

## Competency Standards for Caribbean Vocational Qualifications (CVQ)

**CCMEM20507**

**Level II in Plumbing**

Unit Number	Unit Title	Mandatory/ Elective	Hours
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
MEMCOR0081A	Mark off/out (general engineering)	Mandatory	10
MEMCOR0091A	Draw and interpret sketches and simple drawings	Mandatory	20
MEMCOR0111A	Use power tools	Mandatory	15
MEMCOR0121A	Classify engineering materials – (basic)	Mandatory	30
MEMCAC0011A	Perform technical computations (basic)	Mandatory	40
MEMCOM0011A	Apply language and communication skills (basic)	Mandatory	40
MEMMAH0071A	Perform manual handling and lifting	Mandatory	5
MEMMAH0081A	Perform housekeeping duties	Mandatory	10
MEMINS0061A	Prepare for piping and tubing installation	Mandatory	20
MEMASY0071A	Assemble pipes and fittings for clients	Mandatory	40
MEMFAB0041A	Carry out mechanical cutting operations - (basic)	Mandatory	10
MEMINS0041A	Install and maintain piping and tubing	Mandatory	40
MEMFAB0051A	Perform brazing and/or silver soldering	Mandatory	20
MEMMPO0081A	Use workshop machines for basic operations	Mandatory	20
BCGMAS0101A	Carry out concreting to simple forms	Mandatory	20
MEMCOR0012A	Plan a complete activity	Mandatory	5
MEMCOR0042A	Interpret standard specifications and manuals	Mandatory	5
MEMCOR0052A	Operate in an autonomous team environment	Mandatory	5
MEMCOR0122B	Write technical reports (basic)	Mandatory	20
MEMCOR0152A	Use graphical techniques and perform simple statistical computations (basic)	Mandatory	20
MEMCAC0012A	Perform technical computations - general	Mandatory	40
MEMCOM0012A	Apply language and communication skills (I)	Mandatory	40
MEMINS0182A	Install valves, regulators and metering devices	Mandatory	15
MEMINS0192A	Roughing-in customer's pipework (install pipework)	Mandatory	15
MEMINS0202A	Install plumbing fixtures	Mandatory	15
MEMINS0212A	Install plumbing equipment	Mandatory	15
MEMINS0222A	Install auxiliary equipment	Mandatory	15
MEMINS0232A	Prepare material and locations for installing drains and waste systems	Mandatory	15
MEMINS0242A	Position, join and secure pipes and components to provide drains and waste systems	Mandatory	15
MEMMRD0462A	Carry out routine maintenance of plumbing systems to sustain effective performance	Mandatory	20

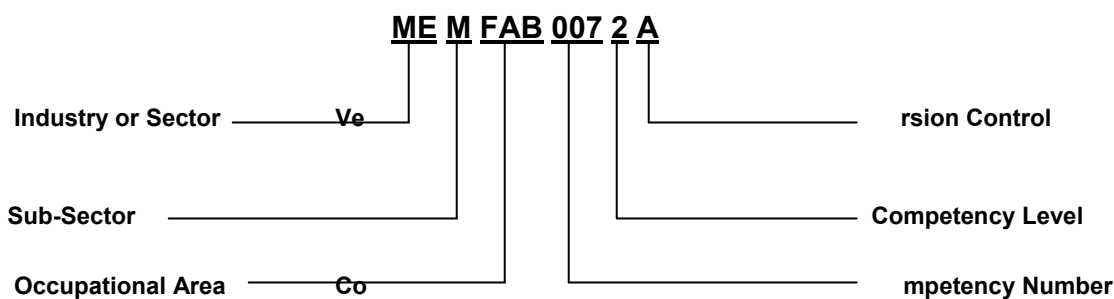
Unit Number	Unit Title	Mandatory/ Elective	Hours
MEMFAB0061A	Perform manual heating and thermal cutting	Elective	20
MEMFAB0071A	Undertake fabrication, forming, bending and shaping	Elective	40
MEMFAB0121A	Perform basic welding using oxyacetylene welding process (OAW) - fuel gas welding	Elective	50
MEMCOR0101A	Prepare basic engineering drawing	Elective	30
ITICOR0011A	Carry out data entry and retrieval procedures	Elective	40
BCGCOR0171A	Prepare for demolition process	Elective	40
BCGCOR0212A	Prepare surfaces	Elective	40
BCGMAS0292A	Carry out concrete work	Elective	40
MEMFAB0072A	Perform advanced welding using oxyacetylene welding process (OAW)	Elective	40
MEMMRD0072A	Shut down/isolate machine/equipment	Elective	20
MEMCOR0062A	Attend to breakdown	Elective	20
MEMMAH0042A	Order materials	Elective	20
MEMQUA0012A	Perform inspection (basic)	Elective	20
BSBSBM0012A	Craft personal entrepreneurial strategy	Elective	50
MEMMAH0073A	Purchase materials	Elective	20
MEMASY0023A	Assemble distribution systems and components	Elective	40
MEMINS0043A	Install & maintain main distribution systems and components	Elective	40
MEMMRD0343A	Maintain the effective operation of storage and distribution systems	Elective	40

To achieve this qualification ALL Mandatory competencies plus a minimum of one (1) level one elective three (3) level two electives and one (1) level three elective must be achieved.

Nominal Training Hours (Institutional Delivery) include total hours of Mandatory competencies and Electives selected.

### Legend to Unit Code

Example: MEMFAB0072A



**KEY:** COR – Mandatory; SBM Small Business Management (Sub-Sector); FAB – Fabrication; MAH – Machine Handling; INS – Installation; ASY – Assembly; MAS – Masonry; MPO – Machine & Process Operations; MRD – Maintenance Repairs & Diagnostic; QUA – Quality; ITI - Information Technology (Information); CAC Calculations and Computations; MEM – Metal Engineering (Maintenance); COM – Communication; MAH – Machine Handling; MRD – Maintenance Repairs & Diagnostic; BSB – Business Services (Industry); Building Construction General

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

### Competency Descriptor:

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

### Competency Field:

Metal, Engineering and Maintenance

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

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

## RANGE STATEMENT

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

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

- electrical,
- mechanical
- hydraulic
- pneumatic
- emergency

- steam and water
- oxy fuel

Quality Assurance requirements may include:

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

Personal protective equipment may include but is not limited to:

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

Emergency procedures include:

- fire fighting
- medical and first aid
- evacuation

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

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

### (2) Pre-requisite Relationship of Units

- Nil

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

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

#### Skills

The ability to:

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

### (4) Resource Implications

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0161A: Plan to undertake a routine task**

Competency Descriptor:

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

Competency Field:

Metal, Engineering and Maintenance

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



## RANGE STATEMENT

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

Instructions may include but not limited to:

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

**(2) Pre-requisite Relationship of Units**

- Nil

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0171A: Use graduated measuring devices**

## Competency Descriptor:

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

## Competency Field:

Metal, Engineering and Maintenance

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

**RANGE STATEMENT**

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

Measuring devices may include but not limited to:

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

Measurements undertaken may include but not limited to:

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

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

### (2) Pre-requisite Relationship of Units

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

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

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

#### Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0191A: Use hand tools**

Competency Descriptor:

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

Competency Field:

Metal, Engineering and Maintenance

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

**RANGE STATEMENT**

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

Hand tools may include but not limited to:

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

Applications may include hand tools used for

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

### (2) Pre-requisite Relationship of Units

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



**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0081A: Mark off/out (general engineering)**

## Competency Descriptor:

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

## Competency Field:

Metal, Engineering and Maintenance

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

**RANGE STATEMENT**

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

Storage procedures include labelling and identification to standard operating procedures

Marking out covers but not limited to:

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

Equipment may include but not limited to:

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

### (2) Pre-requisite Relationship of Units

- MEMCOR0091A Draw and Interpret sketches and simple drawings

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0091A: Draw and interpret sketches and simple drawings**

Competency Descriptor:

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

Competency Field:

Metal, Engineering and Maintenance

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

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

## RANGE STATEMENT

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

Technical drawings may utilise any of the following techniques:

- perspective
- exploded views
- hidden view

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

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

Drawing instruments and supplies:

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

Measurement systems:

- inch/foot system
- metric(SI) system

Alphabet of line:

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



Geometric construction to include:

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

Multi-view (orthographic 2-D) drawings:

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

Pictorial (3-D) drawing to include:

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

Dimension reading:

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

**(2) Pre-requisite Relationship of Units**

- Nil

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0111A: Use power tools**

Competency Descriptor:

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

Competency Field:

Metal, Engineering and Maintenance

**ELEMENT OF COMPETENCY****PERFORMANCE CRITERIA**

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

**RANGE STATEMENT**

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

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

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

Applications may include power tools used for

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

Operations may include:

- clamping
- aligning
- adjusting
- finish
- size
- shape

Outcomes to job specifications may include

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

### (2) Pre-requisite Relationship of Units

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

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

The assessment environment should not disadvantage the candidate.

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMCOR0121A: Classify engineering materials – (basic)**

Competency Descriptor:

This unit deals with skills and knowledge required to competently select and use appropriate metals for operations and procedures in the metal engineering and maintenance trades, and applies to individuals in the industry.

Competency Field:

Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Distinguish between the characteristics of engineering materials	1.1	Identified the characteristics of engineering materials.
		1.2	Demonstrated knowledge of the effect external factors has on engineering metals.
2.	Distinguish between the characteristics of metals	2.1	Identified the characteristics of engineering metals.
		2.2	Compared the properties and characteristics of engineering metals.
		2.3	Demonstrated the ability to carry out testing methods for engineering metals.
		2.4	Demonstrated the ability to carry out heat treatment process.
3.	Identify and select engineering metals for specific applications	3.1	Identified common applications of engineering metals.
		3.2	Identified ferrous and non-ferrous metals according to specific requirements.

**RANGE STATEMENT**

This unit applies to the knowledge of and skills required to classify identify, select and use engineering materials for various procedures and operations in the engineering and maintenance field.

Materials may include both ferrous and non-ferrous metals, plastics ceramics and metal alloys



## EVIDENCE GUIDE

Competency is to be demonstrated by classifying engineering in accordance with the range listed within the range of variables statement.

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to identify and compare the properties and characteristics of engineering metals
- demonstrate the ability to apply appropriate principles/techniques to identify materials
- demonstrate the ability to carry out specific heat treatment and testing procedures
- Take responsibility for the quality of their own work
- Perform all tasks in accordance with standard operating procedures

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

### (2) Pre-requisite Relationship of Units

- MEMCOR01311A Undertake interactive workplace communication
- MEMCOR0141A Follow principles of occupational Health and Safety (OH&S) in work place

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

- workplace and equipment safety requirements and OH&S legislation
- properties and nature of materials
- properties of plastics and ceramics
- properties of metals
- heat treatment procedures
- material testing procedures
- engineering application of metals
- ferrous and non-ferrous metals

#### Skills

The ability to:

- work safely to instructions
- compare the properties and characteristics of engineering metals
- apply appropriate principles/techniques to identify materials
- select appropriate material for usage
- carry out specific heat treatment and testing procedures
- communicate effectively

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMCAC0011A: Perform technical computations (Basic)**

## Competency Descriptor:

This unit deals with the skills, knowledge and attributes required to explore mathematical principles and techniques which are applicable to engineering and maintenance activities. The candidate is required to use numerical techniques to solve problems in related trade situations.

Competency Field: Calculations and Computations

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Use the rules of addition, subtraction, multiplication and division of decimal fractions to solve related trade problems	1.1 Number system is used to solve problems in related trade situations. 1.2 Simple calculations are performed using four basic rules, addition, subtraction, multiplication and division. 1.3 Concepts are understood and simple calculations are performed involving rounding off. 1.4 Concepts are understood and simple calculations are performed involving changing to common fractions and vice versa. 1.5 Concepts are understood and simple calculations are performed involving use of decimal equivalent table. 1.6 Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.
2. Solve problems using whole numbers, fractions and decimal numbers	2.1 Simple calculations are performed using four basic rules, addition, subtraction, multiplication and division. 2.1 Concepts are understood and simple calculations are performed involving whole numbers . 2.3 Concepts are understood and simple calculations are performed involving fractions . 2.4 Concepts are understood and simple calculations are performed involving decimal numbers . 2.5 Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.

- 
- |    |   |     |   |
|----|---|-----|---|
| 3. | Use percentage and ratio to solve related skill problems  | 3.1 | Concepts are understood and simple calculations using percentages are performed involving decimal numbers .   |
|    |   | 3.2 | Concepts are understood and simple calculations using percentages are performed involving fractions .   |
|    |   | 3.3 | Concepts are understood and simple calculations using percentages are performed involving whole numbers .   |
|    |   | 3.4 | Concepts are understood and simple calculations using ratio are performed involving decimal numbers .   |
|    |   | 3.5 | Concepts are understood and simple calculations using ratio are performed involving fractions .   |
|    |   | 3.6 | Concepts are understood and simple calculations using ratio are performed involving whole numbers .   |
|    |   | 3.7 | Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.  |
| 4. | Change percent to decimal or fractions and vice versa, and subsequently perform these operations on related trade problems. | 4.1 | Concepts of conversion are understood and simple calculations using percent to decimal or fractions and vice versa are performed involving cost.                            |
|    |   | 4.2 | Concepts of conversion are understood and simple calculations using percent to decimal or fractions and vice versa are performed involving wages .                          |
|    |   | 4.3 | Concepts of conversion are understood and simple calculations using percent to decimal or fractions and vice versa are performed involving related applications .           |
|    |   | 4.4 | Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.  |
| 5. | Calculate perimeters and areas of applications in related trade   | 5.1 | Concepts of calculating perimeters and areas are understood and simple calculations using squares and rectangles are performed involving related applications .             |
|    |   | 5.2 | Concepts of calculating perimeters and areas are understood and simple calculations using circles (circumferences and areas) are performed involving related applications . |
|    |   | 5.3 | Concepts of calculating perimeters and areas are understood and simple calculations using trapezoids are performed involving related applications .                         |

- 
- 5.4 Concepts of calculating perimeters and areas are understood and simple calculations using cones are performed involving related applications .
  - 5.5 Concepts of calculating perimeters and areas are understood and simple calculations using cylinders are performed involving related applications .
  - 5.6 Concepts of calculating perimeters and areas are understood and simple calculations using triangles (hypotenuse) are performed involving related applications .
  - 5.7 Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.
6. Calculate volume of applications in related trade
- 6.1 Concepts of calculating volume are understood and simple calculations using squares and rectangles cross section are performed involving related applications .
  - 6.2 Concepts of calculating volumes are understood and simple calculations using conical cross section are performed involving related applications.
  - 6.3 Concepts of calculating volumes are understood and simple calculations using cylindrical cross section are performed involving related applications .
  - 6.4 Concepts of calculating volumes are understood and simple calculations using triangular cross section are performed involving related applications .
  - 6.5 Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.
7. Apply angular measurement between 0 and 360 degrees with the use of a protractor
- 7.1 Protractor is used to solve problems in related trade situations.
  - 7.2 Concepts of calculating angles are understood and simple calculations using four basic rules, addition, subtraction, multiplication and division are performed involving related applications .
  - 7.3 Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.

## RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance.

The following variables may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts

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

- measurement
- fundamentals of general mathematics
- 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

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

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

## 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

**Critical Aspects of Evidence (Cont'd)**

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

**(2) Pre-requisite Relationship of Units**

- Nil

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- drawings and specifications
- basic operations in simple geometry,
- measurement and calculations
- costing relative to the trade application
- 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
- apply the fundamentals of general mathematics
- measure and calculate manually
- record measurements
- operate electronic calculating devices
- perform basic technical computation
- 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
- written 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

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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMCOM0011A: Apply language and communication skills (basic)**

Competency Descriptor:

This unit applies to the attitudes, skills and knowledge necessary to communicate effectively in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field:

Communication

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1. Apply grammar and usage		1.1	Knowledge of the types of sentences are demonstrated .
		1.2	Different kinds of phrases are identified .
		1.3	Sentences are constructed using different subordinates clauses.
		1.4	Sentences are constructed showing correct use of agreement between subject and verb.
		1.5	Sentences are constructed showing agreement between pronouns and the antecedents.
		1.6	The correct forms of verbs are identified and appropriately used .
		1.7	Different tenses are identified and appropriately used .
		1.8	Knowledge of the correct use of adjectives is demonstrated .
		1.9	Sentences are constructed showing verbs in their active and passive voice.
		1.10	Sentences faults are identified and corrected .
2. Apply mechanics vocabulary and spelling		2.1	Knowledge of rules governing the use of capitalization, punctuation and abbreviation is demonstrated.
		2.2	Punctuation marks are used correctly in written exercises .
		2.3	Abbreviations are identified and used as related to skill area .
		2.4	Words are spelt and their meanings interpreted through context clues and industry standards.
3. Communicate concepts in writing		3.1	Concepts are written using appropriate terminology/industry jargon where required.
		3.2	Concepts are written using appropriate sentence construction techniques.

- |  |     |   |
|--|-----|---|
|  | 3.3 | Concepts are coherent , adequately.                     |
|  | 3.4 | Main points identified and expanded.                    |
|  | 3.5 | Activities are completed within specified time .        |
|  | 3.6 | References are acknowledged as required .               |
| 4.   | 4.1 | Subject matter are identified and communicated.         |
| Apply intrapersonal and interpersonal communication skills to work environment | 4.2 | Effective communication is practiced in the workplace . |
|  | 4.3 | Good communication is practiced in the workplace .      |

## 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 nature and it should be based on the writer having technical knowledge.

