Competency Standards for Caribbean Vocational Qualifications (CVQ)

CCMEM21102 Level II in Electrical/Electronic Maintenance

Unit Number	Unit Title	Mandatory /Elective	Hours
MEMCOR0051A	Perform related computations – (basic)	Mandatory	20
MEMCOR0071A	Use electrical/electronic measuring devices	Mandatory	10
MEMCOR0081A	Mark off/out (general engineering)	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
ITICOR0011A	Carry out data entry and retrieval procedures	Mandatory	40
MEMMAH0071A	Perform manual handling and lifting	Mandatory	5
MEMMAH0081A	Perform housekeeping duties	Mandatory	10
MEMINS0071A	Prepare for electrical conduits/wiring installation	Mandatory	20
MEMFAB0011A	Perform manual soldering/de-soldering – electrical/electronic components	Mandatory	15
MEMMRD0081A	Remove dismantle, assemble and replace basic engineering components	Mandatory	50
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
MEMMRD0091A	Terminate signal and data cables – (basic)	Mandatory	20
MEMINS0011A	Install, terminate and connect electrical wiring	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
MEMCOR0062A	Attend to breakdown	Mandatory	20
MEMCOR0122A	Write technical reports (basic)	Mandatory	40
MEMCOR0152A	Use graphical techniques and perform simple statistical computations (basic)	Mandatory	20
MEMINS0062A	Terminate and connect specialist cables	Mandatory	30
MEMINS0092A	Install electrical/electronic apparatus, machinery, fixtures and secondary wiring	Mandatory	60
MEMQUA0012A	Perform inspection (basic)	Mandatory	20
MEMMRD0402A	Check/identify/isolate/rectify malfunctioning electrical machinery appliance and fixtures	Mandatory	30
MEMMRD0652A	Service and maintain electrical motor starting systems	Mandatory	40
MEMMRD0662A	Service and maintain motor control systems	Mandatory	40
MEMMRD0872A	Install and maintain electrical equipment	Mandatory	60

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CCMEM21102 Level II in Electrical/Electronic Maintenance Cont'd.

Unit Number	Unit Title	Mandatory /Elective	Hours
MEMCOR0101A	Prepare basic engineering drawing	Elective	30
MEMINS0051A	Cut, bend and install electrical conduit	Elective	
MEMMRD0121A	Perform basic repair to electrical/electronic apparatus	Elective	40
MEMMRD0091A	Terminate signal and data cables - (basic)		20
MEMMRD0191A	Assemble & Disassemble scaffolding to enable access to the work area	Elective	20
MEMMRD0062A	Perform levelling and alignment of machines and engineering components	Elective	20
MEMMRD0222A	Maintain/service analog/digital electronic equipment	Elective	40
MEMMRD0362A	Locate & rectify fault(s) in electrical equipment up to 1kVac/ 1.5Vdc	Elective	40
MEMMRD0552A	Maintain and service pneumatic system components and system	Elective	30
MEMMRD0562A	Maintain and service hydraulic system components and system	Elective	30
MEMMRD0572A	Maintain/repair electro-pneumatic systems	Elective	20
MEMMRD0642A	Service and maintain power supplies	Elective	40
MEMMRD0862A	Maintain battery banks and cells	Elective	20
MEMMRD0882A	Conduct generator electrical maintenance	Elective	20
MEMMRD0892A	Install and maintain electronic electrical equipment and distribution circuits	Elective	40
MEMMRD0902A	Service and repair electrical motors	Elective	40
BSBSBM0012A	Craft personal entrepreneurial strategy	Elective	50
MEMINS0162A	Cut and fit install trunking systems		
MEMINS0172A	Prepare and install basic cable trays		
MEMINS0122A	Install below ground communication cables	Elective	10
MEMMAH0042A	Order materials	Elective	20
MEMCOR0063A	Attend to breakdowns in hazardous areas	Elective	20
MEMMAH0073A	Purchase materials	Elective	40
MEMMRD0253A	Monitor essential services operations in remote areas	Elective	20
MEMCOR0013A	Assist in the provision of on the job training	Elective	20
MEMPLN0063A	Coordinate and manage basic installation projects	Elective	40
MEMMRD0443A	Diagnose and repair faults in electrical equipment	Elective	40

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.

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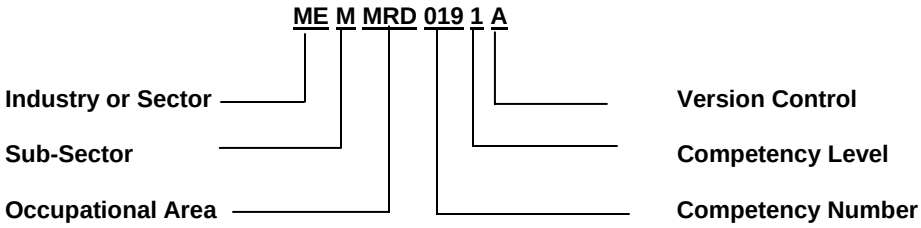
Legend to Unit Code

Example: MEMMRD0191A



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

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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

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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

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(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

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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 NCTVET 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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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

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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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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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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.

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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

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(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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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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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.

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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.

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(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.

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(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 NCTVET 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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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.

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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

Ladders and work platforms include:

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

Power connections include:

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

Safety responsibilities apply to:

- personal protection
- safe interactive work practices (duty of care)
- Occupational Health and Safety (OHS) regulations
- National Environment and Planning agency (NEPA) regulations

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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

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(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 NCTVET 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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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.

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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

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(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.

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(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 NCTVET 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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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.

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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

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(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 NCTVET 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	

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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.

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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).

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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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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.

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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.

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		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

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Input devices:

- keyboard
- mouse
- scanner
- microphone
- camera

Data:

- textual
- numerical
- graphical

Software systems to include for:

- word processing
- spread sheet
- internet access

File operations:

Naming, updating, archiving, traversing field and records in database, use of search, sort, print

Files save on:

- network
- magnetic media
- personal PC

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 retrieva l 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.

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(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

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(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 EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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

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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

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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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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	

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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.

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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

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- 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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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	

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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.

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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.

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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

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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/JS 21
- 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

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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

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(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 NCTVET 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.

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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.

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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.

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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

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(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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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	

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MEMMRD0081A: Remove dismantle, assemble and replace basic engineering components

Competency Descriptor: This unit deals with the skills and knowledge required to effectively remove dismantle, assemble and replace engineering 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.	Check engineering components	1.1	System components are identified correctly.
		1.2	The characteristics and basic operational function of each system component are understood.
		1.3	The operational function of each component are inspected and tested by supervisor.
2.	Remove/replace engineering components	2.1	Engineering components are inspected by supervisor and task requirements analysed.
		2.2	Appropriate tools and equipment are selected and component/s are prepared for removal/replacement.
		2.3	Components are removed/replaced using standard operating procedures, tools and equipment.
		3.4	Engineering components are clearly marked to aid reassembly.
3.	Dismantle engineering components	3.1	Engineering components are inspected by supervisor and task requirements analysed.
		3.2	Appropriate tools and equipment are selected and component/s prepared for dismantling.
		3.3	Components are dismantled using standard operating procedures, tools and equipment.
		3.4	Engineering components are clearly marked to aid reassembly.

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4.	Replace faulty components	4.1	Specifications for components are obtained from appropriate source and verified by supervisor.
		4.2	Damaged or faulty components are assessed by supervisor against specifications.
		4.3	Faulty components are identified for repair, replacement or adjustment.
5.	Select replacement components	5.1	Where applicable, replacement and/or repaired parts are selected for reassembly.
6.	Assemble basic engineering components into assemblies or sub-assemblies	6.1	Appropriate techniques are applied in the preparation, assembly and adjustment of components.
		6.2	Correct lubrication, packing and sealing materials are applied correctly and in conformance to job specifications and supervisor instructions.
		6.3	Final component is assembly inspected, tested and adjusted as necessary for compliance with operational specifications.
		6.4	Final component is returned to use according to standard operating procedure.
7.	Clean up	7.1	Materials/supplies are stacked /stored for re-use or disposal.
		7.2	Work area is cleared.
		7.3	Tools and equipment are cleaned and stored in a cool place.
		7.4	Waste is disposed of using appropriate method according to National Environmental Protection Agency (NEPA) requirements and company's operating procedures.

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RANGE STATEMENT

Work undertaken under supervision or in a team environment using predetermined standards of quality, safety and workshop procedures.

This unit involves the dismantling, inspection, replacement, assembling of engineering components.

All specifications interpreted from manufacturers' manuals, engineering drawings, detailed/technical sketches and associated data sheets.

