finish to commutators and slip rings, bedding of brushes,
- restoring the effectiveness of enclosures
- maintaining the effectiveness of component parts of cooling system
- maintaining the effectiveness of electrical components
- maintaining the effectiveness of bearings and seals
- cleaning component
- observations and measurements to include:
- measuring resistance of insulation
- measuring continuity of wires and cables
- assessing winding balance
- checking pressure and resistance of contacts
- checking condition of brushes, commutators and slip rings
- checking coil winding and winding security
- checking contactors and operating mechanisms
- checking terminals and terminations
- checking conductors
- checking circuit protection
- checking bearings and seals
- checking mechanical covers and fixing devices and slip rings
- replacing commutators and slip rings
- preparing surface finish of commutators and slip rings
- re-coating and baking coil windings
- replacing and bedding brushes
- replacing bearings, bushings and seals
- repairing/replacing cooling system components
- tightening fastening devices and terminations
- replacing brush holders and springs
- lifting and manipulating motors and generators
- mounting and securing motors and generators in position

EVIDENCE GUIDE

It is essential that competence is assessed in the critical aspects of the knowledge and application of relevant sections of occupational, health and safety guidelines, industry regulation, company/site safety procedures and company/site emergency procedures

(1) Critical Aspects of Evidence

It is essential that competence be observed in the following aspects:

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- attain electrical licence, where appropriate, deeming competency associated with electrical work
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to identify electrical equipment
- demonstrate correct procedures for checking electrical equipment
- demonstrate the ability to perform routine test on electrical equipment
- demonstrate correct procedures repairing electrical equipment
- demonstrate correct procedures for diagnosing electrical equipment
- demonstrate correct procedures in removing and replacing electrical equipment components
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0051A Use graduated measuring devices
- MEMCOR0071A Use electrical/electronic measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry standards
- equipment and material required to perform the work; Isolation procedures
- layout of plant/work site and operation of its equipment
- fault finding and diagnostic techniques repair techniques
- electrical equipment; Regulatory procedures
- electrical principles
- test and measurement instruments Circuit plan appreciation
- engineering and workshop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- apply relevant industry standards
- use and update plans, drawings and texts
- use tools and relevant equipment
- use test and measurement instruments
- verify and identify faults
- use appropriate fault finding and diagnostic techniques
- repair faults
- select materials for the job
- apply regulatory procedures
- apply electrical principles
- communicate effectively
- apply data analysis techniques and tools

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- identify supervisors or colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Method of Assessment

Evidence of competence may be obtained through a variety of methods including:

- observation
- oral questioning
- examination of assessee's portfolio/CV
- supporting statement from section engineer, supervisor or equivalent
- examples of related activities to which applicant has contributed, or worked on
- training courses on material related to range of variables and or knowledge requirement.
- examples of authenticated assessments and/or assignments from formal education courses
- simulation

(6) Context of Assessment

Competency shall be assessed on the job, off the job or a combination of both in accordance with work place procedures

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BSBFLM0053A Support operational plan

Competency Descriptor: This unit deals with the skills and knowledge required for the frontline supervisor to actively engaged in planning, implementing, monitoring and recording performance to achieve the business plans of the team/organisation.

Competency Field: Business Management Services

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan resource use	1.1	Resource information for use in operational plans is collected, analysed and organised in consultation with colleagues and specialist resource managers.
	1.2	Operational plans contribute to the achievement of the organisation's performance/business plan.
	1.3	Key performance indicators are developed within operational plans.
	1.4	Contingency plans are prepared in the event that initial plans need to be varied.
2. Acquire resources	2.1	Employees are recruited and/or inducted within the organisation's human resource management policies and practices.
	2.2	Physical resources and services are acquired within the organisation's polices, practices and procedures.
3. Monitor operational performance	3.1	Performance systems and processes are monitored to assess progress in achieving profit/productivity plans and targets.
	3.2	Budget and actual financial information is analysed and interpreted to monitor profit/productivity performance.
	3.3	Unsatisfactory performance is identified and prompt action is taken to rectify the situation.
	3.4	Mentoring and coaching is provided to support individuals/teams use resources to the required standard.