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

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

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

Grammar and usage may include:

- types and functions of sentences
- phrases and their functions
- subordinate clauses (adverbial adjectival, noun)
- subject and verb (focus on compound subjects, indefinite pronoun as subject collective noun as subject)
- pronouns and their 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

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
- spelling words and interpretation of their meanings through context clues and word analysis, prefixes, suffixes, root (focus on words used in skill area)

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

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

Intrapersonal and interpersonal communication skills including:

- goal setting
- effective communication practice
- good customer service
- oral presentation techniques

## EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of communication 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 apply language and communication skills
- 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 usage
- types of sentences
- parts of sentences
- types of paragraph
- mechanics, vocabulary and 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
- apply language and communication skills in the work place

**(4) Resource Implications**

The candidate will be provided with:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMMAH0071A: Perform manual handling and lifting**

## Competency Descriptor:

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

Competency Field: Material handling

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

**RANGE STATEMENT**

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

Moving/shifting equipment may include but not limited to:

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



## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

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

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

### (2) Pre-requisite Relationship of Units

- Nil

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

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

**Skills**

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMMAH0081A: Perform housekeeping duties**

## Competency Descriptor:

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

## Competency Field:

Maintenance

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

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

## RANGE STATEMENT

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

Tools and equipment includes but is not limited to:

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



- Engineering materials include but are not limited to:
  - bricks and concrete masonry
  - mortar components – cement, coarse aggregate, sand
  - timber
  - structural steel sections/components
  - concrete
  - scaffolding components, pipe sections
  - plywood and particle board
  - metal sheeting
  - steel reinforcement
  - insulation
  - glass
  - paints and sealants
  - plaster sheeting

Protection of stacked/stored materials may include:

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

Dust suppression procedures may include:

- spraying with water
- covering
- use of vacuum cleaner

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

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

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

Reporting of faults may be verbal or written.

## EVIDENCE GUIDE

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

### (1) Critical Aspects and Evidence

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

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

**(2) Pre-requisite Relationship of Units**

- Nil

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.



**MEMINS0061A: Prepare for piping and tubing installation**

## Competency Descriptor:

This unit deals with the skills and knowledge required to effectively prepare the process for carrying out installation of piping and tubing 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	<p>1.1 Quality Assurance requirements of engineering /maintenance operations are recognized and adhered to.</p> <p>1.2 Preparation and planning requirements are identified from drawings/work location and/or supervisor's instructions.</p> <p>1.3 OH&amp;S requirements are identified and adhered to in accordance with application tasks and workplace environment.</p> <p>1.4 Safety hazards are identified and correct procedures adopted to minimise risk to self and others.</p> <p>1.5 Materials are selected according to supervisor's instructions, safely handled and stored for application.</p> <p>1.6 Appropriate personal protective equipment are selected, correctly fitted and used.</p> <p>1.7 Tools and equipment selected is consistent with the job requirements.</p> <p>1.8 Tools and equipment is checked for serviceability and any faults reported to supervisor</p> <p>1.9 Materials/components selected are consistent with the job requirements and checked for damage.</p>
2. Prepare materials selected for installation process	<p>2.1 Activities for material preparation are identified from specifications or supervisor's instructions.</p> <p>2.2 Material preparation is carried out to satisfy requirements of installation process.</p>

- |    |   |     |  |
|----|---|-----|--|
| 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 are suitable for application and process identified.   |
|    |   | 4.2 | Regular tools/measuring devices are used safely and effectively to carry out processes where applicable.                         |
| 5. | Prepare background of surfaces/environment for piping and tubing installation | 5.1 | Surfaces/environment are identified for preparation.   |
|    |   | 5.2 | Surface where appropriate is chassed/chopped/prepared.   |
|    |   | 5.3 | Excavations are carried out where appropriate.   |
| 6. | Select materials and cut components   | 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 | Appropriate techniques used to accurately cut/bent/fabricate/secure components to same length and to given instruction.          |
| 7. | Distribute components   | 7.1 | Components are distributed and stacked to suit job location and sequence.  |
| 8. | Clean up  | 8.1 | Materials are stacked/stored for re-use or disposed of.  |
|    |   | 8.2 | Work area is cleared.  |
|    |   | 8.3 | Tools and equipment are cleaned, maintained and stored.  |

## RANGE STATEMENT

This unit applies to the preparation processes carried out in preparing for the installation of piping and tubing as per instructions.

Background surfaces for installation of piping and tubing include but not limited to:

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

Installation 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 goggles

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

Tools and equipment to include:

- hand and power hack saws
- stock dies
- pipe threading machine
- pipe wrenches
- pipe cutters
- cold chisels
- soldering and brazing equipment
- wenches
- tube cutter
- flaring tool
- screwdrivers
- shovels
- pickaxes
- hand drills
- pipe reamers
- swaging tools
- files
- heavy duty hammer drill
- hammers

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
- threading

Representative range of applications may include such things as

- fixtures
- equipment
- valves
- regulators
- metering devices

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

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 piping and tubing 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
- demonstrate the ability to prepare for piping and tubing installation
- demonstrate the ability to apply appropriate principles/techniques to installation environment
- indicate compliance with organisational policies and procedures including Quality Assurance requirements
- 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.
- 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

### (2) Pre-requisite Relationship of Units

- MEMCRI0021A (Apply principles of Occupational Health and safety (OH&S) in work environment)
- MEMCRI0071A (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 piping and tubing installation
- 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 piping and tubing installation

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

- 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMASY0071A: Assemble pipes and fittings for clients**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively assemble pipes and fittings and applies to individuals working in the metal engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

**ELEMENT OF COMPETENCY****PERFORMANCE CRITERIA**

1.	Read and understand job sheets	1.1	Job sheets/instruction are correctly interpreted and followed.
2.	Select and use pipe cutting and assembly tools	2.1	Tools are correctly selected and used.
3.	Select and use pipes, tools and fittings assembly equipment	3.1	Assembly equipment is selected in accordance with instructions on job sheet.
		3.2	Equipment is used in a safe manner according to standard operating procedure.
4.	Assemble fabrications	4.1	Assembly is produced following correct sequence of operations
		4.2	Assemblies/fabrications/fittings are joined according to specification using appropriate techniques.
		4.3	Assembly is tested/checked for compliance with job sheet requirements using standard operating procedures.
5.	Protect assembly from damage	5.1	Assemblies/fabrications/fittings are handled and stored in a safe manner least likely to cause damage using standard operating 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.



Work processes may include but not limited to:

- identifying and selecting materials, fixtures and supplies
- identifying and selecting tools and equipment
- identifying and selecting pipes and fittings
- measuring, cutting and preparing plastic pipes for joining
- applying solvent cement weld to plastic pipes and fittings and joining pipes
- cleaning tools and work area
- preparing pipe ends for installation
- installing valves, regulators and metering devices
- positioning and installing kitchen/bath room fixtures plumbing fixtures
- soldering copper pipe fittings
- measuring and cutting steel pipes
- threading steel pipes
- joining steel/copper pipes
- welding steel/copper pipes
- brazing steel/copper pipes
- testing pipe joints
- excavating trenches
- chasing, boring and drilling concrete
- roughen-in pipe-work
- erecting and/or installing piers brackets and other supports
- flaring copper tubes

Preparation of materials would be minimal and may include but not limited to:

- preheating
- setting up jigs,
- setting up fixtures
- setting up clamps
- cleaning up material
- joint preparation

Location/condition may include but not limited to:

- workshops
- domestic complexes
- plants and commercial complexes
- in the field
- confined spaces
- elevated positions
- damp and wet situations
- on wall surfaces

Roughen-in may include but not limited to:

- kitchen fixtures
- bathroom fixtures
- laundry equipment
- specified chemical systems
- compressed air line
- specified steam line
- farming complex

Joining of pipes may be done by but not limited to:

- screwed method
- welding
- brazing
- soldering
- flanged method
- compression method
- solvent weld – (P.V.C cement)
- seaming
- bonding
- riveting

Tools and equipment may include but not limited to:

- hand and power saws
- pipe cutters
- threading machine
- pipe reamers
- pipe dies/taps
- tape measure
- jigs and fixtures
- ladders/scaffolding
- welding/brazing/soldering equipment
- masonry tools
- hammers/screwdrivers/hand tools
- hand brush
- pipe bending spring
- pipe vices/wrenches/tripod/benders

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively assembly pipes and fittings 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 assembling pipes and fittings and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in assembling pipes and fittings
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations
- demonstrate effective skills 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 the assembly of pipes and fittings or other units requiring the exercise of the skills and knowledge covered by this unit.

### (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
- MEMCOR0171A Use graduated measuring devices
- MEMFAB0041A Carry out mechanical cutting operations - (basic)
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- assembly methods
- assemble equipment
- hand tools and equipment
- jigs, fixtures, tools and measuring equipment relative to repairing, replacing and modifying fabrications
- materials preparation
- manual handling
- measurement
- drawings, sketches and instructions
- types and use of tools

Skills

The ability to:

- work safely to instructions
- plan to undertake a routine assembly task
- interpret relative drawings and instructions
- select and use tools and fittings related to assembly process
- select pipes and fixtures for the assembly process
- measure relative to the assembly processes
- communicate effectively
- assemble pipes and fittings efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

- answer questions put by the assessor.
- identify 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.

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMFAB0041A: Carry out mechanical cutting operations – (basic)**

## Competency Descriptor:

This unit deals with the skills and knowledge required to effectively carry out mechanical cutting as 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	Job specification and requirements are determined from job sheets and/or instructions.
		1.2	Appropriate method/machine is selected to meet specifications.
		1.3	Machine is loaded and adjusted appropriately for operation and is consistent with standard operating procedures.
2.	Select/set up machine tooling	2.1	Selected most appropriate tooling.
		2.2	Installed tooling correctly using standard operating procedures.
		2.3	Machine is set up and adjusted using standard operating.
3.	Operate mechanical cutting machine	3.1	Appropriate stops and guards are set and adjusted as required.
		3.2	Material is secured and correctly positioned using measuring equipment as necessary.
		3.3	Machine is started and stopped safely to standard operating procedures.
		3.4	Machine is operated to cut/hole material to specifications using standard operating procedures.
		3.5	Lubricant used as required.
		3.6	Appropriate safety precautions are taken.
4.	Check material for conformance to specification	4.1	Material is checked against specification.
		4.2	Machine and/or tooling is adjusted as required

- 4.3 Material is cut and/or holed to within workplace tolerances.
- 4.4 Material used in most economical way.
- 4.4 Codes and standards are observed.

## RANGE STATEMENT

This unit may cover the operation of a number of the following activities:

- sawing
- shearing
- cropping
- holing /boring

Materials may include:

- ferrous metals
- non-ferrous metals
- non-metallic products

Examples of machines that could be covered include:

- guillotines
- croppers
- cold saws
- band saws
- automatic saws

Work is undertaken under supervision or as part of a team environment to predetermined:

- standards of quality
- safety
- workshop procedure.

This unit includes the set up and operation of a range of:

- mechanical cutting equipment
- holing /holing equipment

Typical applications of this unit may include cutting for:

- manufacture
- production
- cutting of materials selected from stores in a maintenance environment
- fabrication

## EVIDENCE GUIDE

Competency is to be demonstrated safely and effectively when cutting material 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 setting up mechanical cutting equipment and during the cutting process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in setting up cutting equipment
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations
- demonstrate effective cutting to produce designed cut material

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

### (2) Pre-requisite Relationship of Units

This unit does not cover hand or hand held power tools used for cutting purposes eg: circular saws, nibblers and side grinder. These skills are covered by other units; see Unit MEMCOR0191A (Use hand tools) and Unit MEMCOR0111A (Use power tools).

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- cutting equipment
- cutting processes operations or activities
- hand tools and equipment
- materials relative to cutting processes
- materials preparation
- manual handling
- measurement
- drawings, sketches and instructions

Skills

The ability to:

- work safely to instructions
- interpret relative drawings and instructions
- use power tools and hand tools
- select material
- measure relative to cutting processes
- communicate effectively

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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



## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMINS0041A: Install and maintain piping and tubing**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively install and terminate piping and tubing associated with domestic plumbing installation 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 | Piping, and tubing is checked against job requirements.   |
|    |                                   | 1.5 | Piping and tubing is obtained in accordance with established procedures and to comply with requirements.  |
|    |                                   | 1.6 | Location in which piping and tubing 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. |
|    |                                   | 1.9 | Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.  |
| 2. | Install piping and tubing         | 2.1 | OH&S policies and procedures for installing piping and tubing are followed.   |
|    |                                   | 2.2 | Piping and tubing are installed in accordance with requirements, without damage or distortion to the surrounding environment or services.   |

- |    |                                       |   |
|----|---------------------------------------|---|
|    | 2.3                                   | Piping and tubing 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. | Test for leaks                        | 3.1 Leaks are tested for using appropriate devices and procedures.  |
| 4. | Inspect and notify completion of work | 4.1 Final inspections are undertaken to ensure the installed piping and tubing conforms to requirements.                            |
|    |                                       | 4.2 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 regulations, procedures, technology and the like related to the scope and application of this unit

Use identification and application of tools for

- |               |                          |
|---------------|--------------------------|
| • marking out | • threading              |
| • measuring   | • tapping                |
| • cutting     | • finishing              |
| • shaping     | • dismantling/assembling |
| • drilling    | • flaring                |
| • brazing     | • soldering              |

Fabrication techniques may include but not limited to:

- |               |                  |
|---------------|------------------|
| • marking out | • drilling       |
| • cutting     | • punching       |
| • bending     | • soldering      |
| • flaring     | • cutting mitres |
| • brazing     | • welding        |

Representative range of applications may include such things as:

- water supply
- steam
- air
- oil
- refrigeration
- other fluids
- equipment
- tools
- accessories
- components

Installation techniques:

- surface mount
- in wall
- underground/overhead
- in floorings/in ceilings

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively install and maintain piping and tubing for domestic plumbing installations 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 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'.

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to install and maintain piping
- 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 installation and maintenance procedures;
- perform all related tasks to specification;
- 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
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0171A Use graduated measuring devices
- MEMFAB0041A Carry out mechanical cutting
- MEMFAB0051A Perform brazing and/or silver soldering
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- installation tools and equipment
- materials used in installation
- materials used for piping and fittings
- fabrication techniques
- installation techniques
- maintenance techniques for different materials and nature of work
- assembly/disassembly techniques
- leak detection techniques
- types of joining compounds

Skills

The ability to:

- identify potential workplace hazards; preventative measures
- work with tools and equipment
- read and interpret simple freehand sketches
- measure accurately
- communicate effectively
- install and maintain piping and tubing efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

- answer questions put by the assessor.
- Identify 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.

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 on and off the job 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manage process</li> <li>• Select the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

**MEMFAB0051A: Perform brazing and/or silver soldering**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively perform brazing and /or silver soldering as 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 and equipment	1.1	Job requirements are determined from specifications and/ or instructions.
		1.2	Materials are correctly prepared using appropriate tools and techniques.
		1.3	Materials are correctly assembled/aligned to meet specifications as required.
		1.4	Distortion prevention measures are identified and appropriate action taken as required.
		1.5	Heating equipment is assembled and set up safely and correctly in accordance with standard operating procedures.
		1.6	Correct and appropriate consumables are selected and prepared.
		1.7	Test run undertaken and verified as required.
2.	Braze and/or silver solder	2.1	Correct and appropriate processes are selected to meet specifications.
		2.2	Materials are preheated as required.
		2.3	Consumables are applied using correct and appropriate techniques.
		2.4	Jointing material is applied correctly and in appropriate quantities to meet job/specifications.
		2.5	Used correct temperature and appropriate techniques.

- |   |                |     |  |
|---|----------------|-----|--|
| 3 | Inspect joints | 3.1 | Excess jointing materials are removed using correct and appropriate techniques.                    |
|   |                | 3.2 | Inspection of joints is undertaken using standard operating procedures and meeting specifications. |
|   |                | 3.3 | Inspection results are reported/recorded using standard operating procedures as required.          |

## RANGE STATEMENT

Work undertaken in a production, engineering or maintenance environment using predetermined standards of quality, safety and work procedures. Work may be undertaken under supervision or within a team environment. All work undertaken to standard requirements

Appropriate assembly of heating equipment may include:

- cylinders
- connections
- hoses
- tips
- nozzles

Materials:

- low carbon steel (mild steel) up to 10 gauge
- low carbon steel plate up to 5mm
- steel and galvanised pipes up to 50mm

Work activities:

- measuring,
- marking,
- grinding
- lifting,
- welding

Heating medium and appropriate consumables can include:

- oxyacetylene
- fuel gas
- fluxes (resin or powder)
- all types of silver solder and brazing rods

Location/condition:

- workshop
- plant
- fieldwork at ground level
- elevated positions
- dry
- humid and wet conditions
- construction environment
- agricultural environment
- food processing environment

- cutting
- aligning,
- shaping,
- filing,
- general machining



## Specification:

- welding procedure
- weld profile regular in width
- even/regular ripple formation
- uniform in appearance,
- free from excessive undulations
- smooth stop/starts, tack incorporated,
- adequate penetration
- no excess undercut
- no craters

## Types of welding joints:

- fillet weld
- lap weld
- butt weld,
- single and multi-run

## Welding position:

- flat,
- vertical
- horizontal
- overhead

**EVIDENCE GUIDE**

Competency is to be demonstrated by safely and effectively performing routine oxyacetylene welding (fuel gas welding) 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 setting up oxy acetylene equipment and during the brazing and or silver soldering process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in setting up and shutting down oxy acetylene equipment
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations
- demonstrate effective brazing and or silver soldering 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 brazing and/or silver soldering or other units requiring the exercise of the skills and knowledge covered by this unit.