Tasks are undertaken utilising engineering principles, designated procedures, appropriate tools, equipment and safe workshop practices.

Replacement parts are proved by supervisor and selected from manufacturers' catalogues, etc.

Appropriate techniques utilised in the assembly of component parts using fastening equipment and methods which ensure conformance to specifications, operational performance, quality and safety; this may include the straightforward removal and replacement of pre-manufactured bearings and seals.

Appropriate lubrication, packing, sealing materials are selected and applied in conformance to standard operating procedure.

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively removing, dismantling, assembling and replacing engineering components 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 undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in removing/replacing engineering components
- demonstrate correct procedures in dismantling and assembling engineering components
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies
- interactively communicate with others to ensure safe operations demonstrate effective engineering techniques to produce designed outcome

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(2) Pre-requisite Relationship of Units

- MEMCOR0051A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and technical drawings
- MEMCOR0071A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational Health and Safety regulations
- basic tools for removal, replacing, dismantling and assembling engineering system components
- standard characteristics of basic engineering system components
- standard removal/replacing tasks
- standard engineering system components
- standard operational test for basic engineering systems
- manufacturers standard specification
- standard application/operation of pneumatic system components
- reading
- writing basic English
- basic numeracy

Skills
The ability to:

- follow safely to instructions
- use hand tools
- handle materials
- select seals
- apply quality assurance
- perform removal and replacement of engineering system components

(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

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(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

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 NCTVET 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	

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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.

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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.

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		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

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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.

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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

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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

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(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 NCTVET 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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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.

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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

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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 Jamaican 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)

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(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

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(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 NCTVET 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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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.

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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.

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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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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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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

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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

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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 JS21
- 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

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(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 NCTVET 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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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.

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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

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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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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.

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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

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(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

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(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 NCTVET 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	

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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.

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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.

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(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 uni

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 NCTVET 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	

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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.

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		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.

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(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.

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(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 NCTVET 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	

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MEMCOR0062A: Attend to breakdown

Competency Descriptor: This unit deals with the skills and knowledge required to effectively attend to break down 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 to attend breakdown	1.1 Nature of the breakdown is confirmed with appropriate personnel to establish the need to attend.
	1.2 Work clearances are obtained and other preliminary OH&S procedures are followed, where required.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Tools, equipment and testing devices anticipated as being needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
2. Evaluate extent of work	2.1 Customer service requirements are dealt with.
	2.2 OH&S policies and procedures for working in the area at the breakdown are adhered to.
	2.3 Extent of breakdown is evaluated and confirmed with appropriate personnel.
	2.4 Appropriate personnel required to determine cause and rectify breakdown is ascertained from available evidence and arrangements made for their attendance where applicable.
	2.5 Extend of repair work is ascertained from available evidence and confirmed with appropriate personnel.
	2.6 Limits of repair work that can be carried out in-situ are established with regards to potential hazards and in accordance with established procedures and requirements.

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		2.7	Arrange repair work by appropriate personnel, where necessary.
3.	Confirm completion	3.1	Apparatus and systems are inspected and tested after repairs completed to ensure requirements are met.
		3.2	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 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’.

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During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to attend to breakdown 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 Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- company documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate
- company occupational health and safety instructions
- responsibilities and rights of others involved including clients, property owners, other workers and the public
- time management and co-ordination processes
- maintenance techniques
- organisational arrangements for communicating plans, information, intentions and safety criteria to others by appropriate means
- operation of plant and equipment associated with a given workplace
- perform necessary actions to protect the environment

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

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(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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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

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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

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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.

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(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 NCTVET 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	

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MEMCOR0152A: Use graphical techniques and perform simple statistical computations (basic)

Competency Descriptor: This unit deals with the skills and knowledge required to use statistics to aid in making decisions, drawing conclusion and making reports and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Reads and constructs graphs from given or determined data	1.1 Complex information is extracted from graphical representation
	1.2 Data is analysed with respect to emerging trends
	1.3 Graphs are constructed as required from data and drawn with respect to scale and accepted method
	1.4 Significant features of graphical representation are understood such as limit lines, gradients (straight line graphs), intercepts, maximum and minimum values
	1.5 Constructs a wide variety of graphs as required including histograms, control charts, straight line graphs and parabolic graphs
2. Performs basic statistical calculations	2.1 Calculates mean, median and mode from given data
	2.2 Calculates standard deviation and understands the significance of 1, 2 and 3 sigma limits

RANGE STATEMENT

Graphs and charts may be applied to information from various work contexts, quality processes, production and market trends and other engineering applications. A range of devices may be used to assist with calculations. Given relevant data the individual should be able to use statistics to aid in making decisions, drawing conclusion and making reports.

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Activities may include but not limited to:

- using graphical methods to organise data (straight line graph, bar chart, pie chart)
- reading and interpreting graphic data
- determining quantities from graphical information
- developing data collection instrument for statistical analysis
- compiling and tallying scare from raw data collected
- formatting raw data into statistical information using tables

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
- MEMCOR022A Perform related computations

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- numbers and basic arithmetic operations
- drawings and specifications
- graphical methods
- graphic data
- data collection instruments for statistical analysis
- basic statistics (charts, tables scales and graphs)
- compiling and tallying score from raw data
- formatting raw data into statistical into statistical information using tables

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Knowledge
Knowledge of: (Cont'd)

- 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
- use graphical methods to organise data (straight line graph, bar chart, pie chart)
- read and interpreting graphic data
- determin quantities from graphical information
- develop data collection instrument for statistical analysis
- compile and tally scare from raw data collected
- format raw data into statistical information using tables
- 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.

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

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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 NCTVET 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	

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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 JS 21regulations 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 JS 21 regulations and standard requirements.
		3.2	All brackets, clamps, holders etc. are adjusted and fixed to specifications.

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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

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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

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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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These l evels do not relate to the NCTVET 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 Gu idelines for advice on how to use the Critical Employability Skills.

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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.

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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 of JS21 1992 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.

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		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.

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	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
- JS21 1992 regulation governing installation
- other relevant codes
- manual lifting and handling
- protective clothing
- relevant electrical and safety practices

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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
-

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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

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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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational Health and Safety regulations
- JS21 1992 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

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(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 NCTVET 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.

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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.

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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

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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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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.

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	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
- JS21 1992 regulation governing installation
- other relevant codes
- manual lifting and handling
- protective clothing
- relevant electrical and safety practices

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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

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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’.

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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

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(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

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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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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MEMMRD0652A: Service and maintain electrical motor starting systems

Competency Descriptor: This unit refers to the maintenance and service of electrical motor starting systems including, but not limited to, process measurement, control systems and analytical instrumentation as applies to the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Undertake maintenance checks and routine tests	1.1 Electrical motor starting system functions are determined and understood by reference to circuit diagrams, equipment manuals and/or consultation with equipment operator where appropriate.
	1.2 Electrical motor starting system functions are recorded to standard operating procedures where appropriate.
	1.3 Built-in faults/status display are noted and recorded to standard operating procedure.
	1.4 Electrical motor starting system /sub-assemblies, components, connections, terminations etc. are checked visually and with correct and appropriate test equipment and techniques.
	1.5 Faulty components are removed and replaced where appropriate.
	1.6 All results are checked for compliance with manufacturers' requirements or specification, results are recorded to standard operating procedures.
2. Maintain and/or service electrical motor starting system	2.1 Where appropriate, isolate sub-assemblies to standard operating procedures.
	2.2 Electrical motor starting system /sub-assemblies are adjusted to standard operating procedures using correct and appropriate techniques, tools and equipment.

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3.	Return electrical motor starting system to service	3.1	Electrical motor starting system /sub assemblies are returned into service utilising correct and appropriate techniques and procedures.
		3.2	Electrical motor starting system /sub assemblies are checked for operational compliance to specifications and/or manufacturers requirements and documentation requirements are carried out to standard operating procedure.

RANGE STATEMENT

This unit covers the testing and maintenance of Electrical motor starting system; it covers situations in which a series of checks and pre-determined tests is applied in accordance with work shop manuals, testing procedures etc. This unit also covers the replacement of faulty components identified during these tests. Work ordinarily undertaken with minimal assistance but could include working as part of team. Work may be undertaken in field or workshop/laboratory, plant or site environment. All work and work practices are undertaken to industry and company requirements.