3.5 Recommendations for variation to operational plans are negotiated and approved by the designated persons/groups.

3.6 Systems, procedures and records associated with documenting performance are managed in accordance with the organisation's requirements.

RANGE STATEMENT

The scope and context of this unit of competence allow for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Legislation, codes and national standards relevant to the workplace, which may include

- award and enterprise agreements and relevant industrial instruments
- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- relevant industry codes of practice

NVQJ level 3 supervisors will normally be engaged in a workplace context where they:

- engage in short term planning within the department's business plans. For example, prepares a weekly schedule of outputs and/or outcomes to be achieved
- take responsibility for own outputs in work and learning. For example, assesses own performance and identifies the competencies which need to be upgraded/developed
- take limited responsibility for the output of others. For example, provides coaching support to assist individuals meet their performance requirements
- demonstrate some relevant theoretical knowledge. For example, explains the purpose of Key Performance Indicators to others
- perform a defined range of skills, usually within known routines, methods and procedures and within known time constraints. For example, provides services to internal customers within an agreed schedule
- apply known solutions to a variety of predictable problems. For example, within the organisation's standard procedures considers the options and, using some discretion and judgement, selects the preferred action to rectify faulty service to a customer
- interpret available information, using some discretion and judgement in work responsibilities. For example, interprets the continuous improvement processes, procedures and documentation used by the team and decides how to apply them to own work function

Frontline management at level III normally operate in a relatively simple and routine workplace environment in which they use the organisation's:

- goals, objectives, plans, systems and processes
- business and performance plans
- access and equity principles and practice
- ethical standards
- quality and continuous improvement processes and standards
- defined resource parameters

OHS considerations may include:

- provision of information about OHS and the organisation's OHS policies, procedures and programs
- employee induction
- systems, procedures and records
- organisation's procedures for dealing with hazardous events
- key performance indicators include OHS

The organisation's policies, practices and procedures are:

- those which govern the acquisition of resources, for example, the purchase of equipment

Designated persons/groups may include:

- those who have the authority to make decisions and/or recommendations about varying operations

Resources may include:

- people
- power/energy
- information
- finance
- buildings/facilities
- equipment
- technology
- time

Operational plans are:

- the short term plans developed by the department/section to describe product/service performance

Colleagues and specialist resource managers may include:

- persons at the same level or more senior managers, and may include people from a wide range of social, cultural and ethnic backgrounds
-

EVIDENCE GUIDE

The critical aspects, underpinning knowledge and skills identified must be demonstrated to confirm competence for this unit.

(1) Critical Aspects of Evidence

- produces short term plans for department/section
- plans, acquires and uses resources
- monitors and adjusts operational performance
- reports performance

(2) Pre-requisite Relationship of Units

Pre-requisites for this unit are:

- BSBFLM0023A Support leadership in the workplace
- BSBFLM0033A Contribute to effective workplace relationships
- BSBFLM0043A Participate in work teams
- BSBFLM0063A Provide workplace information and resourcing plans
- BSBCMN0113A Maintain workplace safety
- BSBFLM0093A Support continuous improvement systems and processes

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- the principles and techniques of:
- planning operations
- resource planning
- resource management systems
- budgeting and financial analysis and interpretation
- monitoring performance
- reporting performance
- problem identification and resolution
- alternative approaches to improving resource usage and eliminating resource inefficiencies and waste
- ways of supporting individuals/teams who have difficulty in performing to the required standard

Skills
The ability to:

- access and use workplace information
- maintain a safe workplace and environment
- access and use feedback to improve operational performance
- prepare recommendations to improve operations
- access and use established systems and processes
- use coaching and mentoring skills to provide support to colleagues
- relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities

(4) Resource Implications

The following resources should be provided:

- access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

In order to achieve consistency of performance, evidence should be collected over a set period of time, which is sufficient to include dealings with an appropriate range and variety of situations

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Business Services Competency Package.