**(2) Pre-requisite Relationship of Units**

- MEMCOR0141A Follow principles of occupational health and safety (OH&S) in work environment
- MEMCOR01611A Plan and undertake a routine task
- MEMCOR0191A Use hand tools

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- metal properties and classification
- heating medium/technique
- brazing/soldering processes
- oxy-fuel equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to brazing and silver soldering procedures
- materials preparation
- manual handling
- measurement
- drawings, sketches and instructions

Skills

The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings and instructions
- use brazing and soldering equipment
- identify/select material
- identify/select brazing soldering processes
- handle material, tools and equipment
- measure relative to brazing and or silver soldering processes
- identify/select materials relative to the brazing and or soldering process
- prepare materials relative to the brazing and or soldering process
- braze and or silver solder efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

#### (6) Context of Assessment

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

### CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMMPO0081A: Use workshop machines for basic operations**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively use workshop machines for basic operations 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	Job requirements are interpreted.
	1.2	Appropriate machine is selected to meet requirements.
2. Set up machine	2.1	Tools are selected where appropriate.
	2.2	Cutting tools are sharpened as required.
	2.3	Tools are correctly installed using standard operating procedures.
	2.4	Appropriate guards are set and adjusted as required.
3. Operate machine	3.1	Material to be machined is positioned and secured
	3.2	Machine is operated appropriately to suit job and material requirements.
4. Check finished component	4.1	Machined component are checked against requirements and predetermined finish.

**RANGE STATEMENT**

Work undertaken under supervision or in a team environment using predetermined standards of quality, safety and workshop procedures. This unit covers basic machining in a maintenance or jobbing environment. The machines include but are not limited to lathe, radial arm drill, etc., and covers the sharpening of tools as required.

Instruments:

- tapes
- ruler
- vernier
- callipers
- 
- feeler gauges
- slip gauges
- range of micrometer instruments

Working hold devices including:

- jigs/fixtures
- vices
- chuck/collets
- mounting direct to table,
- automatic or manual operation

## 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 manual metal arc welding all process or other competencies 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 machining processes efficiently.
- communicate information about 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

- MEMCOR0141A Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0081A Mark off/out (general engineering)
- MEMCOR0191A Use hand tools

This unit is not to be selected when Units MEMMPO0021A (Perform general machining) or MEMMPO0061A (Operate and monitor machine/process) have already been selected. For hand held/power tools use MEMCOR0111A (Use power tools).

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S regulations
- metal properties and classification
- common machine setting/holding tools
- metal lathe machines (capstan, center or turret)
- basic machining techniques
- setting basic metal machines
- machining processes
- hand tools and equipment
- materials preparation
- manual handling and lifting
- measurement
- drawings, sketches and instructions

Skills

The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings and instructions
- use basic machining equipment
- identify/select material/equipment
- identify/select machining processes
- handle material, tools and equipment
- measure relative to machining processes
- identify/select materials suitable for machining processes
- prepare materials relative to the machining process
- perform basic machining processes efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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.

## BCGMAS0101A: Carry out concreting to simple forms

### Competency Descriptor:

This unit deals with the skills and knowledge required to effectively and safely carry out concreting to simple formwork, and applies to all individuals working in the preparation and placing of formwork and concrete.

### Competency Field:

General Construction

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Select tools and equipment	1.1	Quality Assurance requirements recognised and adhered to in accordance with company's construction operations.
		1.2	Occupational Health and Safety (OH&S) requirements recognised and adhered to in accordance with application tasks and workplace environment.
		1.3	Appropriate personal protective equipment selected, correctly fitted and used.
		1.4	Tools and equipment selected to instructions consistent with job requirements checked for serviceability and any faults reported to supervisor.
2.	Erect and strip simple formwork	2.1	Design of formwork identified from drawings/supervisors instructions.
		2.2	Formwork safely erected on commencement and stripped on completion under direction of supervisor.
		2.3	Stripping agent applied to erected formwork, where appropriate.
		2.4	Timber components dewatered following stripping of formwork.
		2.5	All components cleaned, stacked and stored for re-use or bundled for removal.
3.	Place and tie reinforcement	3.1	Reinforcing components safely handled and carried to required position.
		3.2	Reinforcing bars, rods, stirrups and mesh positioned under supervisor's directions.
		3.3	Bar chairs and spacers located in place, checking minimum edge cover under the direction of supervisor.



- |    |                |     |  |
|----|----------------|-----|--|
| 4. | Place concrete | 4.1 | Formwork/excavation cleaned of excess material and debris prior to concrete placement.                         |
|    |                | 4.2 | Concrete correctly proportioned and mixed and/or safely transported by wheelbarrow and placed under direction. |
|    |                | 4.3 | Pump line/chute controlled and concrete placed as directed.  |
|    |                | 4.4 | Concrete spread as directed to specified levels.   |
|    |                | 4.5 | Concrete consolidated under direction and screeded to finished levels as directed.                             |
|    |                | 4.6 | Surface of concrete finished as directed to specified finish.  |
| 5. | Clean up       | 5.1 | Formwork components removed from site.   |
|    |                | 5.2 | Pour site and surrounds cleared of concrete spills and other debris and surface left in safe condition.        |
|    |                | 5.3 | Worksite cleared of debris and unused materials.   |
|    |                | 5.4 | Tools and equipment cleaned, maintained and stored.  |

## RANGE OF STATEMENT

This unit applies to placing concrete to simple forms and excavations which includes:

- post holes
- trench foundations
- pad foundations
- slabs
- pathways
- simple concrete aprons
- channels
- garden edges

Personal protective equipment may include:

- overalls
- boots
- hard hat/cap
- safety glasses/goggles
- gum boots
- face masks
- waterproof pants and jacket

Formwork in this unit applies to edging forms where structural components would include:

- edge boards
- pegs
- struts
- bracing

Concrete finishes include:

- wood floated
- steel floated
- broom brushed

Excess material and debris includes:

- excavated loose soil
- off cut timber
- paper
- rags
- sticks
- nails

Concrete placement methods include:

- shovel
- wheelbarrow
- chute
- pump line

Work is to be undertaken in a team situation or individually under supervision.

Reporting of faults may be verbal or written.

OH&S requirements are in accordance with Statutory requirements.

## EVIDENCE GUIDE

Competency is to be demonstrated by the safe installation of formwork, reinforcement and concrete using any two of the simple forms listed within the range statement relevant to the work orientation.

### (1) Critical Aspects and 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 construction processes
- demonstrate safe and effective operational use of tools, plant and equipment
- interactively communicate with others to ensure safe and effective operations

### (2) Pre-requisite Relationship of Units

- BCGCOR0011A Carry out OH&S requirements
- BCGCOR0051A Use hand and power tools
- BCGCOR0061A Use small plant and equipment

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements
- hand tools and equipment
- concrete and formwork materials
- materials handling
- measurement and proportion
- transporting and placing concrete
- levelling equipment
- simple formwork and reinforcement components
- select and handle materials appropriate to concreting processes

Skills

The ability to:

- work safely to instructions
- measure relative to the concreting process
- use power tools and hand tools
- mix concrete by hand
- use simple levelling equipment
- communicate effectively
- select and handle materials appropriate to concreting processes

**(4) Resource Implications**

The following resources should be made available:

- general construction materials relevant to forming, re inforcing and placement of concrete
- hand tools and power tools appropriate to construction process
- tools and equipment appropriate to construction process
- suitable work area appropriate to concreting process
- information relevant to OH&S requirements

**(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 inte grated project work.

Assessment may be by intermittent checking at the various stages of the job application in accordance with the performance criteria.

**(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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0012A: Plan a complete activity**

Competency Descriptor:

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

Competency Field:

Metal, Engineering and Maintenance

**ELEMENT OF COMPETENCY****PERFORMANCE CRITERIA**

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

**RANGE STATEMENT**

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

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

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

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

### (2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

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

**Skills**

The ability to:

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

**(4) Resource Implications**

The candidate will be provided with:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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.



**MEMCOR0042A: Interpret standard specifications and manuals**

## Competency Descriptor:

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

## Competency Field:

Metal, Engineering and Maintenance

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

**RANGE STATEMENT**

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

**EVIDENCE GUIDE**

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

**(1) Critical Aspects of Evidence**

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

During assessment the individual will:

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

**(2) Pre-requisite Relationship of Units**

- MEMCOR0091 Interpret sketches and technical drawings

**(3) Underpinning Knowledge and Skills**

Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The candidate will be provided with:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMCOR0052A: Operate in an autonomous team environment**

## Competency Descriptor:

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

## Competency Field:

Metal, Engineering and Maintenance

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

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

## RANGE STATEMENT

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

## EVIDENCE GUIDE

Competency is to be demonstrated by

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

**(2) Pre-requisite Relationship of Units**

- MEMCOR0031A Operate in a work based team environment

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The candidate will be provided with:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMCOR0122B: 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:

Communication

**ELEMENT OF COMPETENCY PERFORMANCE CRITERIA**

- |    |   |      |   |
|----|---|------|---|
| 1. | Apply grammar and usage                 | 1.1  | Knowledge of the types and functions of sentences are demonstrated.                                   |
|    |   | 1.2  | Different kinds of phrases are identified.  |
|    |   | 1.3  | Sentences are constructed using different subordinates clauses.                                       |
|    |   | 1.4  | Sentences are constructed showing correct use of agreement between subject and verb .                 |
|    |   | 1.5  | Sentences are constructed showing agreement between pronouns and the antecedents .                    |
|    |   | 1.6  | The correct forms of verbs are identified and appropriately used.                                     |
|    |   | 1.7  | Different tenses are identified and appropriately used.   |
|    |   | 1.8  | Knowledge of the correct use of adjectives is demonstrated.   |
|    |   | 1.9  | Sentences are constructed showing verbs in their active and passive voice.                            |
|    |   | 1.10 | Sentences faults are identified and corrected .   |
| 2. | Apply mechanics vocabulary and spelling | 2.1  | Knowledge of rules governing the use of capitalization, punctuation and abbreviation is demonstrated. |
|    |   | 2.2  | Punctuation marks are used correctly in written exercises .   |
|    |   | 2.3  | Abbreviations are identified and used as related to skill area .                                      |
|    |   | 2.4  | Words are spelt and their meanings interpreted through context clues and industry standards.          |



- |    |                         |     |  |
|----|-------------------------|-----|--|
| 3. | Write technical Reports | 3.1 | Reports are written using appropriate terminology /relevant jargons where required.          |
|    |                         | 3.2 | Reports are written using paragraph development techniques.                                  |
|    |                         | 3.3 | Reports are coherent, adequately developed and based on an analysis or research undertaken . |
|    |                         | 3.4 | Main points are identified and expanded in report.   |
|    |                         | 3.5 | Conclusions are based on the facts and recommendations are made if required .                |
|    |                         | 3.6 | Reports are completed within specified time .  |
|    |                         | 3.7 | 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 nature and should be based on the writer having technical knowledge.

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

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

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

Grammar and usage may include:

- types and functions of sentences
- phrases and their functions
- subordinate clauses (adverbial adjectival, noun)
- subject and verb (focus on compound subjects, indefinite pronoun as subject collective noun as subject)
- pronouns and their 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

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
- Spelling of words and interpretation of their meanings through context clues and word analysis, prefixes, suffixes, root (focus on words used in skill area)

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

Writing skills may include:

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate the ability to write technical reports
- demonstrate effective writing style
- demonstrate the ability to identify main points
- demonstrate the ability to expand main points
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- use accepted technical 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 usage
- mechanics, vocabulary and spelling
- writing styles (technical or non-technical)
- communication skills
- information systems
- reports including graphs, charts, tables

Skills

The ability to:

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

**(4) Resource Implications**

The candidate will be provided with:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

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

## **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

<b>ELEMENT OF COMPETENCY</b>		<b>PERFORMANCE CRITERIA</b>	
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.

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 score 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

**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

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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

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



**MEMCAC0012A: Perform technical computations - general**

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:

Calculations and Computations

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Apply the fundamentals of general mathematics	1.1	Concepts of whole numbers are understood and calculations are performed involving practical applications .
		1.2	Concepts of common fractions are understood and calculations are performed involving practical applications .
		1.3	Concepts of decimal fractions are understood and calculations are performed involving practical applications .
		1.4	Concepts of percentages are understood and calculations are performed involving practical applications .
		1.5	Concepts of graphs: bar and line are understood and calculations are performed involving practical applications .
2.	Apply the fundamentals of measurements	2.1	Concepts of precision, accuracy and tolerance are understood and calculations are performed involving practical applications .
		2.2	Concepts of measurement units are understood and calculations are performed involving practical applications .
		2.3	Application of steel rules and vernier callipers are understood and calculations are performed involving practical applications .
		2.4	Applications of micrometers are understood and calculations are performed involving practical applications .
		2.5	Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.

- 
- |    |  |     |   |
|----|--|-----|---|
| 3. | Apply the fundamentals of algebra                        | 3.1 | Concepts of algebra operations are understood and calculations are performed involving practical applications .   |
|    |  | 3.2 | Concepts of simple equations are understood and calculations are performed involving practical applications .   |
|    |  | 3.3 | Concepts of ratio and proportion are understood and calculations are performed involving practical applications .   |
|    |  | 3.4 | Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.  |
| 4. | Apply the fundamentals of plane geometry                 | 4.1 | Concepts of plane geometry are understood and calculations are performed involving practical applications .   |
|    |  | 4.2 | Concepts of angular measure are understood and calculations are performed involving practical applications .  |
|    |  | 4.3 | Concepts and applications of triangles are understood and calculations are performed involving practical applications .   |
|    |  | 4.4 | Concepts and applications of polygons are understood and calculations are performed involving practical applications .  |
|    |  | 4.5 | Concepts and applications of circles are understood and calculations are performed involving practical applications .   |
|    |  | 4.6 | Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.  |
| 5. | Apply the fundamentals of trigonometry                   | 5.1 | Concepts of trigonometric functions are understood and calculations are performed involving practical applications .  |
|    |  | 5.2 | Concepts of trigonometric functions with right angles are understood and calculations are performed involving practical applications .  |
|    |  | 5.3 | Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application.  |
| 6. | Use the principles of computed measure to solve problems | 6.1 | Concepts of computed measure are understood and computations are performed involving the calculation of areas of common polygons using practical applications .                         |
|    |  | 6.2 | Concepts of computed measure are understood and computations are performed involving the calculation of areas of circles, sectors, segments and ellipses using practical applications . |

- 6.3 Concepts of computed measure are understood and computations are performed involving the calculation of prisms and cylinders volumes, surface areas and weights using practical applications.
- 6.4 Numerical answers are provided with appropriate units to a degree of accuracy commensurate with related application .

## 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, line graphs 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.

Fundamentals of general mathematics may include:

- combined operations with whole numbers in practical applications
- word problem solving with practical applications
- use of common fractions in practical applications
- combined operations of common fractions in practical applications
- computing with calculator
- finding percent in practical applications
- reading combined data line graphs
- drawing line graphs (broken, straight and curved)
- combined operations of decimal fractions in practical operations

Steel rules, vernier callipers and micrometer applications may include:

- measurements that do not fall on rule graduations
- reading decimal-inch measurements on steel rule
- reading metric measurements on steel rule
- reading measurements on an English vernier calliper
- reading measurements on an metric vernier calliper
- reading measurements on an English micrometers
- reading measurements on an metric micrometers

Fundamentals of trigonometry may include:

- introduction to trigonometric functions
- ratio of right triangle sides
- determining angles of given functions and functions of given angles
- trigonometric functions with right triangles
- variation of functions
- functions of complementary angles
- determining unknown for angles
- trigonometric functions – ratio method

Areas for discussion may include but not limited to:

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

•

Fundamentals of plane geometry may include but not limited to:

- axioms and postulates
- points and lines
- angular geometry principles
- triangles
- isosceles and equilateral triangles practical applications
- Pythagorean theorem practical applications
- polygons and quadrilaterals
- polygon interior and exterior angles practical application
- trapezoid median practical application

Fundamentals of algebra may include:

- evaluation of algebraic expression
- signed numbers
- combined operations of signed numbers
- basic algebraic operations
- solution of equation by principle of equality
- writing equations from word situations

Computed measure may include:

- area of common polygons ( rectangles, parallelograms, trapezoids and triangles)
- areas of circles, sectors, segments and ellipses
- prisms and cylinders (volumes, surface areas and weights)
- computing altitudes and bases of prisms and cylinders
- surface areas of right prisms and cylinders

## 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
- apply the fundamentals of general mathematics
- apply the fundamentals of measurements
- apply the fundamentals of algebra
- apply the fundamentals of plane geometry
- apply the fundamentals of trigonometry
- use the principles of computed measure to solve problems
- use accepted engineering techniques, practices, processes and workplace procedures

**(2) Pre-requisite Relationship of Units**

- MEMCAC0011A Perform technical computations - basic

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- numbers and basic arithmetic operations
- drawings and specifications
- basic operations in simple geometry,
- algebra
- costing and pricing
- ratio and proportion
- basic statistics (charts, tables scales and graphs)
- interpretation of measurement and calculations
- trigonometry
- computed measure
- plane geometry
- statistics
- mathematical applications 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 mathematical ideas
- measure and calculate manually
- interpret measurements and calculations
- relate to and or perform calculations on related applications
- apply the fundamentals of general mathematics
- apply the fundamentals of measurements
- apply the fundamentals of algebra
- apply the fundamentals of plane geometry
- apply the fundamentals of trigonometry
- use the principles of computed measure to solve problems
- use accepted engineering techniques, practices, processes and workplace procedures 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.