Correct and appropriate tools and equipment includes the use of:

- voltmeters
- ammeters
- cathode ray oscilloscopes
- frequency counters
- continuity testers
- hand tools
- soldering and de-soldering devices
- phase rotation tester

Starting systems may include:

- fractional horsepower-manual motor starters
- manual line voltage starters
- starter control pilot devices
- reduced current starters
- reduced voltage starters
- three-phase multi-speed controllers
- wound rotors (slip ring) motor controllers
- synchronous motor control
- direct current controllers

Check, tests, adjustments, services and maintenance undertaken on a wide range of equipment utilised in engineering environments including:

- telecommunication
- process control
- computer systems
- security monitoring
- alarm systems

All specifications and procedures may be obtained from:

- circuit drawings
- schematic diagram
- maintenance schedules
- engineering data sheets
- manufacturers hand books

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Materials may include:

- cables
- solder/flux
- lubricants
- cleaning solvents
- contact cleaners
- connectors
- adhesive and sealants

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
- shorted circuits
- burn, signs of excessive heat
- bulging fixed capacitors

Control circuits may include:

- two - wire control
- three - wire and separate controls hand-off
- automatic controls, multiple push button stations interlocking methods of reversing control
- sequence control
- time-delay
- low-voltage release
- thyristor control single phase half wave speed control reversible speed control
- three-phase drive,
- pulse-width modulated control
- variable-frequency inverters

Preliminary checks:

- checking for loose connections
- blown fuses
- checking for hairline cracks and poor solder joints, fuse checks
- checking for open circuits

Types of circuits:

- single phase systems - AC and DC
- multi phase systems - AC and DC

Work activities may include:

- selecting tools and equipment
- setting up equipment
- isolating system
- examining system components
- grinding burnt contacts
- applying lubricants and coolants
- re-tightening loosened parts
- replacing damage or worn parts
- wiring, wiping and cleaning components

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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 motor starting systems
- demonstrate correct procedures for checking motor starting systems
- demonstrate the ability to perform routine test on motor starting systems
- demonstrate correct procedures servicing motor starting systems
- demonstrate correct procedures for maintaining motor starting systems
- demonstrate correct procedures in removing and replacing motor starting systems
- 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

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(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
- general layout of plant/work site and operation of its equipment
- regulatory aspects
- characteristics of AC and DC supply
- principle of rectification and rectification circuits
- filter circuits and their principle of operation
- theory of voltage amplification
- motor starting circuits
- types of rectification circuits and their principle of operation
- limitations of motor starting circuits
- electrical fundamentals
- test and measurement instruments
- circuit plan appreciation
- basics of industrial electronics
- engineering and workshop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- locate and interpret plans, drawings and text
- use tools and relevant equipment
- use test and measurement instruments
- use correct maintenance procedures
- identify and select materials for the job
- apply regulatory aspects theory
- apply industrial electronics fundamentals theory
- apply distributed control theory
- carry out work completion details
- communicate effectively
- apply data analysis techniques and tools
- maintain motor starting systems
- service motor starting systems

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0662A: Service and maintain motor control systems

Competency Descriptor: This unit refers to the maintenance and service of motor control systems including, but not limited to, process measurement, control systems and analytical instrumentation as applies to the metal engineering and maintenance industry

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Undertake maintenance checks and routine tests	1.1 Motor control systems functions are determined and understood by reference to circuit diagrams, equipment manuals and/or consultation with equipment operator where appropriate.
	1.2 Motor control systems functions are recorded to standard operating procedures where appropriate.
	1.3 Built-in faults/status display are noted and recorded to standard operating procedure.
	1.4 Motor control systems /sub-assemblies, components, connections, terminations etc. are checked visually and with correct and appropriate test equipment and techniques.
	1.5 Faulty components are removed and replaced where appropriate.
	1.6 All results are checked for compliance with manufacturers' requirements or specification, results are recorded to standard operating procedures.
2. Maintain and/or service electrical motor control systems	2.1 Where appropriate, isolate sub-assemblies to standard operating procedures.
	2.2 Motor control systems system /sub-assemblies are adjusted to standard operating procedures using correct and appropriate techniques, tools and equipment.

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3.	Return electrical motor control system to service	3.1	Motor control systems /sub assemblies are returned into service utilising correct and appropriate techniques and procedures.
		3.2	Motor control systems /sub assemblies are checked for operational compliance to specifications and/or manufacturers requirements and documentation requirements are carried out to standard operating procedure.

RANGE STATEMENT

This unit covers the testing and maintenance of Motor control systems; it covers situations in which a series of checks and pre-determined tests is applied in accordance with work shop manuals, testing procedures etc. This unit also covers the replacement of faulty components identified during these tests. Work ordinarily undertaken with minimal assistance but could include working as part of team. Work may be undertaken in field or workshop/laboratory, plant or site environment. All work and work practices are undertaken to industry and company requirements.

Correct and appropriate tools and equipment includes the use of:

- voltmeters
- ammeters
- cathode ray oscilloscopes
- frequency counters
- continuity testers
- hand tools
- soldering and de-soldering devices
- phase rotation tester

Starting systems may include:

- fractional horsepower-manual motor starters
- manual line voltage starters
- starter control pilot devices
- reduced current starters
- reduced voltage starters
- three-phase multi-speed controllers
- wound rotors (slip ring) motor controllers
- synchronous motor control
- direct current controllers

Check, tests, adjustments, services and maintenance undertaken on a wide range of equipment utilised in engineering environments including:

- telecommunication
- process control
- computer systems
- security monitoring
- alarm systems

All specifications and procedures may be obtained from:

- circuit drawings
- schematic diagram
- maintenance schedules
- engineering data sheets
- manufacturers hand books

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Materials may include:

- cables
- solder/flux
- lubricants
- cleaning solvents
- contact cleaners
- connectors
- adhesive and sealants

Control circuits may include:

- two - wire control
- three - wire and separate controls hand-off
- automatic controls, multiple push button stations interlocking methods of reversing control
- sequence control
- time-delay
- low-voltage release
- thyristor control single phase half wave speed control reversible speed control
- three-phase drive,
- pulse-width modulated control
- variable-frequency inverters

Preliminary checks:

- checking for loose connections
- blown fuses
- checking for hairline cracks and poor solder joints, fuse checks
- checking for open circuits
- shorted circuits
- burn, signs of excessive heat
- bulging fixed capacitors

Types of circuits:

- single phase systems - AC and DC
- multi phase systems - AC and DC

Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

Work activities may include:

- selecting tools and equipment
- setting up equipment
- isolating system
- examining system components
- grinding burnt contacts
- applying lubricants and coolants
- re-tightening loosened parts
- replacing damage or worn parts
- wiring, wiping and cleaning components

Work site environment may be affected by:

- nearby plant or processes e.g.
  - heat
  - noise
  - dust
  - oil
  - water and chemical

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EVIDENCE GUIDE

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(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
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- demonstrate correct procedures for checking motor starting systems
- demonstrate the ability to perform routine test on motor starting systems
- demonstrate correct procedures servicing motor starting systems
- demonstrate correct procedures for maintaining motor starting systems
- demonstrate correct procedures in removing and replacing motor starting systems
- 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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- relevant industry standards
- equipment and material required to perform the work
- isolation procedures
- general layout of plant/work site and operation of its equipment
- regulatory aspects
- characteristics of AC and DC supply
- principle of rectification and rectification circuits
- filter circuits and their principle of operation
- theory of voltage amplification
- motor starting circuits
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- limitations of motor starting circuits
- electrical fundamentals
- test and measurement instruments
- circuit plan appreciation
- basics of industrial electronics
- engineering and workshop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- locate and interpret plans, drawings and text
- use tools and relevant equipment
- use test and measurement instruments
- use correct maintenance procedures
- identify and select materials for the job
- apply regulatory aspects theory
- apply industrial electronics fundamentals theory
- apply distributed control theory
- carry out work completion details
- communicate effectively
- apply data analysis techniques and tools
- maintain motor starting systems
- service motor starting systems

(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

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(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.

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Solve problems	Level 2	
Use technology	Level 1	

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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.

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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.

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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

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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

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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

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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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry (JS21)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 (JS21)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.

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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.

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CRITICAL EMPLOYABILITY SKILLS

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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	

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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.

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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

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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

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(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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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

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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.

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		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, JS 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
-

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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

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- 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:
- JS21 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.

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(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 NCTVET 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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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.

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(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

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(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.

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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 NCTVET 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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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.

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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.

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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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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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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.

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		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.