Assessment of performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

Assessment should reinforce the integration of the Critical Employability Skills and the Business Services Common Competencies for the particular NVQ Level.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

BSBFLM0093A Support continuous improvement systems and processes

Competency Descriptor: This unit deals with the skills and knowledge required for the frontline supervisor to have an active role in managing the continuous improvement process in achieving the organisation's objectives.

Competency Field: Business Management Services

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Implement continuous improvement systems and processes	1.1 The manager actively encourages and supports team members to participate in decision making processes and to assume responsibility and authority.
	1.2 The organisation's continuous improvement processes are communicated to individuals/teams.
	1.3 The manager's mentoring and coaching support ensures that individuals/teams are able to implement the organisation's continuous improvement processes.
2. Monitor, adjust and report performance	2.1 The organisation's systems and technology are used to monitor progress and to identify ways in which planning and operations could be improved.
	2.2 Customer service is strengthened through the use of continuous improvement techniques and processes.
	2.3 Plans are adjusted and communicated to those who have a role in their development and implementation.
3. Consolidate opportunities for further improvement	3.1 Team members are informed of savings and productivity/service improvements in achieving the business plan.
	3.2 Work performance is documented and the information is used to identify opportunities for further improvement.
	3.3 Records, reports and recommendations for improvement are managed within the organisation's systems and processes.

RANGE STATEMENT

The scope and context of this unit of competence allow for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Legislation, codes and national standards relevant to the workplace, which may include:

- award and enterprise agreements and relevant industrial instruments
- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- relevant industry codes of practice

NVQJ level 3, frontline supervisors will normally be engaged in a workplace context where they:

- engage in short term planning within the department's business plans. For example, prepares a weekly schedule of outputs and/or outcomes to be achieved
- take responsibility for own outputs in work and learning. For example, assesses own performance and identifies the competencies which need to be upgraded/developed
- take limited responsibility for the output of others. For example, provides coaching support to assist individuals meet their performance requirements
- demonstrate some relevant theoretical knowledge. For example, explains the purpose of Key Performance Indicators to others
- perform a defined range of skills, usually within known routines, methods and procedures and within known time constraints. For example, provides services to internal customers within an agreed schedule
- apply known solutions to a variety of predictable problems. For example, within the organisation's standard procedures considers the options and, using some discretion and judgement, selects the preferred action to rectify faulty service to a customer
- interpret available information, using some discretion and judgement in work responsibilities. For example, interprets the continuous improvement processes, procedures and documentation used by the team and decides how to apply them to own work function

Frontline supervisors at this level III normally operate in a relatively simple and routine workplace environment in which they use the organisations:

- goals, objectives, plans, systems and processes
- business and performance plans
- access and equity principles and practice
- ethical standards
- quality and continuous improvement processes and standards
- defined resource parameters

Technology will be:

- that readily available in the workplace and will be appropriate to frontline management's roles and responsibilities

Customer service may be:

- internal or external, to existing or new clients

OHS considerations may include:

- implement and monitor participative arrangements for the management of OHS
- delegation and reporting complies with requirements of OHS legislation
- the continuous improvement processes of any OHS management system are implemented and monitored

EVIDENCE GUIDE

The critical aspects, underpinning knowledge and skills identified must be demonstrated to confirm competence for this unit.