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

- observation
- written 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 in general math
- examples of authentic ated assessments and/or assignments from formal education courses  
self assessment reports

**(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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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 1	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 1	

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

**MEMCOM0012A: Apply language and communication skills (I)**

Competency Descriptor:

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

Competency Field:

Communication

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Apply grammar and usage	1.1 Knowledge of the types and functions of sentences are demonstrated. 1.2 Different kinds of phrases are identified . 1.3 Sentences are constructed using different subordinates clauses. 1.4 Sentences are constructed showing correct use of agreement between subject and verb . 1.5 Sentences are constructed showing agreement between pronouns and the antecedents . 1.6 The correct forms of verbs are identified and appropriately used . 1.7 Different tenses are identified and appropriately used . 1.8 Knowledge of the correct use of adjectives is demonstrated. 1.9 Sentences are constructed showing verbs in their active and passive voice. 1.10 Sentences faults are identified and corrected .
2. Apply mechanics vocabulary and spelling	2.1 Knowledge of rules governing the use of capitalization, punctuation and abbreviation is demonstrated . 2.2 Punctuation marks are used correctly in written exercises . 2.3 Abbreviations are identified and used as related to skill area . 2.4 Words are spelt and their meanings interpreted through context clues and industry standards .



- 
- |    |                                 |     |   |
|----|---------------------------------|-----|---|
| 3. | Communicate concepts in writing | 3.1 | Concepts are written using appropriate terminology/industry jargon where required.            |
|    |                                 | 3.2 | Concepts are written using paragraph development techniques.                                  |
|    |                                 | 3.3 | Concepts are coherent, adequately developed and based on any analysis or research undertaken. |
|    |                                 | 3.4 | Main points identified and expanded.  |
|    |                                 | 3.5 | Conclusions are based on the facts and recommendations are made if required.                  |
|    |                                 | 3.6 | Activities are completed within specified time.   |
|    |                                 | 3.7 | References are acknowledged as required.  |
| 4. | Communicate effectively         | 4.1 | Identified and discuss the importance of good listening skills in communication.              |
|    |                                 | 4.2 | Different kinds of communication barriers are identified and discussed.                       |
|    |                                 | 4.3 | Principles of effective communication are outlined.   |
|    |                                 | 4.4 | Clear and logical reasoning is practiced.   |
|    |                                 | 4.5 | Formal reports and speech are presented.  |
|    |                                 | 4.6 | Interviews are presented with emphasis on communication skills.                               |
|    |                                 | 4.7 | Presentations are made using technical representations.                                       |
| 5. | Use information systems         | 5.1 | Multi-media centres are used for communication.   |
|    |                                 | 5.2 | Computers are used in information storage and retrieval to perform communication activities.  |
|    |                                 | 5.3 | Information systems are used to access and communicate information.                           |

## 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 nature and it should be based on the writer having technical knowledge.

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

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

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

Grammar and usage may include:

- types and functions of sentences
- phrases and their functions
- subordinate clauses (adverbial adjectival, noun)
- subject and verb (focus on compound subjects, indefinite pronoun as subject collective noun as subject)
- pronouns and their 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
- spelling words and interpretation of their meanings through context clues and word analysis, prefixes, suffixes, root (focus on words used in skill area)

Writing skills may include:

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

## EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of communication 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 apply language and communication skills
- 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 usage
- types and function of sentences
- forms of different kinds of verbs
- kinds and functions of phrases and clauses
- parts of sentences
- sentence construction
- types of paragraph
- methods of paragraph development
- mechanics, vocabulary and spelling
- writing styles (technical or non-technical)
- business letters, job related reports and summarizing information
- communication skills
- information systems

#### Skills

The ability to:

- communicate concepts in writing
- identify main points
- expand main points
- apply language and communication skills in the workplace

**(4) Resource Implications**

The candidate will be provided with:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMINS0182A: Install valves, regulators and metering devices**

## Competency Descriptor:

This unit deals with the skills and knowledge required to effectively install valves regulators and metering devices associated with 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 | Pipework are checked against job requirements.   |
|    |                                   | 1.5 | Pipework are obtained in accordance with established procedures and to comply with requirements.                                       |
|    |                                   | 1.6 | Location in which valves, regulators or metering devices 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. |
|    |                                   | 1.8 | Tools, equipment and testing devices are checked for correct operation and safety.   |
|    |                                   | 1.9 | Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.                               |

- |    |   |     |  |
|----|---|-----|--|
| 2. | Install valves, regulators and metering devices | 2.1 | OH&S policies and procedures for installing pipework are followed.   |
|    |   | 2.2 | Valves, regulators or metering devices are installed in accordance with requirements, without causing damage or distortion to the surrounding environment or services. |
|    |   | 2.3 | Pipework 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.   |
|    |   | 2.7 | Work is completed within acceptable time.  |
| 3. | Test system                                     | 3.1 | Correct testing procedures are used  |
| 4. | Clean up area                                   | 4.1 | All waste material is removed and dispose of.  |
|    |   | 4.2 | Area related to work activities is cleaned.  |
|    |   | 4.3 | Tools and equipment are cleaned, maintained and stored.  |
| 5. | Inspect and notify completion of work           | 5.1 | Final inspections are undertaken to ensure the installed valves, regulators and metering devices conforms to requirements.   |
|    |   | 5.2 | 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 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

### Locations/conditions:

- trenches
- confined spaces
- elevated positions
- hot cold
- damp and wet situations

### Plumbing systems:

- hot and cold water
- chemicals
- steam
- compressed air
- hydrants - fire lines

### Devices:

- Valves
- Regulators and metering devices for hot and cold water
- Chemicals steam
- Compressed air

### Tools and equipment to include:

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• hand and power hack saws</li> <li>• pipe dies</li> <li>• pipe threading machine</li> <li>• pipe wrenches</li> <li>• pipe cutters</li> <li>• wenches</li> <li>• screwdrivers</li> <li>• masonry trowel</li> <li>• shovels</li> <li>• cold chisels</li> <li>•</li> </ul> | <ul style="list-style-type: none"> <li>• pickaxes</li> <li>• hand drills</li> <li>• pipe reamers</li> <li>• swaging tools</li> <li>• files</li> <li>• flaring tool</li> <li>• tube cutters</li> <li>• hammers</li> <li>• soldering and brazing equipment</li> <li>•</li> </ul> |
|---|--|



## Materials and supplies:

- range of pipes/tubing and fittings – steel
- copper
- iron
- plastic
- brass alloys up to 100mm
- gate valves
- globe valve
- 

## Safety:

- personal and public safety
- machine power and hand tool safety

## Work processes:

- reading and interpreting drawings and other relevant information
- determining and organizing job requirements
- identifying and selecting tools and equipment
- preparing pipe ends for installation

## Valves, regulatory and metering devices:

- butterfly
- saunders valve
- pressure relief
- safety valve
- pressure gauges
- check valves
- ball valves
- float valves

## Appropriate personnel:

- apprentices
- supervisor

- installing valve, regulators and metering devices to pipe-work installations
- install testing devices

## EVIDENCE GUIDE

This Evidence guide is intended to include components defined within the Range 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 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'.

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to install valves regulators and metering devices
- communicate information about 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

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- installation tools and equipment
- installation techniques
- valves regulatory and metering devices
- use and selection of appropriate tools, materials and supplies

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand and power tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- install valves, regulators and metering devices appropriately
- test system to ensure valves are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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.

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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 2	
Solve problems	Level 2	
Use technology	Level 1	

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

## MEMINS0192A: Roughing-in customer's pipework (install pipework)

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively roughing-in pipe-work associated with 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	<p>1.1 Work instructions/information are accurately interpreted and the task is organized accordingly .</p> <p>1.2 The work is carried out in accordance with planned work procedures .</p> <p>1.3 The correct tools and components are assembled as necessary to facilitate completion of installation .</p> <p>1.4 Pipes are cut and formed to specifications, to include 90 degrees bends, offsets, bridges and loops to within tolerance of +/-mm of length.</p> <p>1.5 Where appropriate, pipes are threaded to suit fittings without burrs or excess thread.</p> <p>1.6 Pipes and fittings are assembled according to installation specifications.</p> <p>1.7 Correct cleaner, solvent, adhesive and thread tape are used where applicable</p> <p>1.8 Joints are mechanically sound and water tight.</p>
2. Install piping and tubing	<p>2.1 Pipes are secured-in to a depth of at least 13 mm from finished concrete surfaces.</p> <p>2.2 The completed installation is tested for leaks and conforms with regulations and industry standards.</p> <p>2.3 Work is completed with minimum waste of material.</p> <p>2.4 Pipes and fittings are free from defects and deficiencies of shape, form and surface imperfections.</p>

- |    |     |   |
|----|-----|---|
|    | 2.5 | Pipes are appropriately strapped and secured to regulation requirements.  |
|    | 2.6 | Pipe ends are appropriately secured/protected.  |
|    | 2.7 | Health and safety procedures are observed during work operations.   |
|    | 2.8 | Work is completed within acceptable time.   |
| 3. | 3.1 | Clean up area<br>All waste material is removed and disposed of.   |
|    | 3.2 | Work area related to work activities is cleaned.  |
|    | 3.3 | Tools and equipment are cleaned, maintained and stored.   |
| 4. | 4.1 | Inspect and notify completion of work<br>Final inspections are undertaken to ensure the installed pipe-work conforms to requirements. |
|    | 4.2 | 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 regulations, procedures, technology and the like related to the scope and application of this unit

### Locations/conditions:

- trenches
- confined spaces
- elevated positions
- ground level
- wet and damp areas
- in and through concrete work

### Source of information:

- Working drawings/sketches
- Oral/written work instructions
- Manufacturer's recommendations

### Plumbing systems:

- hot and cold water
- chemicals
- steam
- compressed air

### Safety:

- personal safety
- machine power and hand tool safety
- protective clothing

## Tools and equipment to include:

- hand and power hack saws
- stock dies
- pipe threading machine
- pipe wrenches
- pipe cutters
- cold chisels
- soldering and brazing equipment
- wenchers
- tube cutter
- flaring tool
- screwdrivers
- masonry trowel
- shovels
- pickaxes
- hand drills
- pipe reamers
- swaging tools
- files
- heavy duty hammer drill
- hammers

## Work processes:

- identifying and selecting materials and supplies
- identifying and selecting tools and equipment
- roughen-in pipe-work for kitchen fixtures
- roughen-in pipe-work for bathroom fixtures
- roughen-in pipe-work for laundry equipment
- roughen-in pipe-work for specified chemical systems
- roughen-in pipe-work for compressed air line
- roughen in pipe-work for specified stream line work
- roughen in pipe-work for farming complex

## Materials and supplies:

- pipes
- tubing and fittings
- steel
- copper
- iron
- plastic
- brass
- alloy up to 75mm

**EVIDENCE GUIDE**

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

**(1) Critical Aspects of Evidence**

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to roughen-in pipe-work
- communicate information about tasks being undertaken to ensure a safe and efficient working environment

**Critical Aspect of Evidence (Cont'd)**

- 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**

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- roughen-in pipe-work tools and equipment
- roughen-in pipe-work techniques
- fittings and types plumbing systems
- use and selection of appropriate tools, materials and supplies
- working conditions

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand and power tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- roughen-in pipe-work efficiently
- test system to ensure pipe-work are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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



**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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.

**MEMINS0202A: Install plumbing fixtures**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively install plumbing fixtures 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 Work instructions/information are accurately interpreted and the task is organized accordingly. 1.2 The correct size, type and quantity of pipes, valves and fitting are selected. 1.3 Instructions/information are communicated to appropriate personnel and confirmed as understood. 1.4 Fixtures, fittings, valves, faucets and pipes are not damaged. 1.5 Where appropriate, pipes and fittings are assembled according to specifications and all connections are mechanically sound and water tight. 1.6 Pipes and fittings are accurately located, correctly identified and proved suitable for connection to fixtures. 1.7 Where pipes and fittings are proved unsuitable, deficiencies are noted and prompt and appropriate action is taken.
2. Install plumbing fixtures	2.1 Disturbance/damage to building fabric and/or structure is minimized. 2.2 Tools and equipment used are appropriate for the intended task. 2.3 Work is carried out in accordance with health, safety and codes of practice. 2.4 Fixtures are positioned, fixed and accurately fastened according to the installation specifications/instruction. 2.5 Fixtures are installed without damage to fixtures and polished surfaces. 2.6 Fixtures are tested appropriately for leaks and operation.

	2.7	Health and safety procedures are observed during work operations.
3.	Test fixtures	3.1 Correct testing procedures are used.
4.	Clean up area	4.1 All waste material is removed and disposed of. 4.2 Area related to work activities is cleaned. 4.3 Tools and equipment are cleaned, maintained and stored .
5.	Inspect and notify completion of work	5.1 Final inspections are undertaken to ensure the installed fixtures conforms to requirements. 5.2 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 regulations, procedures, technology and the like related to the scope and application of this unit

Types of plumbing fixtures to include:

- basins
- bidets
- water closets
- bathtubs
- showers
- sinks
- wash tubs

Corrective action:

- replacing defective materials/reporting deviation to supervisor

Source of information:

- Working drawings/sketches
- Oral/written work instructions
- Manufacturer's information

Types of supply:

- hot and cold water

## Tools and equipment to include:

- hack saws
- pipe wrenches
- pipe vices
- stock and dies
- pipe cutters
- swaging tools
- hand drill
- concrete drill bits
- cold chisels
- pipe reamers
- files
- screwdrivers
- hammers
- measuring tapes
- spanners

## Materials:

- appropriate size hot and cold water pipes
- drain pipes and fittings
- flexible tubing
- pipe tape
- screws
- plugs

## Appropriate personnel:

- apprentices
- supervisor

## Work processes:

- reading and interpreting drawings and other relevant information
- identifying and selecting plumbing fixtures and supplies
- identifying and selecting hand and power tools
- positioning and installing kitchen plumbing fixtures
- positioning and installing bathroom fixtures
- positioning and installing laundry fixtures
- testing installed fixtures

## Safety:

- personal
- safety
- machine power and hand tool safety
- protective clothing

## EVIDENCE GUIDE

This Evidence guide is intended to include components defined within the Range statement, of which the Glossary is an integral part. Terms in italics, e.g. consistent performance, with respect to the Evidence guide are also contained in the Glossary.

### (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

**Critical Aspect of Evidence (Cont'd)**

- 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 plumbing fixtures
- 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**

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- standards of quality
- installation tools and equipment
- installation techniques
- types, sizes, make of plumbing fixtures
- use and selection of appropriate tools, materials and supplies

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- install plumbing fixtures appropriately
- test system to ensure fixtures are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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.

**MEMINS0212A: Install plumbing equipment**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively install plumbing equipment 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 Work instructions/information are accurately interpreted and the task is organized accordingly. 1.2 The correct size, type and quantity of pipes and fitting are selected. 1.3 Equipment is positioned and fixed according to the installation specifications/work instructions. 1.4 Instructions/information are communicated to appropriate personnel and confirmed as understood. 1.5 Equipment, fittings and pipes are not damaged. 1.6 Where required, pipes and fittings assembled according to specifications/instructions, and all connections are mechanically sound and water tight.
2. Install plumbing equipment	2.1 Input services are accurately located, correctly identified and are proved suitable for connections to equipment. 2.2 Where input services prove unsuitable, deficiencies of the installation's objective, appropriate action is taken. 2.3 Where defects/potential dangers affect the achievements of the installation objectives, appropriate action is taken 2.4 Disturbance/damage to building fabric and/or structure is minimized. 2.5 Tools and equipment used are appropriate for the intended task. 2.6 Work is carried out in accordance with health, safety and codes of practice.



3.	Test equipment	3.1	Correct testing procedures are used.
4.	Clean up area	4.1	All waste material is removed and disposed of.
		4.2	Area related to work activities is cleaned.
		4.3	Tools and equipment are cleaned, maintained and stored.
5.	Inspect and notify completion of work	5.1	Final inspections are undertaken to ensure the installed equipment, conforms to requirements.
		5.2	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 regulations, procedures, technology and the like related to the scope and application of this unit

Types of plumbing equipment:

- Single point gas water heater
- Electric storage water heater
- Cooking range
- Domestic dishwasher
- Domestic garbage disposal unit
- Domestic washing machine
- Water cooler
- Solar water heater

Source of information:

- Working drawings/sketches
- Equipment
- Schematic drawings
- Manufacturer's specifications
- Oral/written work instructions

Locations:

- Domestic
- Commercial
- Industrial and farming complexes

Input service:

- gas
- water

## Tools and equipment to include:

- hack saws
- pipe wrenches
- pipe vices
- stock and dies
- pipe cutters
- swaging tools
- hand drill
- tube cutter- plastic & copper
- cold chisels
- pipe reamers
- files
- screwdrivers
- hammers
- measuring tapes
- concrete drill bits
- flaring tools

## Materials:

- appropriate size and type – pipes and tubing
- flow regulative devices
- pipe tape
- wood screws
- wall plugs
- nuts and bolts
- pressure relief devices
- air relief devices

## Corrective action:

- replacing defective materials/reporting deviation to supervisor

## Work processes

- reading and interpreting drawings and other relevant information
- identifying and selecting plumbing equipment and supplies
- identifying and selecting hand and power tools
- installing domestic gas water heaters
- installing domestic electric water heaters
- installing solar water heaters
- installing water coolers
- installing industrial gas/oil range
- installing gas cooking/oil range
- installing dishwashers
- installing washing machines
- installing garbage units
- testing installed equipment

## Safety:

- personal and public
- protective clothing
- transporting
- use of and powered tool
- structure

## Appropriate personnel:

- apprentices
- supervisor

## EVIDENCE GUIDE

This Evidence guide is intended to include components defined within the Range statement, of which the.