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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

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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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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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MEMMRD0062A: Perform levelling and alignment of machines and engineering components

Competency Descriptor: This unit deals with skills and knowledge required to competently perform levelling and alignment of machines and engineering components and applies to individuals in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Undertake levelling and alignment measurements/readings	1.1 Principles of levelling and alignment are understood and utilised.
	1.2 Task requirements are determined by inspection of equipment to be levelled and/or components to be aligned.
	1.3 Correct appropriate levelling and/or alignment procedure are selected.
	1.4 Correct and appropriate levelling or alignment devices/equipment are selected and set up to standard operating procedures or manufacturer's recommendation.
	1.5 Measurements/readings taken accurately and recorded correctly to standard operating procedures.
2. Perform levelling and/or alignment tasks	2.1 Correct and appropriate engineering principles, techniques, tools and equipment selected.
	2.2 Levelling realignment calculations performed using correct and appropriate method for levelling/alignment application.
	2.3 Equipment levelled to specifications using correct and appropriate technique.
	2.4 Levelling and alignment task completed to specifications.

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RANGE STATEMENT

Work undertaken autonomously or in a team environment using predetermined standards of quality, safety and workshop procedures involving the levelling of equipment and the alignment of component parts.

The use of appropriate engineering principles, techniques, tools and equipment is integral to all application tasks.

Included is the setting up and use of alignment measuring devices and precision levelling devices.

Level or out of alignment calculation performed using most appropriate means for the type of application being performed.

Level and alignment specifications obtained from engineering drawings, data sheets or manufacturers specifications.

All adjustments performed according to designated procedures in conformance to specifications.

Included is the use of a variety of tools and equipment not limited to:

- precision levels
- spirit levels
- line levels
- optical levels
- electronic levels
- laser levels
- dial indicators
- special type dial indicator fixtures
- magnetic bases
- feeler gauges
- bench centres
- vee blocks
- plumb and line
- folding wedges
- straight edges
- shim pack materials
- dumpy levels and other associated levelling and alignment equipment

Installation techniques:

- surface mount
- underground
- PVC piping
- metal
- on masonry
- on steel
- in pavements
- with clamps
- with saddles
- on/in walls
- in floors
- overhead
- access ways
- wood

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Background surfaces for the leveling and alignment of machines and engineering components may include:

- concrete
- concrete block work
- brickwork/stonework
- pavements
- underground

Levelling process includes:

- preparation of pipes and tubing
- preparation of surfaces
- finish of surfaces
- workplace preparation

Personal protective equipment may include:

- overalls
- waterproof pants and jacket
- boots
- water (rubber) boots
- gloves
- dust masks/respirators
- hard hat/cap
- safety goggle

Working conditions may include but are not limited to:

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

Representative range of applications may include such things as:

- fixtures
- equipment
- valves
- regulators
- metering devices
- refrigeration units
- machinery
- plant
- warehousing
- power plants

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively performing routine operational maintenance of machines/equipment 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 performing routine operational maintenance of machines/equipment
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in performing leveling of machines and engineering components
- demonstrate correct procedures in performing alignment of machines and engineering components
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- 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
- MEMCOR0161A Plan and undertake a routine task
- MEMMAH0071A Perform manual handling and lifting

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational Health and Safety regulations
- basic measuring devices
- standard machines/equipment range
- levelling principles
- levelling techniques
- alignment principles
- alignment techniques
- standard consumable replacements
- standard machine/equipment adjustments
- reading
- writing basic 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
- perform operational maintenance of 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) 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.

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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 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 NCTVET 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 1	
Work with others and in team	Level 2	
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.

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MEMMRD0222A: Maintain/service analog/digital electronic equipment

Competency Descriptor: This unit refers to the maintenance and service of analog/digital electronic equipment including, but not limited to, process measurement, control systems and analytical instrumentation as applies to the metal engineering and maintenance

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Undertake maintenance checks and routine tests	1.1 Electronic equipment, functions are determined and understood by reference to circuit diagrams, equipment manuals and/or consultation with equipment operator where appropriate.
	1.2 Equipment built-in test functions run and results are recorded to standard operating procedures where appropriate.
	1.3 Built-in faults/status display are noted and recorded to standard operating procedure.
	1.4 Equipment/sub-assemblies, components, connections, terminations etc. are checked visually and with correct and appropriate test equipment and techniques.
	1.4 Faulty components are removed and replaced where appropriate.
	1.5 All results are checked for compliance with manufacturers' requirements or specification; results are recorded to standard operating procedures.
2. Maintain and/or service electronic equipment	2.1 Where appropriate, isolate sub-assemblies to standard operating procedures.
	2.2 Electronic equipment/sub-assemblies is adjusted to standard operating procedures using correct and appropriate techniques, tools and equipment.
3. Return electronic equipment to service	3.1 Equipment/sub assemblies are returned into service utilising correct and appropriate techniques and procedures.
	3.2 Equipment/sub assemblies are checked for operational compliance to specifications and/or manufacturers requirements and documentation requirements are carried out to standard operating procedure.

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RANGE STATEMENT

This unit covers the testing and maintenance of electronic equipment and systems, it covers situations in which a series of checks and pre-determined tests is applied in accordance with work shop manuals, testing procedures etc. This unit also covers the replacement of faulty components identified during these tests. Work ordinarily undertaken with minimal assistance but could include working as part of team. Work may be undertaken in field or workshop/laboratory environment. All work and work practices are undertaken to industry and company requirements

Check, tests, adjustments and services undertaken on a wide range of equipment utilised in engineering environments including:

- telecommunication
- process control
- computer systems
- security monitoring
- alarm systems

Components may include:

- discrete component
- circuit boards
- connectors
- plug-in items
- power supplies

Materials may include:

- cables
- solder/flux
- lubricants
- cleaning solvents
- contact cleaners
- connectors
- adhesive and sealants

Correct and appropriate tools and equipment includes the use of:

- voltmeters
- ammeters
- cathode ray oscilloscopes
- frequency counters
- continuity testers
- hand tools
- soldering and de-soldering devices

All specifications and procedures may be obtained from:

- circuit drawings
- engineering data sheets
- manufacturers hand books

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

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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 equipment
- demonstrate correct procedures for checking system components
- demonstrate the ability to perform routine test on system components
- demonstrate correct procedures servicing system components
- demonstrate correct procedures for maintaining electronic equipment
- demonstrate correct procedures in removing, replacing and aligning system components and equipment
- 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

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(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
- general layout of plant/work site and operation of its equipment
- maintenance techniques for the equipment
- electronic equipment including (telecommunication, process control, computer systems and security monitoring alarm systems)
- regulatory aspects
- electrical fundamentals
- test and measurement instruments
- circuit plan appreciation
- instrumentation electronics
- engineering and workshop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- locate and interpret plans, drawings and text
- use tools and relevant equipment
- use test and measurement instruments
- use correct maintenance procedures
- use correct calibration procedures
- identify and select materials for the job
- apply regulatory aspects theory
- apply instrumentation electronics theory
- apply electrical fundamentals theory
- apply distributed control theory
- apply programmable control theory
- carry out work completion details
- communicate effectively
- apply data analysis techniques and tools
- maintain analog/digital electronic equipment
- service analog/digital electronic equipment

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(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:

- 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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0362A: Locate & rectify fault(s) in electrical equipment up to 1kVac/1.5Vdc

Competency Descriptor: Locate and rectify fault(s) in electrical equipment intended to operate to a connected supply up to 1,000 volts A.C. or 1,500 volts D.C., incidental to a principle function in the workplace following prescribed procedures.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Prepare to identify fault(s)	1.1	Nature of the fault(s) are confirmed in accordance with established procedures and appropriate personnel
	1.2	The work is planned to ensure OH&S policies and established procedures are followed
	1.3	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
	1.4	Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site
	1.5	Possible electrical equipment fault(s) are checked against job requirements and in accordance with established procedures
	1.6	Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements
	1.7	Electrical characteristics of electrical equipment and electrical supply are determined and recorded in accordance with established procedures
	1.8	Electrical equipment and associated circuits are identified for isolation purposes, where necessary, in accordance with established procedures
2. Locate fault(s) in the electrical equipment	2.1.	Electrical equipment and associated circuits are isolated, where necessary, in accordance with prescribed procedures
	2.2	Other OH&S policies and procedures are followed

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		2.3	Visual checks of the electrical equipment and components are carried out in accordance with prescribed procedures to detect any abnormal or obvious damage or fault
		2.4	Safety tests and circuit continuity are progressively carried out to assure isolation, and to detect operational, electrical or other non-conformances or fault(s)
		2.5	Electrical equipment is dismantled and/or removed, where necessary, and components stored in accordance with established procedures to protect them against loss or damage
		2.6	Fault(s) are confirmed and components to be replaced or adjusted are determined and details recorded in accordance with prescribed procedures
		2.7	On-going checks of the quality of work are undertaken in accordance with established procedures
3.	Rectify fault(s)	3.1	Isolation of electrical equipment and associated circuits is confirmed in accordance with requirements and prescribed procedures
		3.2	Materials and resources necessary to complete the work are obtained in accordance with established procedures and checked against job requirements
		3.3	Adjustments are made in accordance with prescribed procedures, where necessary, to ensure electrical equipment operates in accordance with intended parameters
		3.4	Fault(s) are rectified in accordance with prescribed procedures, where necessary.
		3.5	Approval is obtained in accordance with prescribed procedures from appropriate personnel, before any contingencies are implemented
		3.6	Tests on the electrical equipment are in accordance with prescribed procedures performed to ensure safe return to service and operation of the electrical equipment
4.	Provide status report(s)	4.1	Status report(s) are completed and notified in accordance with established procedures

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RANGE STATEMENT

Competency can be achieved on any one, more than one or all of the items of electrical equipment. Formal endorsement for each is to be provided separately as prescribed in the evidence guide and critical aspects.