(1) Critical Aspects of Evidence

- adjusts plans, processes and procedures to improve performance
- supports others to implement the continuous improvement system/processes
- identifies opportunities for further improvement

(2) Pre-requisite Relationship of Units

Pre-requisites for this unit are:

- BSBFLM0023A Support leadership in the workplace
- BSBFLM0043A Participate in work teams
- BSBFLM0053A Support operational plan
- BSBCMN0103A Deliver and monitor a service to customers
- BSBCMN0113A Maintain workplace safety.
- BSBCMN0123A Support innovation and change
- BSBFLM0113A Support a workplace learning environment

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of

- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, and industrial relations
- the principles and techniques associated with:
  - continuous improvement systems and processes, benchmarking, and best practice
  - the benefits of continuous improvement
  - the quality approaches which the organisation may implement
  - the methods that can be used in continuous improvement
  - the barriers to continuous improvement

Skills
The ability to:

- access and use workplace information
- use communication skills including researching, analysing and interpreting information from a variety of people and reporting
- monitor and evaluate systems, processes and procedures
- gain the commitment of individuals/teams to continuous improvement
- Consolidate opportunities for improvement
- deal with people openly and fairly
- use consultation skills effectively
- use coaching and mentoring skills to provide support to colleagues
- relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities

(4) Resource Implications

The following resources should be provided:

- access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

In order to achieve consistency of performance, evidence should be collected over a set period of time, which is sufficient to include dealings with an appropriate range and variety of situations

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statement

Assessment must take account of the endorsed assessment guidelines in the Business Services Competency Package

Assessment of performance requirements in this unit should be undertaken in an actual workplace or simulated environment

Assessment should reinforce the integration of the Critical Employability Skills and the Business Services Common Competencies for the particular NVQ Level.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMPLN0034A: Coordinate and manage commissioning processes

Competency Descriptor: This unit applies to the skills and knowledge necessary to coordinate and manage commissioning processes in a wide range of different contexts in the Electrical Installation and maintenance industry

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Plan and prepare to manage commissioning processes	1.1	Management of commissioning processes OH&S policies and procedures are planned and prepared to ensure these are followed.
		1.2	Commissioning processes schedules are prepared in accordance with requirements.
		1.3	Appropriate personnel are consulted to ensure commissioning processes are prepared effectively.
		1.4	Human resource and procurement plans for commissioning processes are determined in accordance with established procedures and checked against requirements.
2	Manage commissioning processes.	2.1	Mechanisms are used to measure, record and report progress of activities in relation to the agreed processes schedules and plans.
		2.2	Processes are managed in accordance with established procedures and requirements to achieve designated objectives.
		2.3	Records and documentation of processes activities are maintained in accordance with established procedures to facilitate quality management and to provide an audit trail.
		2.4	Results of processes activities are documented and evaluated in accordance with established procedures to determine compliance with agreed quality standards.
		2.5	Shortfalls in quality outcomes are reported in accordance with established procedures to enable appropriate action to be initiated.

3	Inspect and notify completion of work	3.1	Quality management issues and responses are reported in accordance with established procedures
		3.2	Completions of projects are notified in accordance with established procedures.

RANGE STATEMENTS

This unit recognises the commonality of skills and knowledge that exists for the unit as well as the additional specific outcome; which is to be reported on. Therefore, competency can be displayed on one, some or all of the following categories and in addition to the respective common underpinning knowledge associated with the selected specialisation:

Commissioning Processes may include:

- Starting -up
- Test run
- Verification process
- Compliance with specifications
- Notification
- Report Writing
- Visual Inspections

Commissioning Processes objectives may include:

- Commissioning Processes manager responsibility
- Behavioral aspect of personnel and coordinator responsibly for commissioning processes
- Work breakdown structure in coordinating commissioning processes
- Tools and techniques needed for keeping the commissioning processes on course
- Date of commissioning
- Identification and notification of relevant personnel

Nature of commissioning project may include:

- Power plant
- Generator
- Motors and switchgear
- Cell site
- A/C systems

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of techniques to coordinate and manage commissioning processes within a wide range of the electrical installation and maintenance work industry

(1) Critical Aspects and Evidence

Achievement of this unit of competence is based on each of the following conditions being met:

- demonstrating consistent performance for each element of the unit and exhibit specialisation across a wide range of applications; autonomously and to requirements.
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace for each of the categories and areas of specialisation.
- demonstrating an understanding of the underpinning knowledge and skills identified for undertaking the task. .