### (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'

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to install plumbing equipment
- communicate information about processes, 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

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- standards of quality
- installation tools and equipment
- installation techniques
- range of plumbing equipment
- use and selection of appropriate tools, materials and supplies

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- install plumbing equipment appropriately
- test system to ensure equipment are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMINS0222A: Install auxiliary equipment**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively install auxiliary equipment 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 Work instructions/information are accurately interpreted and the task is organized accordingly. 1.2 Equipment, fittings selected conform to job specifications/instructions. 1.3 Instructions/information are communicated to appropriate personnel and confirmed as being understood. 1.4 The work is carried out in accordance with planned work procedures. 1.5 The correct tools, materials, fitting and components are assembled as necessary to complete the installation.
2. Install auxiliary equipment	2.1 Auxiliary equipment is correctly located and securely fixed as per specifications/instructions. 2.2 Installed equipment is correctly connected as per specifications/instructions and is clearly identified by means of labelling. 2.3 All joints are mechanically sound, air and water tight. 2.4 Work is completed with minimum waste of materials and rework. 2.5 Health and safety procedures are observed during work operations. 2.6 Tools and equipment are appropriate and fit the task. 2.7 Work is carried out in accordance with health, safety and codes of practice.
3. Test equipment	3.1 Correct testing procedures are used.

- |    |                                       |     |   |
|----|---------------------------------------|-----|---|
| 4. | Clean up area                         | 4.1 | All waste material is removed and disposed of.  |
|    |                                       | 4.2 | Area related to work activities is cleaned.   |
|    |                                       | 4.3 | Tools and equipment are cleaned, maintained and stored.                                       |
| 5. | Inspect and notify completion of work | 5.1 | Final inspections are undertaken to ensure the installed equipment, conforms to requirements. |
|    |                                       | 5.2 | 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

Types of auxiliary equipment:

- Pumps up to 50mm
- Tanks up to 5000 litres
- Filter metering equipment up to 50mm
- Fire hydrants
- Water treatment devices

Source of information:

- Working drawings/sketches
- Manufacturer's technical information
- Oral/written work instructions

Tools and equipment to include:

- pipe vices
- pipe wrenches
- pipe cutters
- tube cutters
- swaging tools
- soldering and brazing equipment
- screwdriver
- hand stock and dies
- pipe threading machine
- lifting devices

Safety:

- personal safety
- machine and power tool operations
- hand tool safety
- welding equipment safety
- manual handling and lifting
- lifting devices operations

## Work processes:

- reading and interpreting drawings and other relevant information
- identifying and selecting plumbing fittings and supplies
- identifying and selecting hand and power tools
- installing water storage tank
- installing metering devices
- installing filters and water treatment devices
- testing installed auxiliary equipment/devices

## Appropriate personnel:

- apprentices
- supervisor

## EVIDENCE GUIDE

This Evidence guide is intended to include components defined within the Range statement, of which the Glossary is an integral part. Terms in italics, e.g. consistent performance, with respect to the Evidence guide are also contained in the Glossary.

### (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'

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to install auxiliary plumbing equipment
- 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

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients



**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- installation tools and equipment
- materials used in installation
- fabrication techniques
- installation techniques
- assembly/disassembly techniques
- standards of quality
- range of auxiliary plumbing equipment

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- install plumbing equipment appropriately
- test system to ensure equipment are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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 knowledg e.

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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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 2	
Solve problems	Level 2	
Use technology	Level 1	

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

## **MEMINS0232A: Prepare material and locations for installing drains and waste systems**

### Competency Descriptor:

This unit deals with the skills and knowledge required to effectively prepare material and locations for installing drains and waste systems as 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 | Work instructions/information are accurately interpreted and the task is organized accordingly.                                      |
|    |   | 1.2 | The correct size, type and quantity of material, components and location are selected and prepared .                                 |
|    |   | 1.3 | Material are located and stored according to the installation specifications/work instructions.                                      |
|    |   | 1.4 | Instructions/information communicated to appropriate personnel are confirmed as understood.  |
|    |   | 1.5 | Materials are not damaged and where deficiencies are observed appropriate corrective action is taken.                                |
|    |   | 1.6 | Where required, materials and components are assembled according to specifications/instructions                                      |
|    |   | 1.7 | All connections are mechanically sound and water tight.  |
| 2. | Prepare materials, components and locations | 2.1 | Material, components and waste system location are accurately located, correctly identified and are proved suitable for preparation. |
|    |   | 2.2 | Where material, components and waste system location prove unsuitable, the appropriate action is taken.                              |
|    |   | 2.3 | Where defects/potential dangers affect the achievements of the installation objectives, appropriate action is taken                  |
|    |   | 2.4 | Disturbance/damage to building fabric and/or structure is minimized.   |

		2.5	Tools and equipment selected are appropriate for the intended task.
		2.6	Work is carried out in accordance with health, safety and codes of practice.
3.	Test equipment	3.1	Correct testing procedures are used.
4.	Clean up area	4.1	All waste material are removed and disposed of.
		4.2	Work area related to work activities is cleaned.
		4.3	Tools and equipment are cleaned, maintained and stored.
5.	Inspect and notify completion of work	5.1	Final inspections are undertaken to ensure the installed equipment, conforms to requirements.
		5.2	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.

### Source of information:

- working drawings/sketches
- manufacturer's technical information
- statutory regulations
- oral/written work instructions

### Corrective action:

- replacing defective/non-match materials/
- reporting deviation to supervisor

### Tools and equipment:

- appropriate hand tools
- power tools
- equipment for digging trenches
- ladder
- scaffolding

### Materials and components:

- sand
- cement
- aggregate
- bedding materials

Range of pipes up to 200 mm in diameter to include earthen:

- plastic,
- copper
- cast-iron
- pre-cast concrete
- cast-iron chambers and manholes

Method of digging:

- use of hand tools and power tools

Work activities:

- identifying and selecting tools and equipment
- excavating and timbering trenches
- grading and bedding trenches
- erecting and/or installing manholes and chambers
- erecting and/or installing piers, brackets and other supports
- excavation of walls and floor

Protective clothing:

- safety boots,
- safety helmet
- coverall,
- goggles
- gloves

Safety:

- manual handling,
- material handling,
- machine operating procedures,
- personal safety,
- ladder and scaffolding safety.
- trench digging

## EVIDENCE GUIDE

### (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'

**(1) Critical Aspects of Evidence (Cont'd)**

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to prepare material and locations for installing drains and waste systems
- communicate information about processes, 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**

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- standards of quality
- installation tools and equipment
- materials and components related to systems
- installation techniques
- range of plumbing draining systems
- range of plumbing waste systems
- use and selection of appropriate tools, materials and supplies

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- install plumbing equipment appropriately
- test system to ensure equipment are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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 employable skills.

## **MEMINS0242A: Position, join and secure pipes and components to provide drains and waste systems**

### Competency Descriptor:

This unit deals with the skills and knowledge required to effectively position, join and secure pipes and components to provide drains and waste systems as 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 Work instructions/information are accurately interpreted and the task is organized accordingly. 1.2 The correct size, type and quantity of pipes and components are selected and prepared. 1.3 Pipes and components are positioned, joined and secured according to the installation specifications/work instructions. 1.4 Instructions/information communicated to appropriate personnel are confirmed as understood. 1.5 Pipes and components are not damaged and where deficiencies are observed appropriate corrective action is taken. 1.6 Where required, pipes and components are joined and secured according to specifications/instructions, 1.7 All connections are mechanically sound and water tight.
2. Join and secure pipes and components	2.1 Pipes, components drains and waste system are accurately located, correctly identified and are proved suitable for joining and securing. 2.2 Where pipes components and waste system location prove unsuitable, appropriate action is taken. 2.3 Where defects/potential dangers affect the achievements of the installation objectives, appropriate action is taken



	2.4	Disturbance/damage to building fabric and/or structure is minimized.
	2.5	Tools and equipment used are appropriate for the intended task.
	2.6	Work is carried out in accordance with health, safety and codes of practice.
3	Inspect and notify completion of work	3.1 Work is completed within acceptable time.
	3.2	Work area is left clean and tidy.

## RANGE STATEMENT

### Materials and components:

- cast iron,
- earthen ware
- plastic waste and drain pipes and fittings up to 100 mm in diameter,
- manholes and/or inspection chambers for pipe up to and over 100 mm in diameter,
- manhole covers
- brackets
- hangers
- straps and clamps
- expansions with rubber rings and seals
- pipe supports
- fittings

### Structures:

- pipe runs
- Manholes
- gullies and grease traps,
- new and old situations
- drilling
- plugging
- plumbing

### Source of information:

- working drawings/sketches,
- manufacturer's technical information,
- statutory regulations,
- oral/written work instructions

### Safety:

- manual handling and lifting
- material handling,
- machine operating procedures,
- personal safety,
- ladder and scaffolding safety

## Work processes:

- identifying and selecting materials and supplies
  - identifying and selecting tools and equipment
  - laying and positioning pipes and fitting for joining
  - joining earth ware pipes and components by mortar methods
  - joining cast iron pipes and components by lead caulking method
  - joining polythene pipe (waste) and components by rubber o-ring method
  - joining PVC pipes and components by solvent cement weld
  - joining pitch fibre pipes (drain) and components by knock on method
  - securing pipes by embedding and backfilling
  - securing pipes by hangers and bracket
  - securing pipes to piers
- checking and testing pipe work installation

## Tools and equipment to include:

- measuring tape
- saw
- brush
- spirit level
- cord line
- trowel
- shovel
- caulking tools
- hand and power drill.
- Cord line
- Spirit level

## Locations/conditions:

- In trenches
- elevated positions
- in confined spaces
- wet and damp situations

## Appropriate action:

- replacing defective/non-match material
- reporting deviation to supervisor

## EVIDENCE GUIDE

### (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'

**Critical Aspects of Evidence (Cont'd)**

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to position join and secure pipes and components to provide drains and waste systems
- communicate information about processes, 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

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

**(2) Pre-requisite Relationship of Units**

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skill**Knowledge

Knowledge of:

- standards of quality
- installation tools and equipment
- materials and components related to systems
- structures related to system
- location and conditions
- installation techniques for joining and securing pipes and components
- range of plumbing draining systems
- range of plumbing waste systems
- use and selection of appropriate tools, materials and supplies

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- position join and secure pipes and components to provide drains and waste systems
- test system to ensure equipment are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

## **MEMMRD0462A: Carry out routine maintenance of plumbing systems to sustain effective performance**

### Competency Descriptor:

This unit deals with the skills and knowledge required to routinely maintain plumbing systems to sustain effective performance and applies to individuals working in the metal engineering and maintenance industry.

### Competency Field:

Metal, Engineering and Maintenance

<b>ELEMENT OF COMPETENCY</b>	<b>PERFORMANCE CRITERIA</b>
1. Plan and prepare for routine maintenance	<p>1.1 Work instructions/information are accurately interpreted and the task is organized accordingly.</p> <p>1.2 The correct size, type and quantity of material components and location are selected and prepared.</p> <p>1.3 Plumbing system components are identified and routinely maintained according to the maintenance specifications/work instructions.</p> <p>1.4 Instructions/information are communicated to appropriate personnel and confirmed as understood.</p> <p>1.5 System components are not damaged and where deficiencies are observed appropriate corrective action is taken.</p> <p>1.6 Where required, plumbing system components are maintained according to specifications/instructions, and all connections are mechanically sound, air and water tight.</p>
2. Maintain plumbing system	<p>2.1 Maintenance routines comply with manufacturers' recommendations (or other authorised recommendations) for required tests, checks for correct operation.</p> <p>2.2 Maintenance activities are carried out in a systematic and logical sequence of operations.</p> <p>2.3 Where components are not meeting performance expectations these are cleaned, repaired or replaced with components of equal technical capability.</p>

- |    |                                       |   |
|----|---------------------------------------|---|
|    | 2.4                                   | Components are maintained using appropriate cleaning agents and equipment.                                  |
|    | 2.5                                   | Plumbing fixtures/lines/equipment are maintained using appropriate tools/equipment/chemical agents/enzymes. |
|    | 2.6                                   | Where cleaning agents are hazardous, appropriate protective clothing is worn.                               |
|    | 2.7                                   | System functions efficiently after maintenance procedure is carried out and items handled are not damaged.  |
|    | 2.8                                   | Work activities are carried out in accordance with health and safety regulations and codes of practice.     |
| 3. | Inspect and notify completion of work | 3.1 Work is completed within acceptable time.   |
|    |                                       | 3.2 Tools and equipment cleaned, sanitized, maintained and stored.  |
|    |                                       | 3.3 Work area is left clean and tidy.   |

## RANGE STATEMENT

### Safety:

- personal safety
- chemical
- gas
- steam and electrical hazards,
- hand and power tools
- operating procedure

### Appropriate personnel:

- apprentices
- trades man
- supervisor
- clients

### Replacement parts to include:

- seals
- washers
- seats

### Sources of information:

- Manufacturers recommendations and specifications
- oral/written work instructions
- maintenance schedules
- maintenance manuals

### Systems:

- domestic
- commercial
- industrial
- agricultural

### Tools and equipment:

- hand and power tools appropriate for the job
- specialized plumbing system maintenance tools

## Range of valves and fittings to include:

- gate,
- globe
- check,
- ball
- stop
- float valve
- solenoid
- mixers & faucets
- saunders valve
- PO plug
- traps
- outlet
- pressure reducing and safety valves
- pipes and fittings.
- pipe taps
- butterfly valve

## Components/fixtures/equipment to include:

- kitchen and bathroom fixtures
- gas and electric water heaters
- gas, cooking range
- garbage disposal
- pressure tanks
- laundry equipment
- boilers
- lift and boost pumps
- pneumatic systems
- irrigation systems

## Components/fixtures/equipment to include:

- 
- valves
- burners
- heating elements,
- thermostats
- diaphragms

## Materials and supplies:

- appropriate cleaning agents

## EVIDENCE GUIDE

### (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'



### Critical Aspects of Evidence (Cont'd)

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to routinely maintain plumbing systems to sustain effective performance
- 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

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- maintenance tools and equipment
- materials used in maintenance
- components and fixtures
- maintenance techniques
- range of plumbing systems and applications

#### Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- routinely maintain plumbing systems to sustain effective performance
- test system to ensure equipment are functional and being installed properly

### (4) Resource Implications

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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 2	
Solve problems	Level 2	
Use technology	Level 1	

Please refer to the Assessment Guidelines for advice on how to use the critical employability skills.

**MEMFAB0061A: Perform manual heating and thermal cutting**

## Competency Descriptor:

This unit deals with the skills and knowledge required to effectively perform manual heating and thermal cutting and applies to individuals working in the metal engineering and maintenance industry.

## Competency Field:

Metal, Engineering and Maintenance

**ELEMENT OF COMPETENCY****PERFORMANCE CRITERIA**

1. Assemble/disassemble plant, equipment for manual heating and thermal cutting	1.1	Appropriate cutting process and/or procedure for material are selected.
	1.2	Accessories and equipment are correctly selected and assembled.
2. Operate heating and thermal cutting equipment	2.1	All safety procedures are observed.
	2.2	Equipment start up procedures is followed correctly and to standard operating procedures.
	2.3	Equipment adjustments are made correctly using standard operating procedures.
	2.4	Appropriate cutting allowances are made.
	2.5	Materials are used in the most economical way.
	2.6	Defects are recognised and corrective action taken to standard operating procedures.
	2.7	Materials are heated and cut to specification shape/size/length and to accepted workplace standards.

**RANGE STATEMENT**

Work is undertaken under supervision or as part of a team. Predetermined standards of quality and safety are observed and work is carried out following standard operating procedures.

- Manual, straight line cutting standards observed.
- Manual or automatic processes used to cut and heat to specifications

Cutting may include flame gouging by hand. All work carried out to standard and regulatory requirements.

Cutting may be applied to material of various thicknesses and types including ferrous, non-ferrous and non-metallic materials by a variety of methods, which may include fuel gas oxy fuel gas and air fuel gas.

Cutting may include use of hand held and self-propelled straight-line cutters.

Heating may be applied to material of various thicknesses and types including ferrous, non-ferrous and non-metallic materials by a variety of methods, which may include fuel gas, oxy fuel gas and air fuel gas.

Materials welded may include:

- low carbon steel
- cast iron

Setting up may include the correct connection of:

- hoses
- blowpipes
- regulators
- settings of gas mixtures

Preparation of materials would be minimal and may include but not limited to:

- preheating
- setting up jigs
- setting up fixtures
- setting up clamps

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively performing routine manual heating and thermal cutting 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 setting up equipment and during the heating and cutting process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in setting up and shutting down equipment
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations
- demonstrate effective heating and thermal cutting techniques 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 heating and thermal cutting or other units requiring the exercise of the skills and knowledge covered by this unit.

**(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
- MEMCOR0081A Mark off/out (general engineering)
- MEMCOR0191A Use hand tools

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- heating medium/technique
- heating/cutting processes
- oxy-fuel equipment identification, transportation and storage
- hand tools and heating/cutting equipment
- materials/consumables relative to oxy-fuel heating and thermal cutting procedures
- materials preparation
- manual handling
- measurement
- drawings, sketches and instructions

Skills

The ability to:

- work safely to instructions
- communicate effectively
- interpret relative drawings and instructions
- use power tools and hand tools
- set up heating cutting equipment
- use heating cutting equipment
- identify/select material
- identify/select heating/cutting processes
- measure relative to heating and thermal cutting processes
- heat/cut efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

#### (6) Context of Assessment

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

### CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

**MEMFAB0071A: Undertake fabrication, forming, bending and shaping**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively undertake fabrication, forming, bending and shaping as applies to individuals working in the metal engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Select and set up forming/shaping equipment for a specific operation	1.1 Most appropriate tools and equipment are selected. 1.2 Equipment are correctly set up and adjusted for operation 1.3 Allowances for shrinkage, thickness, inside/outside measurements are correctly made.
2. Operate forming/shaping equipment	2.1 Machine is safely started and shut down to standard operating procedure. 2.2 Material and safety guards are correctly positioned. 2.3 Equipment are correctly operated and adjusted.
3. Form and shape material	3.1 Material is levelled, straightened, rolled, pressed or bent to specifications/drawings. 3.2 Correct hot or cold-forming procedures are followed. 3.3 Final form/shape is checked for compliance to specification and adjusted as necessary to standard operating procedure.