- Motors
- Electrical heaters
- Control devices
- Single enclosed control device
- Pre-assembled neon signs

This unit describes competency within the scope of:

- The relevant item of electrical equipment so defined.
- Isolating electrical equipment for safe disconnection/reconnection.
- Disconnecting/reconnecting electrical equipment.
- Replacement of electrical equipment like for like.
- Electrical equipment connected to fixed wired supply up to 1,000 volts A.C. or 1,500 D.C.

Correct and appropriate tools and equipment includes the use of:

- voltmeters
- ammeters
- cathode ray oscilloscopes
- frequency counters
- continuity testers
- hand tools
- soldering and de-soldering devices

Test and measurement instruments may include:

- multimeter
- decade box
- DC
- I/V standard
- potentiometer
- radiation meter
- hand-held communicator/ programmer
- frequency counter
- function generator
- CRO
- LCR bridge
- logic analyser and specialised test equipment

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

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Components may include:

- general appliances
- single phase induction motors
- three phase induction motors
- single and three phase electrical heaters

Occupational health and safety may include:

- guidelines and regulations
- identification of personal safety
- workplace hazards
- working with electrically operated tools and equipment
- emergency first aid/resuscitation
- rescue from a live electrical situation
- enterprise policies and procedures

Procedures may include

- differentiation between symptoms
- faults and causes in malfunctioning equipment
- fault-finding techniques and procedures
- diagnosis
- work place inspection
- consultation with other parties/operators
- emergent problem sequence

Fundamental electrical concepts may include:

- effects of current; practical resistors
- sources of emf; series
- parallel and series-parallel circuits
- electrical measurement
- capacitors
- inductors
- magnetism

Isolations can refer to electrical/mechanical or other associated processes

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, statutory 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
- 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 components
- demonstrate correct procedures for checking electrical equipment
- demonstrate correct procedures for locating faults in electrical equipment

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Critical Aspects of Evidence (Cont'd)

- demonstrate correct procedures for rectifying faults in electrical equipment
- demonstrate correct procedures in removing, replacing and aligning electrical system 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

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety:
- Drawing
- Fundamental electrical concepts:
- basic principles of appliances (non mathematical)
- appliance identification
- appliance ratings
- basic principles of operation of control equipment and protection devices
- fault conditions and symptoms
- safe isolation procedures
- test equipment
- safe testing procedures including continuity
- fault types in appliances
- fault-finding procedures (prescriptive)
- basic principles of operation (non mathematical) of single phase induction motors
- basic principles of operation (non mathematical) of three phase induction motors
- basic principles of operation of single and three phase electrical heaters
- motor identification
- motor ratings
- fault types in "phase splitting" and universal type motors
- motor starter principles;
- types of electrical heaters
- electrical heater identification
- electrical heater ratings

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Skills
The ability to:

- apply occupation health and safety standards
- identify and use precision measuring equipment
- identify and select tools and materials
- identify and use relevant test equipment
- select and use specialised tools
- use technical drawings and data
- use hand and portable power tools
- apply testing techniques
- apply pneumatic principles
- identify electrical equipment components
- check electrical equipment
- locate faults in electrical equipment
- rectify faults in electrical equipment
- dismantle and assemble components to specified tolerances
- 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 supervisors or colleagues who can be approached for the collection of competency evidence
- 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

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(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 NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0552A: Maintain and service pneumatic system components and system

Competency Descriptor: This unit refers to the skills and knowledge required for the maintenance and service of pneumatic system components and system as related the metal engineering and maintenance industry

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for work	1.1 Work requirements are identified and clarified/confirmed with appropriate parties or by site inspection.
	1.2 Occupational health and safety standards and other relevant Industry standards 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.

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2.	Check hydraulic system components	2.1	System components identified correctly.
		2.2	The characteristics and operational function of each system component are understood.
		2.3	The operational function of each component inspected and tested.
		2.4	Correct operation of each component assessed against specification.
3.	Remove pneumatic components	3.1	Required isolations are confirmed, where appropriate, in accordance with site requirements.
		3.2	Fluid power components are disconnected in accordance with the work plan.
		3.3	Components are removed in a manner which will assist in replacement in accordance with site requirements.
		3.4	Components are inspected for abnormalities in accordance with the work plan.
4.	Maintain pneumatic components	4.1	Components are identified and prepared for maintenance in accordance with the work plan.
		4.2	Visual inspections and testing are carried out applying hydraulic pneumatic principles in accordance with the work plan.
		4.3	Maintenance is performed in accordance with manufacturers' specifications and site requirements.
		4.4	Components are dismantled, cleaned and examined to verify tolerances using appropriate techniques and procedures to determine replacement, overhaul, or repair in accordance with the work plan.
		4.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with specifications and results recorded in accordance with the work plan.

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		4.6	Faulty items are identified, repaired/overhauled using appropriate techniques and standards in accordance with the work plan.
		4.7	Replacement items are selected, inspected and prepared for installation in accordance with manufacturers' specifications and the work plan.
		4.8	Components are refitted in accordance with manufacturers' specifications and the work plan.
5.	Replace components	5.1	Site is prepared for fluid power component replacement in accordance with the work plan.
		5.2	Pneumatic components are replaced in accordance with the work plan and manufacturers specifications.
		5.3	Pneumatic components are aligned and connected in accordance with the work plan.
		5.4	All connections are leak/pressure tested in accordance with manufacturers' specifications and site requirements.
		5.5	Machinery/plant and components are tested and adjusted as required in accordance with manufacturers' specifications and site requirements.
6.	Complete 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.

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RANGE STATEMENT

Information including:

- system diagrams
- drawings
- technical Specifications

Control method (pneumatic):

- manual
- computer
- sequential
- combinational

Pneumatic components may include:

- actuators
- relays
- rams
- tools
- compressors
- filters
- sensors
- connections
- seals
- pipes
- valves
- actuators
- accumulators
- coolers
- separators

Pneumatic principles may include:

- both small signal control and power operating mediums

Work site environment may be affected by:

- nearby plant or processes, eg chemical, heat, dust, noise, gas and oil

Work completion details may include;

- plant and maintenance records
- job cards; check sheets
- on device labelling updates
- reporting and/or documenting equipment defects

Measuring tools may include:

- micrometers
- dial test indicators
- slip gauges
- surface plate
- depth gauge
- manometer
- ammeters
- stroboscope
- oscilloscopes
- verniers

Details of maintenance may be clarified by

- diagnosis
- work place inspection
- consultation with other parties/operators
- emergent problem sequence
- six-point technique
- half split or input/output technique

Maintenance may include

- repair
- inspection and modification
- overhaul
- lubrication
- servicing
- test running

Isolations can refer to electrical/mechanical or other associated processes

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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, statutory 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
- 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 pneumatic system components
- demonstrate correct procedures checking pneumatic system components
- demonstrate correct procedures servicing pneumatic system components
- demonstrate correct procedures for maintaining pneumatic system components
- demonstrate correct procedures in removing, replacing and aligning pneumatic system 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- occupational health and safety
- pneumatic equipment
- properties of liquids and gases
- precision measuring equipment
- seals and gaskets
- valves and porting principles
- pneumatic principles
- specialised tools and jigs
- bearings
- relevant materials and components
- technical drawings and data
- data recording techniques
- hand and portable power tools
- diagnostic and testing techniques
- plant and systems
- design and construction of pipework

Skills
The ability to:

- apply occupation health and safety standards
- identify and use precision measuring equipment
- identify and select tools and materials
- identify and use relevant test equipment manufacture and install seals and gaskets
- select and use specialised tools and jigs
- use technical drawings and data
- use hand and portable power tools
- apply testing techniques; apply pnuematic principles
- dismantle and assemble components to specified tolerances
- 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.