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- OH&S policies and procedures
- ability to speak clearly
- ability to read properly
- ability to write English properly
- work place safety requirements
- organizations policy and procedures
- commissioning processes schedules
- mechanisms used to measure, record and report progress of activities in relation to the agreed commissioning processes schedules and plans
- tools and techniques for keeping the commissioning processes on course
- budget control

Skill
The ability to:

- listen effectively
- work safely to instructions
- convey information in simple English to invoke correct actions
- prepare commissioning processes schedules
- perform commissioning processes control activities
- Coordinate and manage commissioning processes effectively.

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials.

(5) Method of Assessment

The candidate will be required to orally, or by other methods of communication,

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both.

The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work.

The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 3	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMPLN0094A: Determine and plan for electrical installation requirements

Competency Descriptor: This unit applies to the skills and knowledge necessary to determine and plan for electrical installation requirements in a wide range of different contexts in the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Plan and prepare for electrical installation requirements	1.1	Drawings , blueprints , manuals and job sketches are obtained and interpreted
		1.2	Job location is examined in order to determine suitability and environmental condition.
		1.3	Occupational safety and Health requirements and also job hazards are identified
		1.4	Determine Types , sizes and quantities of materials for the job
		1.5	Determine tools , equipment and vehicles necessary to carry out the job
		1.6	Determine the level and manpower needed to carry out the job
		1.7	Determine the timeframe necessary to complete the job
		1.8	Provide reasonable accurate cost of job labour/materials
		1.9	Identify source of materials and equipment.
2	Identify Electrical Contractor	2.1	Assist with the advertising the job locally
		2.2	Assist with the interviewing and short listing of contractors
		2.3	Assist in conducting final interviews
		2.4	Assist with selecting the most suitable contractor

3	Prepare report	3.1	Prepare report of materials, tools and equipment necessary for the job
		3.2	Prepare report of total cost required to do the job
		3.3	Prepare list of names of contractor who bid for the job and their respective cost
		3.4	Prepare report of the contractor chosen for the job
4	Submit report	4.1	All reports are submitted to the relevant personnel in accordance with workplace requirements

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of electrical installations in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Electrical installations to include:

- Residential Wiring
- Commercial Wiring
- Industrial Wiring
- Installation of Motors
- Installation of A.C. Units
- Appliance Repairs
- Trouble Shooting
- Installation Repairs and modifications

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- various sizes of cables
- various types of cables
- various types of switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- P.V.C. fittings
- Junction boxes
- Locknuts
- Connectors
- Insulating tapes
- protection controls

Tools and equipment to include:

- hammer
- spirit level
- various size spanners
- lifting device
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- lineman pliers
- side cutting pliers
- Amprobe meter
- Volt meter
- Ohmmeter
- nail bag
- shovels
- power saws
- power leads
- nails
- various types screw drivers
- nut and bolts
- rawl bolts
- wall bits
- knife
- wire stripper
- cable straps
- cable pins

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Competency is to be demonstrated by the co-ordination of activities, which result in determining the correct requirements for an electrical installation within a wide range.

It is essential that competence is observed in the following aspects:

- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within the context of determining and plan for electrical installation requirements
- identify and communicate location and details of electrical installation requirements .
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to determine and plan for electrical installation requirements to regulatory requirements
- identify typical faults and problems that occur and necessary action taken to rectify them
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring
- advertising procedures
- contractor Listing
- electrical Hardware

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of electrical wiring support system infrastructure
- communicate effectively
- conduct interviews
- communicate with media houses
- prepare reports
- short list Contractors
- make realistic and correct decision

(4) Resource Implications

The following resources should be provided:

- workplace location
- tools and equipment appropriate for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria.