## RANGE STATEMENT

Work may be undertaken under supervision or as part of a team. Predetermined standards of quality and safety are observed and work is carried out following standard operating procedures.

A wide range of shapes and products are formed which may include but not limited to:

- pipe-work chamfers
- cylinders
- cones,
- angles
- hoppers
- ductwork
- "square to round" "transitions"
- "lobster backs"
- all forms of tubular shapes
- hand rails,
- reticulation pipe-work, mufflers et

Forming, shaping and bending operations may be conducted on:

- plate
- section or sheet
- tube
- pipes
- components

Materials may include:

- ferrous and non ferrous
- non-metalic substances

A variety of tools and equipment may be used including

- presses
- shapers
- vices
- benders
- drop hammers

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively undertaking fabrication, forming, bending and shaping operations 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 fabrication, forming, bending and shaping processes



**Critical Aspects of Evidence (Cont'd)**

- demonstrate correct procedures in setting up
- demonstrate safe and effective operational use of tools, plant and equipment
- forming, bending and shaping equipment
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material and tools
- interactively communicate with others to ensure safe operations
- demonstrate effective fabrication, forming, bending and shaping 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 the forming and shaping of fabricated components or other units requiring the exercise of the skills and knowledge covered by this unit.

**(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
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0081A Mark off/out (general engineering)
- MEMCOR0091A Draw and interpret sketches and simple drawing
- MEMCOR0191A Use hand tools

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- fabrication, forming, bending and shaping technique
- fabrication, forming, bending and shaping equipment
- hand tools and equipment
- materials /consumables relative to fabrication, forming, bending and shaping procedures
- materials preparation
- manual handling
- measurement
- technical drawings, sketches and instructions

Skills

The ability to:

- work safely to instructions
- interpret related drawings and instructions
- use power tools and hand tools
- select material and equipment
- measure relative to fabrication, forming, bending and shaping processes
- communicate effectively
- fabricate, form, bend and shape efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

## **MEMFAB0121A: Perform basic welding using oxyacetylene welding process (OAW) - fuel gas welding**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively perform basic welding using oxyacetylene welding (OAW) and applies to individuals working in the metal engineering and maintenance

Competency Field:

Metal, Engineering and Maintenance

<b>ELEMENT OF COMPETENCY</b>	<b>PERFORMANCE CRITERIA</b>
1. Prepare materials for welding	1.1 Weld requirements are identified from specifications and/or drawings. 1.2 Material is correctly prepared using appropriate tools and techniques. 1.3 Materials are assembled/aligned to specifications where required.
2. Assemble and set up welding equipment	2.1 Welding equipment is assembled and set up safely and correctly in accordance with standard operating procedures. 2.2 Test runs are undertaken and verified in accordance with specifications.
3. Select welding equipment, settings and consumables	3.1 Welding settings and consumables are selected against job requirements, welding procedures, specifications and/or technical drawings.
4. Identify distortion prevention measures	4.1 Distortion prevention measures are identified. 4.2 Appropriate action is taken to minimise and rectify distortion.
5. Weld joints to standard or equivalent	5.1 Welds are deposited correctly in flat and vertical position to specifications and industry standard (or equivalent). 5.2 Correct action is undertaken to minimise distortion. 5.3 Joints are cleaned to specifications using correct and appropriate tools and techniques.

- |    |                |     |  |
|----|----------------|-----|--|
| 6. | Inspect welds. | 6.1 | Weld joints are visually inspected against specifications.               |
|    |                | 6.2 | Weld defects are identified.   |
| 7  | Correct faults | 7.1 | Remedial action taken as required.                                       |
|    |                | 7.2 | Correct remedial action taken and appropriate techniques and tools used. |

## RANGE STATEMENT

Oxyacetylene welding (OAW) would be carried out using a range of material for heavy or light fabrication. The person would work under supervision or within a team environment using predetermined standards of quality, safety, work and welding procedures and the skills applied to a range of fabrication activities. Weld quality must meet required industry standards or equivalent outcomes.

Preparation of materials would include preheating, setting up of jigs, fixtures, clamps etc.

Remedial action using thermal processes may include oxyacetylene and arc air equipment. Grinding devices may also be used.

Setting up may include the correct connection of hoses, blowpipes, regulators etc. and correct settings of gas mixtures.

Appropriate assembly of heating equipment may include:

- cylinders
- connections
- hoses
- tips
- nozzles

Materials:

- low carbon steel (mild steel) up to 10 gauge
- low carbon steel plate up to 5mm
- steel and galvanised pipes up to 50mm

Heating medium and appropriate consumables can include:

- oxyacetylene
- fuel gas
- fluxes (resin or powder)
- all types of silver solder and brazing rods

Location/condition:

- workshop
- plant
- fieldwork at ground level
- elevated positions
- dry
- humid and wet conditions
- construction environment
- agricultural environment
- food processing environment

Work activities:

- measuring,
- marking,
- grinding
- lifting,
- welding
- cutting
- aligning,
- shaping,
- filing,
- general machining

Specification:

- welding procedure
- weld profile regular in width
- even/regular ripple formation
- uniform in appearance,
- free from excessive undulations
- smooth stop/starts, tack incorporated,
- adequate penetration
- no excess undercut
- no craters
- Types of welding:
  - fillet weld
  - lap weld
  - butt weld,
  - single and multi-run
- Welding position:
  - flat,
  - vertical
  - horizontal
  - overhead

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively weld using oxyacetylene welding (fuel gas welding) in accordance with the range listed within the range of variables statement.

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to identify/select materials relative to the oxyacetylene welding process
- communicate information about oxyacetylene welding processes, being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all related tasks in accordance with standard operating procedures
- perform oxyacetylene welding tasks efficiently and 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 and undertake a routine task
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0081A Mark off/out (general engineering
- MEMCOR0191A Use hand tools

Where welds are performed in the overhead position then Unit MEMFAB0072A (Perform advanced welding using oxyacetylene welding process) should be selected.

**(3) Underpinning Knowledge and Skills**

Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- metal properties and classification
- heating medium/techniques
- welding techniques
- welding processes
- oxy-fuel equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to oxyacetylene welding procedures
- materials preparation
- manual handling and lifting
- measurement
- drawings, sketches and instructions

Skills

The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings and instructions
- use oxyacetylene welding equipment
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding soldering processes
- identify/select materials relative to the welding process
- prepare materials relative to the welding process
- weld using oxyacetylene process efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMCOR0101A: Prepare basic engineering drawing**

## Competency Descriptor:

This unit deals with the skills and knowledge required to effectively prepare basic engineering drawing, and applies to individuals working in the metal engineering and maintenance industry.

## Competency Field:

Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify drawing requirements	1.1	Requirements and purpose of drawing are determined from customer and/or work specification and associated documents.
		1.2	Identified and collected all data necessary to produce the drawing.
		1.3	Drawing requirements are confirmed with relevant personnel and timeframes for completion established.
2.	Prepare or make changes to engineering drawing	2.1	Drafting equipment selected are appropriate to the drawing method chosen.
		2.2	Drafting principles is applied to produce a drawing that is consistent with standard operating procedures within the enterprise.
		2.3	All work safely is undertaken to prescribed procedure
		2.4	Completed drawing is approved in accordance with standard operating procedures.
3.	Prepare engineering parts list	3.1	Components and parts are identified and organised by component type and/or in accordance with organisation/customer requirements.
4.	Issue drawing	4.1	Completed drawings and or parts lists are in accordance with standard operating procedures.
		4.2	Copied/issued approved drawings and or parts lists to relevant personnel in accordance with standard operating procedures.
		4.3	Approved drawings and or parts lists are stored and catalogued in accordance with standard operating procedures.

## RANGE STATEMENT

This unit applies to any of the full range of engineering disciplines;

- mechanical
- electrical/electronic
- fabrication

Drawing records may include

- cataloguing
- issuing security classifications
- filing
- preparing
- distribution lists
- drawings

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

Geometric construction to include:

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

Multi-view (orthographic 2-D) drawings:

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

Consultations may include reference to appropriate personnel including

- technical supervisory
- manufacturers
- suppliers
- contractors
- customers

Specifications may be obtained from

- design information
- customer deals/concepts/expectations/requirements
- sketches
- preliminary layouts

Drawing instruments and supplies:

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

Alphabet of line:

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

Pictorial (3-D) drawing to include:

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

Dimension reading:

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

## EVIDENCE GUIDE

Competency is to be demonstrated by developing and effectively preparing basic engineering drawings in accordance with the performance criteria and the range listed within the range statement.

### (1) Critical Aspects of Evidence

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

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

- prepare and understand various types of drawings
- prepare alphabet of lines, scales, lettering, dimensions, symbols, abbreviations and key features
- prepare title panel and reference date of drawings
- prepare basic engineering drawings

### (2) Pre-requisite Relationship of Units

- MEMCOR0091A Draw and interpret sketches and simple drawings

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

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

#### Skills

The ability to:

- estimate measurements
- read and interpret working drawings
- prepare basic engineering drawing
- measure accurately
- communicate effectively

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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

## ITICOR0011A: Carry out data entry and retrieval procedures

Competency Descriptor:

This unit deals with the skills and knowledge required to operate computer, to enter, manipulate and retrieve data and to access information and communicate via the Internet.

Competency Field:

Information Technology and Communications - Operations

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Initiate computer system	1.1	Equipment and work environment are correctly checked for readiness to perform scheduled tasks.
		1.2	The hardware components of the computer and their functions are correctly identified.
		1.3	Equipment is powered up correctly.
		1.4	Access codes are correctly applied.
		1.5	Appropriate software is selected or loaded from the menu.
2.	Enter data	2.1	Types of data for entry correctly identified and collected.
		2.2	Input devices selected and used are appropriate for the intended operations.
		2.3	Manipulative procedures of Input device conform to established practices.
		2.4	Keyboard/mouse is operated within the designated speed and accuracy requirements.
		2.5	Computer files are correctly located or new files are created, named and saved.
		2.6	Data is accurately entered in the appropriate files using specified procedure and format.
		2.7	Data entered is validated in accordance with specified procedures.

- 2.8 Anomalous results are corrected or reported in accordance with specified procedures.
- 2.9 Back-up made in accordance with operating procedures.
- 3. Retrieve data
  - 3.1 The identity and source of information are 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 is retrieved, using approved procedure.
  - 3.6 Formats to retrieved report or information conform to requirements.
  - 3.7 Copy of the data is printed where required.
- 4. Amend data
  - 4.1 Source of data/information for amendment is established.
  - 4.2 Data to be amended is correctly located within the file.
  - 4.3 The correct data/Information is entered, changed or deleted using appropriate input device and approved procedures.
  - 4.4 The Integrity of data is maintained.
- 5. Use document layout and data format facilities
  - 5.1 Requirements for document are verified where necessary.
  - 5.2 The given format and layout are appropriately applied.
  - 5.3 Facilities to achieve the desired format and layout are correctly identified, accessed and used.
  - 5.4 Data manipulating facilities are used correctly.
  - 5.5 Format reflects accuracy and completeness.



- |   |     |   |
|---|-----|---|
| 6. Monitor the operation of equipment               | 6.1 | The system is monitored to ensure correct operation of tasks.   |
|   | 6.2 | Routine system messages are promptly and correctly dealt with.  |
|   | 6.3 | Non-routine messages are promptly referred in accordance with operating requirements.   |
|   | 6.4 | Error conditions within level of authority are dealt with promptly, and uncorrected errors are promptly reported.                         |
|   | 6.5 | Output devices and materials are monitored for quality.   |
| 7. Access and transmit information via the Internet | 7.1 | Access to the Internet is gained in accordance with the provider's operating procedures.  |
|   | 7.2 | Evidence of the ability to negotiate web sites to locate and access specified information and other services is efficiently demonstrated. |
|   | 7.3 | E-Mail is sent and retrieved competently.   |
| 8. Close down computer system                       | 8.1 | The correct shut down sequence is followed.   |
|   | 8.2 | Problem with shutting down computer is reported promptly.   |
|   | 8.3 | All safety and protective procedures are observed.  |
|   | 8.4 | The system integrity and security are preserved.  |
| 9. Maintain computer equipment                      | 9.1 | Cleaning materials and/or solutions used meet specified recommendation.   |
|   | 9.2 | The equipment is cleaned as directed.   |
|   | 9.3 | Wear and faults identified are promptly reported to the appropriate personnel.  |

## RANGE STATEMENT

This unit applies to activities associated with essential operations linked to using and maintaining basic computer equipment.

### Equipment:

- install supplied computer
- install supplied peripherals

### Work environment:

- equipment
- furniture
- cabling
- power supply

### Input devices:

- keyboard
- mouse
- scanner
- microphone
- camera

### 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 retrieval operations on a computer system in accordance with the performance criteria and the range listed within the range of variables statement.

### (1) Critical Aspects and Evidence

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

- Initiate the use on the equipment.
- Use document layout and data format facilities.
- Locate and access data.
- Use file operations.
- Manipulate input devices.
- Key-in and format reports.
- Access to the internet.

### (2) Pre-requisite Relationship of Units

- 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, and personal Computer

Input devices: Keyboard, mouse, other selection devices

**(5) Method of Assessment**

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

Competencies in this unit may be determined concurrently. Assessment must be in accordance with the performance criteria.

**(6) Context of Assessment**

This unit may be assessed on or off the job. Assessment should include practical demonstration either in the workplace or through a simulation. A range of methods to assess underpinning knowledge should support this

**CRITICAL 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**BCGCOR0171A: Prepare for demolition process**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively prepare construction process for demolition, and applies to all individuals carrying out initial demolition work in the construction industry.

Competency Field:

General and Construction

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan for demolition process	1.1	Quality Assurance requirements of company's construction operations recognised and adhered to.
		1.2	Job requirements identified from drawings/supervisor's instructions.
		1.3	OH&S requirements for demolition tasks and workplace environment recognised and adhered to.
		1.4	Safety hazards identified and correct procedures adopted to minimise risk to self and others.
		1.5	Protection of public and environment identified from demolition plan/instructions.
		1.6	Appropriate personal protective equipment selected according to job requirements, and correctly fitted and used.
		1.7	Tools and equipment selected to instructions consistent with the job requirements, checked for serviceability and any faults reported to supervisor.
		1.8	Protective equipment and materials selected to instructions, consistent with job requirements.
2.	Prepare materials for demolition process	2.1	Materials for protection of others, public and environment selected to instructions.
		2.2	Material preparation carried out to satisfy requirements of protective barriers and construction.
3.	Prepare work area for demolition process	3.1	Activities to be carried out in work area identified from supervisor's instructions.
		3.2	Protective barriers to be erected/constructed identified from drawing details and/or instructions.

	3.3	Barriers, dust blankets and/or safety fencing erected/installed to instructions.
4. Use tools and equipment for construction processes	4.1	Regular hand and power tools suitable for application processes identified from demolition plan/supervisor's instructions.
	4.2	Hand and power tools used safely and effectively in construction processes.
5. Set up plant and equipment for demolition processes	5.1	Position for locating plant and equipment identified in accordance with job instructions.
	5.2	Plant and equipment located and established in position ready for operation.
6. Clean up	6.1	Unused materials stacked/stored.
	6.2	Work area cleared.
	6.3	Waste disposed of using appropriate method to NEPA requirements.
	6.4	Tools and equipment cleaned, maintained and stored.

## RANGE OF VARIABLES

This unit applies to the preparation processes carried out prior to and during the demolition of a building.

Construction processes include:

- preparation for protective barriers
- erection of safety fences
- erection of solid panelled fencing/hoarding
- installation of dust blankets
- worksite preparation

Demolition sites include:

- buildings on part of a block
- buildings occupying all of a block
- interiors of buildings

Personal protective equipment may include:

- overalls
- jacket
- waterproof pants and jacket
- boots
- gum boots
- hard hat
- safety goggles/glasses
- ear plugs/muffs
- gloves
- dust masks/respirators

Material item may include:

- timber
- blanket sheeting
- plywood
- steel fencing

Tools may include but are not limited to:

- hammers
- hand and power saws
- shovels
- fencing bars
- staplers
- chisels
- picks
- brooms
- cutting knife

Plant and equipment may include but are not limited to:

- air compressor and hoses
- pneumatic picks, rock-breakers
- wheelbarrows
- ladders

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

OH&S requirements to be in accordance with Statutory Legislation and regulations.

Reporting of faults may be verbal or written.

## EVIDENCE GUIDE

Competency is to be demonstrated by carrying out safe and efficient preparation and construction processes in preparing for the demolition of a building using any of the listed range of variables.

### (1) Critical Aspects of Evidence

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

- demonstrate compliance with OH&S regulations applicable to workplace operations
- indicate compliance with organisational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during construction and demolition processes
- demonstrate safe and effective operational use of tools, plant and equipment
- interactively communicate with others to ensure safe and effective workplace operations



**(2) Pre-requisite Relationship of Units**

- BCGCOR0011A Carry out OH&S requirements
- BCGCOR0051A Use hand and power tools
- BCGCOR0061A Use small plant and equipment

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements
- portable power tools
- hand tools and equipment
- materials
- materials handling
- use of plant and equipment
- drawings and written instructions
- workplace communication

Skills

The ability to:

- work safely to instructions
- use power tools and hand tools
- handle material
- select material
- communicate effectively

**(4) Resource Implications**

The following resources should be made available:

- demolition site
- hand and power tools appropriate to construction process
- plant and equipment appropriate to construction and demolition processes
- appropriate materials for construction activities

**(5) Method of Assessment**

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**BCGCOR0212A: Prepare surfaces**

## Competency Descriptor:

This unit deals with the skills and knowledge required to effectively prepare the range of surfaces for various finishing applications, and applies to individuals working in the preparatory phase of surface finishing in the construction industry.