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(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 workplace procedures

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0562A: Maintain and service hydraulic system components and system

Competency Descriptor: This unit refers to the skills and knowledge required for the maintenance and service of hydraulic system components and system as related the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for work	1.1 Work requirements are identified and clarified/confirmed with appropriate parties or by site inspection.
	1.2 Occupational health and safety standards and other relevant Industry standards 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.

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2.	Check hydraulic system components	2.1	System components are identified correctly.
		2.2	The characteristics and operational function of each system component are understood.
		2.3	The operational function of each component are inspected and tested.
		2.4	Correct operation of each component is assessed against specification.
3.	Remove hydraulic components	3.1	Required isolations are confirmed, where appropriate, in accordance with site requirements.
		3.2	Fluid power components are disconnected in accordance with the work plan.
		3.3	Components are removed in a manner which will assist in replacement in accordance with site requirements.
		3.4	Components are inspected for abnormalities in accordance with the work plan.
4.	Maintain hydraulic components	4.1	Components are identified and prepared for maintenance in accordance with the work plan.
		4.2	Visual inspections and testing are carried out applying hydraulic principles in accordance with the work plan.
		4.3	Maintenance is performed in accordance with manufacturers' specifications and site requirements.
		4.4	Components are dismantled, cleaned and examined to verify tolerances using appropriate techniques and procedures to determine replacement, overhaul, or repair in accordance with the work plan.
		4.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with specifications and results recorded in accordance with the work plan.
		4.6	Faulty items are identified, repaired/overhauled using appropriate techniques and standards in accordance with the work plan.

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		4.7	Replacement items are selected, inspected and prepared for installation in accordance with manufacturers' specifications and the work plan.
		4.8	Components are refitted in accordance with manufacturers' specifications and the work plan.
5.	Replace components	5.1	Site is prepared for fluid power component replacement in accordance with the work plan.
		5.2	Hydraulic components are replaced in accordance with the work plan and manufacturers specifications.
		5.3	Hydraulic components are aligned and connected in accordance with the work plan.
		5.4	All connections are leak/pressure tested in accordance with manufacturers' specifications and site requirements.
		5.5	Machinery/plant and components are tested and adjusted as required in accordance with manufacturers' specifications and site requirements.
6.	Complete 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

Information including:

- system diagrams
- drawings
- technical Specifications

Control method (hydraulic):

- mechanical
- electrical
- servo
- combinational

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Hydraulic components may include:

- fluids
- reservoirs
- seals
- pipes
- pistons
- valves
- actuators
- governors and relays
- accumulators
- coolers
- separators
- filters
- sensors
- connections
- pumps
- rams

Hydraulic principles may include:

- both small signal control and power operating mediums

Work site environment may be affected by:

- nearby plant or processes, eg chemical, heat, dust, noise, gas and oil

Work completion details may include;

- plant and maintenance records
- job cards; check sheets
- on device labelling updates
- reporting and/or documenting equipment defects

Measuring tools may include:

- micrometers
- dial test indicators
- slip gauges
- surface plate
- depth gauge
- micrometers
- dial test indicators
- slip gauges
- surface plate
- depth gauge

Details of maintenance may be clarified by

- diagnosis
- work place inspection
- consultation with other parties/operators
- emergent problem sequence
- six-point technique
- half split or input/output technique

Isolations can refer to electrical/mechanical or other associated processes

Maintenance may include

- repair
- inspection and modification
- overhaul
- lubrication
- servicing
- test running

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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, statutory 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
- 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 hydraulic system components
- demonstrate correct procedures checking hydraulic system components
- demonstrate correct procedures servicing hydraulic system components
- demonstrate correct procedures for maintaining hydraulic system components
- demonstrate correct procedures in removing, replacing and aligning pneumatic system 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- occupational health and safety
- hydraulic equipment
- properties of liquids and gases
- precision measuring equipment
- seals and gaskets
- valves and porting principles
- hydraulic principles
- specialised tools and jigs
- bearings
- relevant materials and components
- technical drawings and data
- data recording techniques
- hand and portable power tools
- diagnostic and testing techniques
- plant and systems
- design and construction of pipework

Skills
The ability to:

- apply occupation health and safety standards
- identify and use precision measuring equipment
- identify and select tools and materials
- identify and use relevant test equipment manufacture and install seals and gaskets
- select and use specialised tools and jigs
- use technical drawings and data
- use hand and portable power tools
- apply testing techniques; apply hydraulic principles
- dismantle and assemble components to specified tolerances
- 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.

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(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 workplace procedures

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0572A: Maintain/repair electro-pneumatic systems

Competency Descriptor: This unit refers to the skills and knowledge required for the maintenance and service of electro- pneumatic system components and system as related the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Undertake preventative maintenance checks/adjustments on electro-pneumatic systems	1.1 System components, assemblies or sub-assemblies are identified and prepared for inspection/preventative maintenance.
	1.2 Visual inspection and testing with appropriate test equipment is carried out according to electro-pneumatic principles, procedures and safety requirements.
	1.3 Scheduled preventative maintenance tasks are performed including obvious repairs and adjustments according to manufacturer's specification using electro-pneumatic techniques/practices.
2. Undertake fault finding on electro-pneumatic systems	2.1 Designated electro-pneumatic system components are identified and a visual inspection of the system is carried out for the collection of fault finding data.
	2.2 System operator is consulted where appropriate and additional data collected.
	2.3 Maintenance reports and preventative maintenance schedules are checked and reviewed for additional fault finding data.
	2.4 Checks and tests are undertaken using electro-pneumatic principles.
	2.5 Faults and malfunctions are identified and verified.
	2.6 Faults and malfunctions are documented or reported by appropriate means to designated personnel and actioned.

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3.	Repair and/or overhaul power system	3.1	System or sub-assembly isolated safely and residue pressure discharged in accordance with prescribed procedures or checked for correct isolation.
		3.2	Isolated system or sub-assembly tagged according to designated means.
		3.3	Component or sub-assembly removed from system using correct removal principles and techniques.
		3.4	Components or sub-assemblies dismantled, examined and verified for replacement, overhaul or repair, using correct and appropriate techniques and procedures.
		3.5	Replacement items selected from manufacturers catalogues to meet specifications.
		3.6	Faulty items repaired/overhauled, using correct and appropriate principles, techniques and procedures.
		3.7	Component or sub assembly items refitted to equipment and tested for correct operation assessed against specifications.
4.	Recommission electro-pneumatic system	4.1	System or sub-assembly recommissioned according to prescribed procedures, to specifications.
		4.2	Correct operation of the system is verified using electro-pneumatic principles and system application techniques.
		4.3	Appropriate follow up procedures are instigated.
		4.4	Maintenance records/service reports are updated and completed by appropriate designated means.

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RANGE STATEMENT

Information including:

- system diagrams
- drawings
- technical Specifications

Control method (Electro-pneumatic):

- manual
- computer
- sequential
- combinational

Electro-Pneumatic components may include:

- actuators
- relays
- rams
- tools
- compressors
- filters
- sensors
- connections
- seals
- pipes
- valves
- actuators
- solenoids
- accumulators
- coolers
- separators

Pneumatic principles may include:

- both small signal control and power operating mediums

Work site environment may be affected by:

- nearby plant or processes, eg chemical, heat, dust, noise, gas and oil

Work completion details may include;

- plant and maintenance records
- job cards; check sheets
- on device labelling updates
- reporting and/or documenting equipment defects

Measuring tools may include:

- micrometers
- dial test indicators
- slip gauges
- surface plate
- depth gauge
- manometer
- ammeters
- stroboscope
- oscilloscopes
- verniers

Details of maintenance may be clarified by

- diagnosis
- work place inspection
- consultation with other parties/operators
- emergent problem sequence
- six-point technique
- half split or input/output technique

Maintenance may include

- repair
- inspection and modification
- overhaul
- lubrication
- servicing
- test running

Isolations can refer to electrical/mechanical or other associated processes

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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
- 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 electro-pneumatic system components
- demonstrate correct procedures checking electro pneumatic system components
- demonstrate correct procedures servicing electro pneumatic system components
- demonstrate correct procedures for maintaining electro-pneumatic system components
- demonstrate correct procedures in removing, replacing and aligning electro-pneumatic system 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- occupational health and safety
- electro-pneumatic equipment
- properties of liquids and gases
- precision measuring equipment
- seals and gaskets
- valves and porting principles
- electro-pneumatic principles
- specialised tools and jigs
- bearings
- relevant materials and components
- technical drawings and data
- data recording techniques
- hand and portable power tools
- diagnostic and testing techniques
- plant and systems
- design and construction of pipe work

Skills
The ability to:

- apply occupation health and safety standards
- identify and use precision measuring equipment
- identify and select tools and materials
- identify and use relevant test equipment manufacture and install seals and gaskets
- select and use specialised tools and jigs
- use technical drawings and data
- use hand and portable power tools
- apply testing techniques
- apply electro -pneumatic principles
- dismantle and assemble components to specified tolerances
- service electro -pneumatic system components
- maintain electro-pneumatic system components
- 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.