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMPLN0104A: Interpret and carry out electrical design

Competency Descriptor: This unit deals with the skills and knowledge required to effectively interpret and carry out electrical design, and applies to all individuals working in the electrical installation and maintenance industry

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Interpret details from electrical design	1.1	Components, assemblies or objects are recognised.
		1.2	Dimensions identified are appropriate to field of employment.
		1.3	Instructions are identified and followed.
		1.4	Material requirements are identified.
		1.5	Symbols are recognised from design.
2	Identify design requirements	2.1	Requirements and purpose of design is determined from customer and/or work specification and associated documents.
		2.2	Design requirements are confirmed with relevant personnel and timeframes for completion established.
3	Implement electrical design	3.1	Work is carried out in accordance with design
		3.2	Completed work conforms with electrical design

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of electrical installation works in the electrical installation and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Materials, facilities required to include:

- electrical design
- suitable office space
- drawing board
- computer
- pens
- pencils
- recording books
- letter size papers
- telephone
- telephone directory
- office staff
- trunking
- ducting
- cable trays
- cable rack
- conduit
- various sizes of cables
- various types of cables
- switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- p.v.c. fittings
- junction boxes
- locknuts

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves

Tools and equipment to include:

- ball-pien hammer
- spirit level
- various sizes and types spanners
- lifting device (hoist)
- ladders
- measuring tape/rule
- hack saw
- steel bits
- hand drills
- lineman pliers
- side cutting pliers
- multimeters
- Compass
- Calculator
- Computer
- Earth resistance tester
- nail bag
- shovels
- power saws
- power leads
- nails
- various types and sizes screw drivers
- nut and bolts
- rawl bolts
- wall bits
- knife
- wire stripper
- cable straps
- cable pins
- socket sets
- power drills
- claw hammer

EVIDENCE GUIDE

(1) **Critical Aspects of Evidence**

Competency is to be demonstrated by the co-ordination of activities, which result in electrical installation works within a wide range.

It is essential that competence is observed in the following aspects:

- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within context of interpreting and carrying out electrical design
- identify and communicate details of interpreting and carrying out electrical design.
- identify hazards and control measures selected, prior to commencing activities.
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks.
- demonstrate ability to ensure that safe and effective procedures are used to interpret and carrying out electrical design to regulatory requirements.
- identify typical faults and problems that occur and necessary action taken to rectify them.
- interactively communicate with others to ensure safe and effective operations.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site designs and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring

Skill
The ability to:

- write technical reports
- interpret designs and documentation
- organise and lead work teams
- interpret and carry out electrical design
- communicate effectively

(4) Resource Implications

The following resources should be provided:

- workplace location
- Electrical design for the tasks
- Tools materials and equipment appropriate to for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria.

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMPLN0114A: Evaluate electrical installation requirements

Competency Descriptor: This unit applies to the skills and knowledge necessary to evaluate electrical installation requirements in a wide range of different contexts in the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Plan and prepare for evaluation of electrical installation requirements	1.1	Drawings , blueprints , manuals and job sketches are obtained and interpreted
		1.2	Job location is examined in order to determine suitability and environmental condition.
		1.3	Occupational safety and Health requirements and also job hazards are identified
		1.4	Determine requirements of Types , sizes and quantities of materials needed
		1.5	Determine tools , equipment and vehicles necessary to carry out the job
		1.6	Determine the levels and manpower requirements
		1.7	Determine the timeframe necessary to complete the job
		1.8	Provide reasonable accurate cost of labour/materials
		1.9	Identify source of materials and equipment.
2	Identify Electrical Contractor/Workmen	2.1	Assist with the selection of Contractors/Workmen for the job.
		2.2	Assist with the interviewing and short listing of Contractors/Workmen
		2.3	Assist in conducting final interviews
		2.4	Assist with selecting the most suitable Contractor/Workmen

3	Prepare report	3.1	Prepare report of materials, tools and equipment necessary for the job
		3.2	Prepare report of total cost required to do the job
		3.3	Prepare list of names of Contractor/Workmen who bid for the job and their respective costs
		3.4	Prepare report of the Contractor/Workmen chosen for the job
4	Submit report	4.1	All reports are submitted to the relevant personnel in accordance with workplace requirements

RANGE STATEMENTS

The Range Statement provides advice to interpret the scope and context of this unit of competency allowing for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

This unit applies to a range of electrical installations in the electrical and maintenance industry in accordance with Work-safety Standards.