## Competency Field:

General Construction

**ELEMENT OF COMPETENCY PERFORMANCE CRITERIA**

- |  |   |
|--|---|
| 1. Plan and prepare work                       | <ul style="list-style-type: none"> <li>1.1 Quality Assurance requirements of company's construction operations recognised and adhered to.</li> <li>1.2 Preparation requirements identified from drawings, work area and instructions/specifications extract.</li> <li>1.3 OH&amp;S requirements recognised and adhered to in accordance with the application tasks and workplace environment.</li> <li>1.4 Appropriate personal protective equipment selected, correctly fitted and used.</li> <li>1.5 Tools and equipment selected to carry out processes consistent with requirements of job are checked for serviceability and any faults reported to supervisor.</li> <li>1.6 Safety hazards identified and correct procedures used to minimise risk to self and others in accordance with OH&amp;S workplace operations.</li> <li>1.7 Materials appropriate to job application selected, safely handled and stored/located ready for application.</li> </ul> |
| 2. Prepare work area for application processes | <ul style="list-style-type: none"> <li>2.1 Hazards and attachments safely removed where applicable or arranged for removal from area.</li> <li>2.2 Work area prepared for application processes in accordance with finishing material and manufacturer's specifications.</li> </ul>   |
| 3. Prepare surface by sanding/grinding         | <ul style="list-style-type: none"> <li>3.1 Correct abrasive disc/sheet or wheel selected in accordance with surface condition and work to be undertaken and fitted to sander/grinder.</li> </ul>  |

- 3.2 Sander/grinder used and applied safely to surface in accordance with manufacturer's specifications and relevant OH&S requirements.
- 3.3 All loose or protruding material removed by sander /grinder and brushing so that surface is prepared to specification.
- 4. Patch holes
  - 4.1 Method of patching hole determined from type of material surface, size of hole, compatibility of materials and planned specified finish.
  - 4.2 Patching materials selected to suit material surface and, where applicable, mixed to requirements of manufacturer's specifications.
  - 4.3 Colour patching materials checked to ensure that colour matches surrounding area, where applicable.
  - 4.4 Material applied to job and material according manufacturer's specifications using appropriate application method.
  - 4.5 Where applicable to type of patching material, patched areas must be sanded to provide flush and flat finish to surface.
  - 4.6 Surface brushed/scraped/washed clean of surplus material in accordance with type of patching material and material surface
  - 4.7 Patched areas sealed by application of prime or sealing coat, where applicable, to suit requirements of specified finishes.
- 5. Stop and fill surface
  - 5.1 Correct stopping material selected for specified surface, where applicable.
  - 5.2 Imperfections prepared and material applied to a flush and even finish, where applicable, to proposed additional surface application processes.
  - 5.3 Excess filler removed without damaging or marking surface.
  - 5.4 Surface fine-sanded and cleaned free of dust, where applicable for proposed applied finishes.

- |    |          |     |   |
|----|----------|-----|---|
| 6. | Clean-up | 6.1 | Area cleaned free of debris.  |
|    |          | 6.2 | Waste and unwanted material disposed of safely using appropriate method according to National Environment Protection Act (NEPA) requirements. |
|    |          | 6.3 | Unused materials stored.  |
|    |          | 6.4 | Tools and equipment cleaned, maintained and stored.   |

## RANGE STATEMENT

This unit applies to the preparation of different material surfaces for the application of applied surface finishes or the abutting or attaching of a construction to that surface.

Surface preparation will vary in accordance with the types of materials to be applied to finish or seal surface and the type of construction, which is to abut or be attached to the surface.

Material surfaces include:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• timber</li> <li>• plasterboard/plaster-glass</li> <li>• masonry</li> <li>• brick</li> </ul> | <ul style="list-style-type: none"> <li>• metal (ferrous and non-ferrous)</li> <li>• concrete</li> <li>• solid plaster</li> <li>• plastic</li> </ul> |
|--|---|

Surface preparation for application finishes includes the preparation for:

- wall and floor tiling
- terrazzo
- segmental paving
- pre-cast cladding
- waterproofing/damp-roofing
- painting
- solid plastering
- wall papering
- clear timber finishes
- stone veneer
- sheet plastering or lining material

Surface preparation for construction applications of abutting or attaching to surfaces includes the preparation for:

- curtain walling fixing
- brick or block laying
- timber partition walls
- light steel partition walls
- formwork construction
- stair installation
- attachment of steel brackets or fabricated units
- aluminium framework fixing
- roof tiling and slating

Surfaces may be new or established material surfaces including both painted and unpainted surfaces.

Personal protective equipment may include:

- overalls
- waterproof pants and jacket
- boots
- gumboots
- gloves
- hard hat/cap
- safety goggles
- ear plugs/muffs
- dust masks/respirators

Equipment includes but is not limited to:

- electrical leads
- elevated work platforms
- trestles
- planks
- ladders
- buckets
- sanders
- hose and water spray

Work area preparation may include:

- clearing area
- setting up equipment for operation
- erecting scaffolding
- disconnecting and removing attachments from or against walls

Waste and debris may include:

- spilt patching material
- cleared or scraped old paint
- discarded abrasive discs/sheets
- cardboard

Tools include but are not limited to:

- scrapers
- paint brushes
- wire brushes
- brooms
- sponges
- sanding blocks
- shovels
- power sanders
- power grinders
- filling blades
- chisels
- hammers

OH&S requirements to be in accordance with Statutory legislation and regulations and may include:

- workplace environment
- protective clothing and equipment
- working platforms
- use of tools and equipment
- control of hazardous substances
- hazard control

Patching materials include but are not limited to:

- cellulose/plaster proprietary fillers
- plaster
- sand and cement
- cornice adhesive
- putty
- plastic wood
- fibreglass
- caulking compounds
- sheet material

- paper
- dirt and dust
- disused containers

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

Instructions and reporting of faults may be verbal or written.

## EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective preparation of at least three separate types of material surfaces from those listed within the range of variables statement relevant to the work orientation.

### (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 organisational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to and during application of preparation processes
- demonstrate that finished patching of holes is flush and straight with surface within tolerances applicable to work orientation
- demonstrate safe and effective operational use of tools, plant and equipment
- interactively communicate with others to ensure safe and effective workplace operations
- prepare surface to specification or instruction requirements

### (2) Pre-requisite Relationship of Units

Prerequisites for this unit are:

- BCGCOR0011A      Carry out OH&S requirements
- BCGCOR0051A      Use hand and power tools
- BCGCOR0061A      Use small plant and equipment
- BCGCOR0071A      Erect and dismantle restricted height scaffolding

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements
- portable power tools
- hand tools and equipment
- materials relevant to patching and preparation of surfaces
- materials handling
- measurement and calculation
- drawings and written instructions
- workplace communication

Skills

The ability to:

- work safely to instructions
- interpret drawing and instructions
- use power tools and hand tools
- handle material
- select material
- measure relative to the process
- communicate effectively

**(4) Resource Implications**

The following resources should be made available:

- general construction and patching materials relevant to surface preparation
- hand tools and power tools appropriate to application processes
- plant and equipment appropriate to application processes
- suitable work area appropriate to surface preparation process

**(5) Method of Assessment**

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

Competency should be assessed through direct observation of application to tasks and questioning related to underpinning knowledge.

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 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 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
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**BCGMAS0292A: Carry out concrete work**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively handle, place and compact concrete, and applies to individuals working in the construction industry.

Competency Field:

General Construction

**ELEMENT OF COMPETENCY PERFORMANCE CRITERIA**

- | <b>ELEMENT OF COMPETENCY</b>    | <b>PERFORMANCE CRITERIA</b>   |
|---------------------------------|---|
| 1. Plan and prepare work        | 1.1 Quality Assurance requirements for company's concrete operations recognised and adhered to.<br><br>1.2 OH&S requirements with application tasks and workplace environment recognised and adhered to, including identification of hazardous material.<br><br>1.3 Appropriate personal protective equipment selected, correctly fitted and used.<br><br>1.4 Tools and equipment selected, to carry out processes consistent with job requirements, checked for serviceability and any faults reported to supervisor.<br><br>1.5 Procedures and the individual's role are identified through the supervisor in team operation to place concrete. |
| 2. Carry out concrete placement | 2.1 Assistance provided with the undertaking of relevant concrete tests.<br><br>2.2 Concrete transported correctly and safely with wheelbarrow and discharged into formwork using correct manual handling techniques.<br><br>2.3 Concrete placed to instruction, minimising spillage.<br><br>2.4 Concrete compacted to specification and instruction using immersion vibrator or other specified method.<br><br>2.5 Concrete screeded to specified levels/grades as per instructions.<br><br>2.6 Concrete finished to instruction to specified surface finish.<br><br>2.7 Curing process identified and applied to instruction.                   |

- |                  |     |   |
|------------------|-----|---|
|                  | 2.8 | Concrete surface adequately covered with appropriate material to support curing process and protect it from damage. |
| 3. Clean up site | 3.1 | Site cleaned free of debris.  |
|                  | 3.2 | Waste and unwanted material disposed of safely.   |
|                  | 3.3 | Tools and equipment cleaned, maintained and stored.   |

## RANGE STATEMENT

This unit applies to manual handling and placing of concrete.

Work is undertaken as part of a team under supervision.

Quality Assurance requirements may include:

- workplace operations and work procedures
- quality of material
- control of placement, compaction and finish of concrete
- use and maintenance of tools, plant and equipment
- specifications of work

Tools and equipment may include:

- shovels and rakes
- wooden floats
- steel floats
- bull floats
- immersion vibrator or vibrating table
- tarpaulins/covers
- curing agent applicator
- steam generator
- wheelbarrow
- tamping rods
- screed boards
- edging tool
- brooms

Concrete work includes placement of concrete onto:

- foundation
- slab on
- simple retaining walls

Concrete may be cured by:

- atmospheric conditions
- applied moisture
- applied agents

Waste material and debris may include:

- concrete spillage
- excess concrete
- pieces of timber
- empty containers
- cardboard and paper

Personal protective equipment may include:

- safety goggles/glasses
- respirators
- ear muffs and safety boots
- boots
- water proof pants and jacket

Concrete may be transported to formwork and placed by the following methods:

- directly from pre-mix truck
- wheelbarrow
- buckets
- manually

Concrete may be finished by:

- steel float
- bull floats
- wood float
- broom

Instructions would be part of supervisor's directions. Instructions and reporting of faults may be verbal or written.

## EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective placement and finish of concrete using any of the conditions and types of structures listed within the range of variables statement, relevant to the work orientation.

### (1) Critical Aspects and Evidence

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

- demonstrate compliance with Occupational Health and Safety regulations applicable to concrete work and workplace operations
- show compliance with organisational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of concreting process
- demonstrate safe and effective operational use of tools, plant and equipment
- interactively communicate to support team and ensure safe and effective workplace operations
- give particular attention to placement and compaction processes

**(2) Pre-requisite Relationship of Units**

Competency in this unit may be determined concurrently, based upon integrated project work using the following units of competence:

- BCGCAR0252A Erect and strip formwork for concrete work
- BCGSTW0262A Carry out steel-fixing

Pre-requisites for this unit in addition to BCGCAR0252A and BCGSTW0262A are:

- BCGCOR0011A Carry out OH&S requirements
- BCGCOR0051A Use hand and power tools
- BCGCOR0061A Use small plant and equipment
- BCGMAS0101A Carry out concrete work to simple forms

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements
- concrete construction
- hand tools and equipment
- materials relating to the concreting process
- materials handling
- measurement relevant to concrete work
- drawings/specifications
- transporting, placing concrete
- levelling equipment
- simple formwork and reinforcement component

Skills

The ability to:

- work safely to instructions
- use power tools and hand tools
- handle materials
- select equipment appropriate to concreting process
- measure relative to concreting process
- communicate effectively
- use simple levelling equipment

**(4) Resource Implications**

The following resources should be made available:

- hand tools and power tools appropriate to concreting process
- plant and equipment appropriate to concreting process
- suitable formwork with placed reinforcement appropriate to concreting process
- concrete testing equipment

**(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, in order to achieve outcomes within time constraints.

Assessment should be by direct observation of tasks and questioning related to underpinning knowledge.

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 the process.

**(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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

## MEMFAB0072A: Perform advanced welding using oxyacetylene welding process (OAW)

### Competency Descriptor:

This unit deals with skills and knowledge required to perform advanced welding using oxyacetylene welding process (OAW) in the metal engineering and maintenance trades, and applies to individuals in the industry.

### Competency Field:

Metal, Engineering Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Select welding equipment and consumables	1.1	Correct welding equipment and consumables are selected from weld procedure specifications.
2.	Assemble welding equipment	1.2	Welding equipment, including cylinders, regulators, hoses, torches and tips is assembled and set up safely in accordance with standard operating procedures.
3.	Weld joints to standards or equivalent	3.1	Materials are welded to Standards or equivalent specifications in the overhead position.
		3.2	Instructions, symbols, specifications are interpreted correctly including bead size, bead placement, reinforcement etc. and in accordance with weld procedure.
4.	Inspect welds	4.1	Weld joints are visually inspected against specifications.
		4.2	Weld defects are identified.
5.	Correct faults	5.1	Defects are removed with minimum loss of sound metal using application correct and appropriate techniques.
6.	Maintain weld records	6.1	Weld records are maintained in accordance with specifications and standard operating procedures.
7.	Clean-up	7.1	Area around work activity is cleaned.
		7.2	Waste and unwanted materials are disposed of safely.
		7.3	Tools and equipment are cleaned, maintained and stored

## RANGE STATEMENT

Advanced oxyacetylene welding (OAW) carried out using a range of materials for general fabrication. The person would work autonomously or in a team environment using predetermined standards of quality, safety and welding procedures.

Weld would be applied to meet appropriate industrial standards, or equivalent outcomes.

Preparation of materials may include preheating, setting up of jigs, fixtures, clamps etc.

Appropriate assembly of heating equipment may include:

- cylinders
- connections
- hoses
- tips
- nozzles

Materials:

- low carbon steel (mild steel) up to 10 gauge
- low carbon steel plate up to 5mm
- steel and galvanised pipes up to 50mm

Types of welding:

- fillet weld
- lap weld
- butt weld,
- single and multi-run

Work activities:

- measuring,
- marking,
- grinding
- lifting,
- welding

Specification:

- welding procedure
- weld profile regular in width
- even/regular ripple formation
- uniform in appearance

Heating medium and appropriate consumables can include:

- oxyacetylene
- fuel gas
- fluxes (resin or powder)
- all types of silver solder and brazing rods

Location/condition:

- workshop
- plant
- fieldwork at ground level
- elevated positions
- dry
- humid and wet conditions
- construction environment
- agricultural environment
- food processing environment

- cutting
- aligning,
- shaping,
- filing,
- general machining

- free from excessive undulations
- smooth stop/starts, tack incorporated,
- adequate penetration
- no excess undercut
- no craters



Welding position:

- flat,
- vertical
- horizontal
- overhead

## 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 oxyacetylene welding or other units requiring the exercise of the skills and knowledge covered by this unit.

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to identify/select materials relative to the oxyacetylene welding process
- communicate information about oxyacetylene welding processes, 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 related tasks in accordance with standard operating procedures;
- perform advanced welding using oxyacetylene fuel efficiently and 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 and undertake a routine task
- MEMCOR0121A Classify engineering materials
- MEMFAB0121A Weld using oxyacetylene welding process (fuel gas welding)

### (3) Underpinning knowledge and Skills

#### Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- metal properties and classification
- heating medium/techniques
- welding techniques
- welding processes
- oxy-fuel equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to oxyacetylene welding procedures
- materials preparation
- manual handling and lifting
- measurement
- drawings, sketches and instructions

### Skills

The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings and instructions
- use oxyacetylene welding equipment
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding soldering processes
- identify/select materials relative to the welding process
- prepare materials relative to the welding process
- performed advanced welding using oxyacetylene process efficiently

#### **(4) Resource Implications**

The following resources should be made available:

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

#### **(5) Method of Assessment**

The candidate will be required to:

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

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

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

#### **(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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

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

**MEMMRD0072A: Shut down/isolate machine/equipment**

Competency Descriptor:

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

Competency Field:

Metal, engineering and Maintenance

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

## RANGE STATEMENT

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

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

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

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

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

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

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

### (2) Pre-requisite Relationship of Units

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

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

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

Skills

The ability to:

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**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	<p>1.1 Nature of the breakdown is confirmed with appropriate personnel to establish the need to attend.</p> <p>1.2 Work clearances are obtained and other preliminary OH&amp;S procedures are followed, where required.</p> <p>1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.</p> <p>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.</p>
2. Evaluate extent of work	<p>2.1 Customer service requirements are dealt with.</p> <p>2.2 OH&amp;S policies and procedures for working in the area at the breakdown are adhered to.</p> <p>2.3 Extent of breakdown is evaluated and confirmed with appropriate personnel.</p> <p>2.4 Appropriate personnel required to determine cause and rectify breakdown is ascertained from available evidence and arrangements made for their attendance where applicable.</p> <p>2.5 Extent of repair work is ascertained from available evidence and confirmed with appropriate personnel.</p> <p>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.</p>



- |                       |     |  |
|-----------------------|-----|--|
|                       | 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'.

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

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

Competency will be determined on evidence of having consistently performed across a representative range of activities and where required support the outcomes of other units within a qualification structure

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**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

<b>ELEMENT OF COMPETENCY</b>		<b>PERFORMANCE CRITERIA</b>	
1.	Prepare purchase order/list	1.1	Purchase order/list is prepared to standard operating procedure.
		1.2	Material specifications, price limitations, quantities and delivery requirements are determined from instructions, requisitions etc.
2.	Order materials	2.1	Supplier/vendor is informed of requirements and specifications according to standard operating procedure.
		2.2	Supplier/vendor orders are followed up to achieve delivery as required.
		2.3	Where appropriate, goods are directly received and checked for damage.
		2.4	Records/files are completed accurately according to standard operating procedure.