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(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.

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
- 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.

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0642A: Service and maintain power supplies

Competency Descriptor: This unit refers to the maintenance and service of power supplies including, but not limited to, process measurement, control systems and analytical instrumentation as applies to the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Undertake maintenance checks and routine tests	1.1 Power supply functions are determined and understood by reference to circuit diagrams, equipment manuals and/or consultation with equipment operator where appropriate.
	1.2 Power supply built-in test functions run and results are recorded to standard operating procedures where appropriate.
	1.3 Built-in faults/status display are noted and recorded to standard operating procedure.
	1.4 Power supply /sub-assemblies, components, connections, terminations etc. are checked visually and with correct and appropriate test equipment and techniques.
	1.4 Faulty components are removed and replaced where appropriate.
	1.5 All results are checked for compliance with manufacturers' requirements or specification; results are recorded to standard operating procedures.
2. Maintain and/or service power supply equipment	2.1 Where appropriate, isolate sub-assemblies to standard operating procedures.
	2.2 Power supply/sub-assemblies are adjusted to standard operating procedures using correct and appropriate techniques, tools and equipment.
3. Return power supply to service	3.1 Power supply/sub assemblies are returned into service utilising correct and appropriate techniques and procedures.

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3.2 Power supply/sub assemblies are checked for operational compliance to specifications and/or manufacturers requirements and documentation requirements are carried out to standard operating procedure.

RANGE STATEMENT

This unit covers the testing and maintenance of power supply and system; it covers situations in which a series of checks and pre-determined tests is applied in accordance with work shop manuals, testing procedures etc. This unit also covers the replacement of faulty components identified during these tests. Work ordinarily undertaken with minimal assistance but could include working as part of team. Work may be undertaken in field or workshop/laboratory environment. All work and work practices are undertaken to industry and company requirements.

Correct and appropriate tools and equipment includes the use of:

- voltmeters
- ammeters
- cathode ray oscilloscopes
- frequency counters
- continuity testers
- hand tools
- soldering and de-soldering devices

Components may include:

- transformers
- capacitors
- inductors
- rectifiers
- resistors
- transistors
- zener diodes

Materials may include:

- cables
- solder/flux
- lubricants
- cleaning solvents
- contact cleaners
- connectors
- adhesive and sealants

Check, tests, adjustments, services and maintenance undertaken on a wide range of equipment utilised in engineering environments including:

- telecommunication
- process control
- computer systems
- security monitoring
- alarm systems

All specifications and procedures may be obtained from:

- circuit drawings
- engineering data sheets
- manufacturers hand books

Work site environment may be affected by:

- nearby plant or processes e.g.
- heat
- noise
- dust
- oil
- water and chemical

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Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

Preliminary checks:

- checking for loose connections
- blown fuses
- checking for hairline cracks and poor solder joints, fuse checks
- checking for open circuits
- shorted circuits
- burn, signs of excessive heat
- bulging fixed capacitors

Work activities:

- select power supply
- make electrical connections
- measure voltage and current output
- connect power supply to load

Types of power supplies:

- conventional
- switching mode

Tests may include but not limited to:

- power supply output
- power supply regulation
- power supply internal resistance
- power supply ripple
- transformer phase
- transformer polarity
- transformer regulation
- transformer impedance ratio
- transformer winding balance

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 power supplies
- demonstrate correct procedures for checking power supplies

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Critical Aspects of Evidence (Cont'd)

- demonstrate the ability to perform routine test on power supplies
- demonstrate correct procedures servicing power supplies
- demonstrate correct procedures for maintaining power supplies
- demonstrate correct procedures in removing and replacing power supplies
- 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
- general layout of plant/work site and operation of its equipment
- electronic equipment including (telecommunication, process control, computer systems and security monitoring alarm systems)
- regulatory aspects
- major stages of a power supply
- characteristics of AC and DC
- principle of rectification and rectification circuits
- filter circuits and their principle of operation
- theory of voltage amplification
- power supply regulation circuits
- types of rectification circuits and their principle of operation
- limitations of power supplies
- electrical fundamentals
- test and measurement instruments
- circuit plan appreciation
- basics of industrial electronics
- engineering and workshop practice
- communication principles

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Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- locate and interpret plans, drawings and text
- use tools and relevant equipment
- use test and measurement instruments
- use correct maintenance procedures
- use correct calibration procedures
- identify and select materials for the job
- apply regulatory aspects theory
- apply instrumentation electronics theory
- apply industrial electronics fundamentals theory
- apply distributed control theory
- apply programmable control theory
- carry out work completion details
- communicate effectively
- apply data analysis techniques and tools
- maintain power supplies
- service power supplies

(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.

  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

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Method of Assessment (cont'd)

- 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 NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0862A: Maintain battery banks and cells

Competency Descriptor: This unit refers to the skills and knowledge required for the installation, testing and maintenance of all battery cells/banks including hydrogen generation cells/banks.

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, industry 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 text 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.

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2.	Test the equipment	2.1	Battery plant/equipment is inspected prior to testing to ensure absence of any damage, defects and/or signs of abnormalities in accordance with the work plan.
		2.2	Tests are carried out to determine battery/plant condition in accordance with site requirements and the work plan.
		2.3	Test results are recorded and analysed to determine battery/plant capabilities in accordance with site requirements and the work plan.
		2.4	Test and measurement instruments are used in accordance with manufacturers' instructions and the work plan.
		2.5	Faults found are noted and reported to appropriate parties in accordance with the work plan.
3.	Maintain the equipment	3.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		3.2	Equipment is disconnected and removed in a logical and sequential manner in order to facilitate maintenance and subsequent replacement in accordance with the work plan.
		3.3	Equipment is maintained using appropriate methods in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		3.4	Repairs and/or adjustments required are carried out to ensure equipment complies to manufacturers' specifications and/or site requirements in accordance with the work plan.
		3.5	Equipment is replaced and connected using appropriate methods 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.

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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

Types of equipment supplied by batteries may include:

- emergency lighting systems
- alarm and protection systems and process management systems

Work processes may include:

- determining work requirements
- identifying and selecting tools and equipment
- identifying and selecting electrolyte
- testing specific gravity of electrolyte
- applying load test to battery
- removing battery from circuit
- charging battery
- checking battery casing

Tools and equipment may include:

- appropriate size spanner
- electrolyte tester
- battery load tester

Types of batteries may include:

- lead acid
- nickel iron
- nickel cambium
- ni-cad and hydrogen gen cells

Installation may include:

- battery rooms
- battery cabinets
- free standing
- vehicle-mounted

Physical defects may include:

- surface damage
- corrosion
- leakage
- uncleanness
- blocked vents

Protective clothing:

- safety boots
- coverall
- safety helmet
- goggles
- respirator
- gloves
- rubber mats

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Battery plant work area may be subject to:

- environmental hazards, e.g. hydrogen gas and corrosive acids

Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

Isolations can refer to electrical/mechanical or other associated processes

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 battery banks and cell
- demonstrate correct procedures for checking battery banks and cell
- demonstrate the ability to perform routine test on battery banks and cell
- demonstrate correct procedures servicing battery banks and cell
- demonstrate correct procedures for maintaining battery banks and cell
- demonstrate correct procedures in removing and replacing battery banks and cell
- 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant industry requirements and codes of practice
- relevant JS21 standards
- equipment and material required to perform the work
- isolation procedures
- battery plant and operation of its equipment
- performance and function of D.C. electrical systems
- fault finding and diagnostic techniques; Hazardous materials
- battery test procedures
- repair techniques
- regulatory procedures
- electrical principles
- circuit plan appreciation
- engineering and work shop practice
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant industry regulations and codes of practice
- apply relevant JS21 standards
- use plans, drawings and texts
- use hand and portable power tool
- use test and measurement instruments
- identify faults
- apply fault finding and diagnostic techniques
- repair faults
- maintain battery banks
- select materials for the job
- handle hazardous materials
- carry out work completion details
- apply data analysis techniques and tools
- 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 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.

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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 NCTVET 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 2	
Use technology	Level 1	

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

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MEMMRD0882A: Conduct generator electrical maintenance

Competency Descriptor: This unit refers skills and knowledge required to perform those tasks required during the maintenance of electrical generating equipment as related 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, industry 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.