The following variables relate to this particular unit:

OH&S requirements to be in accordance with Regulations and may include:

- workplace environment and safety
- protective clothing and equipment
- use of tools and equipment
- handling of materials
- use of ladders

Electrical installations to include:

- Residential Wiring
- Commercial Wiring
- Industrial Wiring
- Installation of Motors
- Installation of A.C. Units
- Appliance Repairs
- Trouble Shooting
- Installation Repairs and modifications

Personal protective equipment may include:

- boots
- safety glasses/goggles
- dust masks/respirators
- gloves
- hard hat
- harness
- workman gloves

Materials to include:

- trunking
- ducting
- cable trays
- cable racks
- conduits
- screws
- various sizes of cables
- various types of cables
- various types of switches
- socket outlets
- light receptacles
- handy boxes
- octagonal boxes
- wall case boxes
- meter sockets
- distribution panels
- P.V.C. fittings
- Junction boxes
- Locknuts
- Connectors
- Insulating tapes
- protection controls
- nail bag
- shovels
- power saws
- power leads
- nails
- various types screw drivers
- nut and bolts
- rawl bolts
- wall bits
- knife
- wire stripper
- cable straps
- cable pins

Tools and equipment to include: • hammer • spirit level • various size spanners • lifting device • ladders • measuring tape/rule • hack saw • steel bits • hand drills • lineman pliers • side cutting pliers • Amprobe meter • Volt meter • Ohmmeter	

EVIDENCE GUIDE

This unit should be assessed in the workplace. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

(1) Critical Aspects of Evidence

Competency is to be demonstrated by the co-ordination of activities, which result in determining the correct requirements for an electrical installation within a wide range.

It is essential that competence is observed in the following aspects:

- demonstrate compliance with occupational health and safety regulations applicable to workplace operations
- demonstrate ability to apply organisational quality procedures and processes within the context of determining and plan for electrical installation requirements
- identify and communicate location and details of electrical installation requirements .
- identify hazards and control measures selected prior to commencing activities
- co-ordinate the selection and use appropriate processes, tools and equipment to carry out tasks
- demonstrate ability to ensure that safe and effective procedures are used to determine and plan for electrical installation requirements to regulatory requirements
- identify typical faults and problems that occur and necessary action taken to rectify them
- interactively communicate with others to ensure safe and effective operations

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant Statutory OH&S legislation, standards and codes of practice
- workplace and equipment safety requirements
- site drawings and specifications
- materials and characteristics
- tools and equipment
- levelling and measuring
- advertising procedures
- contractor Listing
- electrical Hardware

Skill
The ability to:

- write technical reports
- interpret drawings and documentation
- organise and lead work teams
- co-ordinate installation of electrical wiring support system infrastructure
- communicate effectively
- conduct interviews
- communicate with media houses
- prepare reports
- short list Contractors
- make realistic and correct decision

(4) Resource Implications

The following resources should be provided:

- workplace location
- tools and equipment appropriate for the tasks processes
- appropriate communication of documentation related to tasks

(5) Method of Assessment

Competency should be assessed while tasks are undertaken.

Assessment may involve:

- observation of the application process
- questioning related to underpinning knowledge

Assessment may be by intermittent checking at various stages of each task application or at the completion of each task in accordance with the performance criteria

(6) Context of Assessment

Competency may be assessed in the workplace or simulated workplace setting.