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2.	Carry out generator maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		2.2	Generator is maintained using appropriate plans, drawings and texts in accordance with the work plan.
		2.3	Generator is maintained in conjunction with others involved in, or affected by, the work in accordance with the work plan.
		2.4	Maintenance requirements are carried out to ensure generator operates within requirements in accordance with the work plan.
		2.5	Maintenance requirements are carried out, mindful of effects on, or unnecessary loss of, other equipment.
		2.6	Final job inspection is carried out and permits relinquished in accordance with the work plan.
3.	Complete the work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
		3.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
		3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
		3.4	Work completion details are finalised in accordance with site/enterprise procedures.

RANGE STATEMENT

Details of maintenance may be clarified by diagnosis and/or workplace inspection

Maintenance may include:

- brush gear inspection
- condition monitoring
- cleaning
- slot wedging
- re-insulation
- end bell removal
- de-gauzing and coolers

Work completion details may include:

- plant and maintenance records
- job cards
- check sheets and on device labelling updates

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Work site environment may be affected by:

- nearby plant or processes, e.g. heat, noise, dust, oil, water and chemical can refer to electrical/mechanical or other associated processes

Source of information:

- Job cards
- oral/written work instruction
- maintenance schedules
- diagrams
- circuit drawings and relevant technical information of generator

Tools and equipment:

- appropriate hand tools
- multi-range ammeter
- voltmeter
- ohmmeter
- tachometer and bearing analysers

Protective clothing/equipment:

- safety boots
- coverall
- safety helmets
- rubber mats

Types of generators to include:

- Single and three phase AC machines
- shunt series and compound wound DC machines – domestic and industrial plants.

Worn and damage components:

- springs
- brushes
- bearing

Routine servicing of generators may include:

- reading and interpreting technical information
- identifying and selecting tools and test instruments
- washing and drying generator units
- checking the integrity of cables, joints and terminations
- and making necessary corrections
- checking conditions of bearings
- replacing defective bearings
- adjusting springs tension
- replacing and bedding worn brushes
- sanding and polishing commutators and slip rings
- testing voltage output
- testing load current
- testing insulation
- testing load speed
- applying lubricants

Repairing and rectifying faults may include:

- reading and interpreting technical information
- determining work requirements
- planning work priorities and activities
- disassembling generators
- repairing or replacing stators
- grinding and facing commutators and slip rings
- baking drying generator units

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Testing and monitoring of generators may include:

- starting prime mover (engine, etc.)
- monitoring cooling system
- winding governor down to idle speed
- opening turbine throttle valve
- bringing turbine up to speed
- exciting the generator
- adjusting voltages/cycle to match system requirements
- turning on auto-synchroniser
- adjusting unit to load requirements
- reading and recording instrument valves

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 generator
- demonstrate correct procedures for demonstrate the ability to perform routine test on electrical generator
- demonstrate correct procedures servicing electrical generator
- demonstrate correct procedures for maintaining electrical generator
- demonstrate correct procedures in removing and replacing electrical generator components
- give particular attention to safety and elimination of hazards

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Critical Aspects of Evidence (Cont'd)

- checking electrical gemerator
- 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 JS21 1995
- equipment and material required to perform the work
- isolation procedures
- layout of plant/work site and operation of its equipment
- maintenance techniques
- electrical equipment
- regulatory procedures
- test and measurement instruments
- engineering and workshop practice
- communication principles
- teamwork

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- apply relevant industry standards JS21
- use plans, drawings and text
- use tools and relevant equipment
- use test and measurement instruments
- use maintenance procedures
- select materials for the job
- apply regulatory procedures
- apply data analysis techniques and tools
- communicate effectively
- work as part of a team

(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.

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(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 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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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 2	
Use technology	Level 1	

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

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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.

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		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.

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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

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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

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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

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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 JS21
- 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 JS21
- 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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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MEMMRD0902A: Service and repair electrical motors

Competency Descriptor: This unit refers to the skills and knowledge required for the servicing and repair n of electrical motors as applies to the metal engineering and maintenance industry.

Competency Field: Electrical 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.

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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.

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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

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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 t hose 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

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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
- replacing commutators and slip rings

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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
- 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry (JS21)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 (JS21)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.

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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 internal combustion engines
- 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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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 Jamaica 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.

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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.

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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

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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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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	

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MEMINS0162A: Cut and fit 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.

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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

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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
- 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 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

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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.

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(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:
- JS21 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

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(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 NCTVET 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.

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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.

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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

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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

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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:
- JS21 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

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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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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.

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		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

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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.

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(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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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.

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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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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.

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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.

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		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.

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(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

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(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& NEPA 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 & NEPA
- 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

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(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 NCTVET 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	

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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.

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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

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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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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	

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MEMMRD0253A: Monitor essential services operations in remote areas

Competency Descriptor: This unit deals with the skills and knowledge required for monitoring the readings of instruments and gauges and general operating conditions of a remote area essential service operation involving power and/or other industrial application in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Plan and prepare for monitoring	1.1	Monitoring is planned and prepared for to ensure OH&S policies and procedures are followed and 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	Location in which monitoring is to be carried out is determined from job requirements.
	1.4	Tools, equipment and testing devices needed to carry out the monitoring work are obtained in accordance with established procedures and checked for correct operation and safety, if needed.
	1.5	Observations are undertaken to ensure no damage has previously occurred to plant or equipment.
2. Monitor operations	2.1	OH&S policies and procedures for monitoring operations are followed.
	2.2	Monitoring is carried out in accordance with requirements, without damage or distortion to equipment or the surrounding environment or related 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.

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3.	Inspect and notify completion of work	3.1	Final inspections are undertaken to ensure the monitoring conforms to requirements.
		3.2	Work completion is notified in accordance with established procedures.

RANGE STATEMENT

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

Tasks may be performed in plant or in an on-site environment using electrical and electronic test equipment.

Tasks involve plant or site work safely utilising:

- solid
- liquid and gaseous samples for calibration
- electronic test equipment
- associated tools
- calibration charts
- plant or site data
- manufacturers' data sheets.

Employs the use of:

- high pressure gas cylinders
- liquid chemicals and associated equipment during calibration
- the interpretation of operating sequences for program operated devices is included.
- the use of specific calibration devices for laboratory and process analysers employing the principles of spectrometry (infra-red, visible, ultraviolet) both dispersive and non-dispersive, chromatography (gas, liquid), optical refraction, atomic radiation and x-rays.

Plant operations or site environment may include:

- power station instrument/meter reading
- information displayed by the instruments/meters in the power station
- generating equipment (diesel engine) – engine lubrication system oil pressure, engine cooling system coolant temperature (in and out)
- fuel pressure
- interpretation of electrical and electronic circuit diagrams
- switchboard – amperes, voltage, kilowatt, kilowatt hours, frequency hertz (Hz), engine running hours
- station services: fuel tank dip; lubricating oil tank level; fuel flow meter
- use of the information gathered from the instruments/meters for ordering of – fuel, lubricating oil, coolant schedule regular servicing and maintenance for – engine oil and filter changes, fuel filters, drive belt (condition/adjustment), valve

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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 remote essential services
- demonstrate correct procedures for checking system and system components
- demonstrate correct procedures maintaining system and system components
- demonstrate correct procedures for the monitoring of remote essential services operations
- demonstrate correct procedures in removing, replacing and aligning system and system 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

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(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
- general layout of plant/work site and operation of its equipment
- maintenance techniques for the equipment
- principles of spectrometry (infra-red, visible, ultraviolet) both dispersive and non-dispersive
- electronic instrument equipment
- regulatory aspects
- electrical fundamentals
- electrical and electronic circuit diagrams
- test and measurement instruments
- circuit plan appreciation
- instrumentation electronics
- engineering and workshop practice
- distributed control
- programmable control
- communication principles

Skills
The ability to:

- apply occupational health and safety standards
- follow relevant statutory regulations and codes of practice
- locate and interpret plans, drawings and text
- use tools and relevant equipment
- use test and measurement instruments
- use correct maintenance procedures
- use correct calibration procedures
- identify and select materials for the job
- apply regulatory aspects theory
- apply instrumentation electronics theory
- apply electrical fundamentals theory
- apply distributed control theory
- apply programmable control theory
- carry out work completion details
- communicate effectively
- apply data analysis techniques and tools
- maintain and repair scientific analysis 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.

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(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

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CRITICAL EMPLOYABILITY SKILLS

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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 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

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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.

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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

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(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

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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	

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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.

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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.

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(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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the NCTVET 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

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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.

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		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.

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		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.

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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

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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

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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

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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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- relevant industry standards JS21
- 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 JS21
- 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.

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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 NCTVET 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.

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