Assessment shall be while tasks are undertaken either individually or working with a team under limited supervision

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.

MEMPLN0124A: Perform tests on complex electrical installation

Competency Descriptor: This unit applies to the skills and knowledge necessary to perform tests on complex electrical installation in a wide range of electrical works in the electrical installation and maintenance industry.

Competency Field: Electrical Installation and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Test completed task	1.1	Conduct insulation resistance test in accordance with industry standards
		1.2	Conduct earth continuity test in accordance with industry standard
		1.3	Conduct verification of polarity test in accordance with industry standard.
		1.4	Conduct earth resistance test in accordance with industry standard
		1.5	Conduct earth loop impedance test in accordance with industry standard
2	Evaluate completed task	2.1	Fittings and fixtures are examined to ensure that they are mechanically and electrically sound
		2.2	Fittings and fixtures are of the correct type , material and size
		2.3	All electrical devices , fittings and fixtures are installed in accordance with approved standard
		2.4	Circuit breakers , fuses and all other protective devices are of the correct ratings and type
		2.5	Cables and conductors are of the correct size and type
		2.6	Terminations are electrically and mechanically sound and are in accordance with government approved standard

3	Prepare evaluation reports	3.1	Prepare evaluation reports in accordance with standard specification and government regulations
		3.2	Reports are submitted to the required personnel , relevant department and relevant agencies
4	Keep records	4.1	Accurate records are kept at the appropriate location and are made accessible to the relevant personnel in accordance with job requirement
5	Provide feedback	5.1	Findings are reported to the relevant personnel , department /agencies and corrective actions if any, suggested

RANGE STATEMENTS

This unit applies to those whose duties include the testing of complex completed or partly completed electrical installation and maintenance tasks completed by others.

These may include but not limited to:

- installation applications
- maintenance applications

Testing is carried out in accordance with engineering/maintenance standards or specifications, and applies to a range of electrical installation and maintenance techniques.

These may include but not limited to the use of:

- specialized tools/equipment
- measuring equipment/devices/tools

Testing/verification process may include but not limited to:

- visual inspection
- daily maintenance checks
- production run
- in service test and monitoring
-

Testing may involve sectionalizing the installation and performing step by step testing or perform one comprehensive testing. Depending on the testing and examination process other technical units may need to be accessed, for example, the use of appropriate measurements and standards

EVIDENCE GUIDE

This unit could be assessed in conjunction with any other units requiring the same safety, quality, communication, materials handling, recording and reporting associated with the testing process and also the skills and knowledge covered by this unit.

(1) Critical Aspects of Evidence

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to perform quality testing
- demonstrate the ability to use complex testing instruments to perform quality testing
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- plan tasks in all situations and review task requirements as appropriate;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- ability to perform advance calculations
- task requirements
- work place operating procedures
- the use of work schedules, charts, work bulletins and memos
- advance testing methods
- Industry standards
- Types of protective devices
- Types of electrical tests

Skill
The ability to:

- work safely to instructions
- convey information in English to invoke correct actions
- apply quality procedures
- read and interpret instructions manuals quality specifications , technical drawings and blueprints
- plan a routine task
- undertake a routine task
- perform quality inspection
- perform quality testing
- use complex testing instruments
- prepare technical report

(4) Resource Implications

The following resources should be made available:

- all tools, equipment, materials and documentation required.
- any relevant workplace procedures.
- any relevant product and manufacturing specifications.
- any relevant codes, standards, manuals and reference materials

(5) Method of Assessment

- answer questions put by the assessor.
- identify colleagues who can be approached for the collection of competency evidence where appropriate.
- present evidence of credit for any off-job training related to this unit.

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities
Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both. The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the GCTVET Qualification Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

Levels of Competency		
Level 1.	Level 2.	Level 3.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

Please refer to the Assessment Guidelines for advice on how to use the Critical Employability Skills.