**RANGE STATEMENT**

Competency is to be demonstrated by effectively performing routine ordering of materials in accordance with the range listed within the range of variables statement.

This unit applies to purchasing activities carried out by other than the purchasing officer eg: maintenance, service, stores and warehouse personnel. The work is undertaken autonomously or as part of team.

## EVIDENCE GUIDE

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to order materials as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

### (2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0161A Plan and undertake a routine task
- ICTCOR0011A Carry out data entry and retrieval procedures

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

- written/oral communication techniques
- basic computation methods
- documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate to ordering materials
- supplier/vendor/sources for required material
- purchase orders

#### Skills

The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- prepare order for materials

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.



**MEMQUA0012A: Perform inspection (basic)**

Competency Descriptor:

This unit applies to the skills and knowledge necessary to perform basic inspection in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

**ELEMENT OF COMPETENCY****PERFORMANCE CRITERIA**

1.	Inspect completed task	1.1	Job is tested for conformance to specifications in accordance with standard engineering/maintenance procedures.
2.	Keep records	2.1	Test status identification is made on conforming and non-conforming products and records accurately kept using standard operating procedures.
3.	Provide feedback	3.1	Job is tested/inspected/measured after rework or repair.
		3.2	Deficiencies or deviations are reported to standard operating procedures.

**RANGE STATEMENT**

This unit applies to those whose duties include the basic inspection of completed or partly completed engineering and maintenance task completed by others. These may include but not limited to:

- installation applications
- maintenance applications

Inspection is carried out in accordance to engineering/maintenance standards or specifications, and applies to a range of metal engineering and maintenance techniques. These may include but not limited to the use of:

- specialized tools/equipment
- measuring equipment/devices/tools

Inspection/verification process may include but not limited to:

- visual inspection
- daily maintenance checks
- production run
- in service test and monitoring

Inspection may involve "first piece inspection", fixed interval, sample etc. Depending on the inspection process other technical units may need to be accessed, for example, appropriate measurement units.

## EVIDENCE GUIDE

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

### (1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to perform basic quality inspection
- demonstrate the ability to interpret instructions manuals quality specifications and/or technical drawings
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- plan tasks in all situations and review task requirements as appropriate;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

### (2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0141A Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

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

### Skills

The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions
- apply quality procedures
- read and interpret instructions manuals quality specifications and/or technical drawings
- plan a routine task
- undertake a routine task
- perform basic quality inspection

#### **(4) Resource Implications**

The following resources should be made available:

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

#### **(5) Method of Assessment**

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

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

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

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

#### **(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**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.
3. Develop self-assessment profile	3.1	Self-assessment tools/methods to identify personal entrepreneurial potential are identified and properly used.
	3.2	The ability to apply creativity, problem-solving techniques and principles to solve business related problems are demonstrated.

- 3.3 Feedback from others for the purpose of becoming aware of blind spots and for reinforcing or changing existing perceptions of strengths/ weaknesses is appropriately obtained.
- 4. Craft an entrepreneurial strategy
  - 4.1 A profile of the past that includes accomplishments and preferences in terms of life and work styles, coupled with a look into the future and an identification of what one would like to do is developed.
  - 4.2 Commitment, determination and perseverance; orientation towards goals; taking initiative and accepting personal responsibility; recognizing management competencies and identifying areas for development are determined.
  - 4.3 Written guidelines to obtain feedback that is solicited, honest, straightforward, and helpful but not all positive or negative are developed to facilitate reviews.
  - 4.4 Framework and process for setting goals which demand time, self-discipline, commitment, dedication and practice are developed.
  - 4.5 Goals established are specific and concrete, measurable, relate to time, realistic and attainable.
  - 4.6 Priorities, including identifying conflicts and trade-offs and how these may be resolved are established.
  - 4.7 Potential problems, obstacles and risks in meeting goals are identified.
  - 4.8 Specified action steps that are to be performed in order to accomplish goals are identified.
  - 4.9 The method by which results will be measured is indicated.
  - 4.10 Milestones for reviewing progress and tying these to specific dates on a calendar are established.
  - 4.11 Sources of help to obtain resources are identified.
  - 4.12 Evidence of the ability to review process and periodically revise goals is demonstrated.

## RANGE STATEMENT

At this stage of the entrepreneurial process the entrepreneur must be able to conduct a self-assessment profile, examine the frame work for self assessment, develop a personal entrepreneurial strategy, identify data to be collected in the self-assessment process and learn about receiving feedback and setting goals.

Concepts associated to include:

- risk
- entrepreneurship
- macro-screening
- micro-screening
- competition
- wage employment

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

Influencing factors to include:

- market conditions
- markets – demand/supply
- global trends
- level of economic activities
- funding
- economic stability
- social stability
- resources availability

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
- 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 commitment to a premature path with the desirability of flexibility can lead to disaster
- milestones and reviews

## EVIDENCE GUIDE

Competency is to be demonstrated when the entrepreneur is able to undertake a personal entrepreneurial assessment exercise to determine if he or she possesses the necessary credentials to be a successful entrepreneur. This stage of the entrepreneurial process is critical since experience has shown that the founder is one of the deciding forces if the venture is to succeed and prosper.

### (1) Critical Aspects of Evidence

The entrepreneur will be assessed by his/her action in developing an orchestrated plan in order to effectively pursue the business concept.

### (2) Pre-requisite Relationship of Units

- Nil

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

- personal entrepreneurial profile systems
- effective management systems: marketing, operations/productions, finance, administration, law
- how to measure feedback
- the method of developing a personal plan
  - and a business plan
- understanding the difference between entrepreneurial culture and management culture

#### Skills

The ability to:

- determine barriers to entrepreneurship
- minimize exposure to risk
- exploit any available resource pool
- tailor reward systems to meet a particular situation
- effectively plan and execute activities
- use computer technology to undertake assessments

### (4) Resource Implications

The following resources should be made available:

Personal computer with access to the Internet and appropriate software that will enable one to conduct the necessary analysis using the Internet.



**(5) Method of Assessment**

A useful method of assessment is to determine if the venture can stand up to the test of critical evaluation.

**(6) Context of Assessment**

This stage of the entrepreneurial process is assessed when comparisons are made between actual outcomes and plans/projections.

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMMAH0073A: Purchase materials**

Competency Descriptor:

This unit applies to the skills and knowledge necessary to purchase materials in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Determine purchasing requirements	1.1	Consulted with client, customer or user as appropriate.
		1.2	Material specifications are determined from orders, instructions and/or technical drawings.
		1.3	Quantities, price limitations and delivery requirements are determined from orders/instructions.
2.	Prepare purchase order/list	2.1	Purchase order/list is developed to standard operational procedure.
3.	Purchase material	3.1	Standard operational procedures are followed.
		3.2	Supplier/vendor is informed of requirements and specifications.
		3.3	Purchasing schedules are adjusted where required to standard operational procedures.
		3.4	Appropriate paperwork/contracts are exchanged to standard operational procedure.
		3.5	Records/files are maintained accurately using standard operating procedures.

## RANGE STATEMENT

Purchasing schedules developed to operating procedures and for pre-contracted suppliers/vendors.

Contracts/paperwork generated manually or electronically utilising on-site system.

Purchasing can cover one-off or multiple quantities of raw materials, components, equipment etc.

Purchasing specifications are determined from standard engineering drawings and data sheets, instructions written or verbal.

All work and work practices undertaken to regulations or standard requirements.

## EVIDENCE GUIDE

Competency is to be demonstrated by purchasing materials within the range statement relative to the work orientation

### (1) Critical Aspects of Evidence

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

### (2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0042A Interpret standard specifications and manuals
- MEMMAH0042A Order materials
- ICTCOR0011A Carry out data entry and retrieval procedures)

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

- written/oral communication techniques
- basic computation methods
- interpreting standard specifications and manuals
- documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate to ordering and purchasing of materials
- supplier/vendor/sources for required material
- purchase orders

**Skills**

The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- interpret orders, instructions manuals quality specifications and/or technical drawings
- purchase materials relevant to related area

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

**MEMASY0023A: Assemble distribution systems and components**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively assemble distribution systems and components and applies to individuals working in the metal engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

<b>ELEMENT OF COMPETENCY</b>		<b>PERFORMANCE CRITERIA</b>	
1.	Read and understand job sheets/technical information	1.1	Job sheets/instruction/technical information are correctly interpreted and followed.
2.	Select and use pipe cutting and assembly tools	2.1	Tools are correctly selected and used.
3.	Select and use assembly equipment	3.1	Assembly equipment is selected in accordance with instructions/ technical information on job sheet.
		3.2	Equipment is used in a safe manner according to standard operating procedure
4.	Assemble components fabrications/constructions	4.1	Assembly is produced following correct sequence of operations.
		4.2	Components are joined according to specification using appropriate techniques.
		4.3	Assembly is tested/checked for compliance with job sheet requirements using standard operating procedures.
5.	Protect assembly from damage	5.1	Components are handled and stored in a safe manner in accordance with standard operating procedures.
6.	Clean up area	6.1	All waste material is removed and disposed of.
		6.2	Area related to work activities is cleaned.
		6.3	Tools and equipment are cleaned, maintained and stored.
7.	Inspect and notify completion of work	7.1	Final inspections are undertaken to ensure the assembled distribution systems and components conforms to requirements.
		7.2	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.

Work processes may include but no limited to:

- identifying and selecting materials and supplies
- identifying and selecting tools and equipment
- identifying and selecting plastic pipes and main
- measuring, cutting and preparing plastic pipes for joining
- applying solvent cement weld to plastic pipes and fittings and joining pipes
- cleaning tools and work area
- preparing pipe ends for installation
- preparing pipes and system for installing valves, regulators and metering devices
- measuring and cutting steel pipes
- threading steel pipes
- joining steel/copper pipes
- welding steel/copper pipes
- brazing steel/copper pipes
- testing pipe joints
- chasing, boring and drilling concrete
- erecting and/or installing piers brackets and other supports

Preparation of materials would be minimal and may include but not limited to:

- preheating
- setting up jigs,
- setting up fixtures
- setting up clamps
- cleaning up material
- joint preparation

Location/condition may include but not limited to:

- workshops
- domestic complexes
- plants and commercial complexes
- in the field
- confined spaces
- elevated positions
- damp and wet situations
- on wall surfaces

Joining of pipes may be done by but not limited to:

- screwed method
- welding
- brazing
- soldering
- flanged method
- compression method

Systems may include:

- water
- pneumatic
- hydraulic
- steam
- gas

Tools and equipment may include but not limited to:

- hand and power saws
- pipe cutters
- threading machine
- pipe reamers
- pipe dies/taps
- tape measure
- jigs and fixtures
- ladders/scaffolding
- welding/brazing/soldering equipment
- masonry tools
- hammers/screwdrivers/hand tools
- hand brush
- pipe bending spring
- pipe vices/wrenches/tripod/benders

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively assembly pipes and fittings 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 assembling pipes and fittings and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in assembling pipes and fittings
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations
- demonstrate effective skills 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 the assembly of pipes and fittings or other units requiring the exercise of the skills and knowledge covered by this unit.



**(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
- MEMCOR0171A Use graduated measuring devices
- MEMFAB0041A Carry out mechanical cutting
- MEMFAB0051A Perform brazing and/or silver soldering
- MEMCOR0091A Interpret sketches and technical drawings
- MEMCOR0111A Use power tools/hand held operations
- MEMASY0071A Assembly pipes and fittings for consumer plumbing installations

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- assembly methods
- assemble equipment
- hand tools and equipment
- jigs, fixtures, tools and measuring equipment relative to repairing, replacing and modifying fabrications
- materials preparation
- manual handling
- measurement
- drawings, sketches and technical information

Skills

The ability to:

- work safely to instructions
- plan to undertake a routine assembly task
- interpret related drawings and instructions
- select and use tools related to assembly process
- select pipes storage and main distribution systems
- measure relative to the assembly processes
- communicate effectively
- assemble pipes storage and main distributions efficiently

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

The candidate will be required to:

- answer questions put by the assessor.
- identify 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.

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

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

**(6) Context of Assessment**

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

**CRITICAL EMPLOYABILITY SKILLS**

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>• Carries out established processes</li> <li>• Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>• Manages process</li> <li>• Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>• Establishes principles and procedures</li> <li>• Evaluates and reshapes process</li> <li>• Establishes criteria for evaluation</li> </ul>

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.

## **MEMINS0043A: Install & maintain main distribution systems and components**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively install and maintain main distribution systems and components and applies to all related areas in the metal, engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

<b>ELEMENT OF COMPETENCY</b>		<b>PERFORMANCE CRITERIA</b>	
1.	Plan and prepare for installation or maintenance	1.1	Installation/maintenance 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	Storage and main distribution systems are checked against job requirements.
		1.5	Material and supplies are obtained in accordance with established procedures and to comply with requirements.
		1.6	Location in which storage and main distribution systems are to be installed is determined from job requirements.
		1.7	Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
		1.8	Tools, equipment and testing devices needed to carry out the installation and maintenance work are obtained in accordance with established procedures.
		1.9	Tools, equipment and testing devices and checked for correct operation and safety.
		1.10	Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.

- |    |   |     |   |
|----|---|-----|---|
| 2. | Install and maintain storage and main distribution system | 2.1 | OH&S policies and procedures for installing and maintaining storage and main distribution system are followed.  |
|    |   | 2.2 | Storage and main distribution systems are installed and maintained in accordance with requirements and without damage or distortion to the surrounding environment or services. |
|    |   | 2.3 | Storage and main distribution systems 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 storage and main distribution system conforms to requirements.   |
|    |   | 3.2 | All waste material are removed and disposed of.   |
|    |   | 3.3 | Area related to work activities is cleaned.   |
|    |   | 3.4 | Tools and equipment are cleaned, maintained and stored.   |
|    |   | 3.5 | 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 standards, regulations, procedures, technology and the like related to the scope and application of this unit.

This unit will cover installation and maintenance areas including but not limited to:

- preparing site for pipe work installation
- laying and joining water main supply lines
- drilling and tapping water mains under pressure
- installing and maintaining valves, regulators and metering devices
- testing pipe work and main distribution system

Locations/conditions:

- trenches
- confined spaces
- elevated positions
- ground level

Source of information:

- working drawings/sketches,
- oral/written work instructions

Tools and equipment to include:

- hand and power hack saws
- pipe dies
- pipe threading machine
- pipe wrenches
- pipe cutters
- hand drills
- pipe reamers
- swaging tools, files
- cold chisels
- hammers
- soldering and brazing equipment
- wrenches
- screwdrivers
- masonry trowels
- shovels
- pickaxes,

Joining methods:

- threaded
- flanged
- welding/brazing
- solvent weld
- caulked,
- O-ring.
- wet and damp areas
- in/through concrete work
- asphalt
- earth

Devices supplies and fittings for hot and cold water, chemicals, steam, compressed air to include:

- valves
- regulators
- metering devices
- saddle straps,
- plug
- valves
- range of pipes and fittings up to 200 mm in diameter
- seals,
- gaskets
- nut and bolts
- sealing and fastening supplies as per requirements.

Work processes may include:

- identifying and selecting equipment
- identifying and selecting hand power tools and equipment
- checking scaffoldings
- laying out trenches
- excavation trenches
- timbering trenches
- grading trenches
- chasing, boring and drilling concrete
- setting up and assembling equipment
- marking out, drilling and tapping pipes
- installing valves
- reading and interpreting drawings and other relevant information
- determining and organising job requirements
- identifying and selecting materials and supplies
- preparing pipe ends for installation
- performing maintenance duties according to work schedules
- installing valves, regulators and metering devices to
- pipe-work installations
- testing devices installed

## EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively installing and maintaining storage and main distribution system 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 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

### Critical Aspects of Evidence (Cont'd)

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to install and maintain storage and main distribution system
- 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 installation and maintenance 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 and undertake a routine task
- MEMCOR0171A Use graduated measuring devices
- MEMFAB0041A Carry out mechanical cutting
- MEMFAB0051A Perform brazing and/or silver soldering
- MEMCOR0091A Interpret technical drawing
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools

### (3) Underpinning Knowledge and Skills

#### Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- installation/maintenance tools and equipment
- materials used in installation
- materials used for piping
- fabrication techniques
- installation techniques
- maintenance techniques

#### Skills

The ability to:

- identify potential workplace hazards; preventative measures
- work with tools and equipment
- read and interpret simple freehand sketches
- measure accurately
- communicate effectively
- install and maintain storage and main distribution system efficiently

**(4) Resource Implications**

The following resources should be made available:

- all tools, equipment, materials and documentation required
- any relevant workplace procedure
- 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

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

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

**(6) Context of Assessment**

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



## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manage process</li> <li>Select the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.

## MEMMRD0343A: Maintain the effective operation of storage and distribution systems

Competency Descriptor:

This unit deals with the skills and knowledge required to maintain the effective operation of storage and distribution systems and applies to individuals working in the metal engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan and prepare for maintenance activities	1.1	Work instructions/information are accurately interpreted and the task is organized accordingly.
		1.2	The correct size, type and quantity of material components and location are selected and prepared .
		1.3	Storage and distribution system components are identified and maintained according to the maintenance specifications/work instructions.
		1.4	Instructions/information communicated to appropriate personnel are confirmed as understood.
		1.5	System components are not damaged and where deficiencies are observed appropriate corrective action is taken.
		1.6	Where required, storage and distribution system components are maintained according to specifications/instructions, and all connections are mechanically sound air and water tight.
2.	Maintain storage and distribution system	2.1	Maintenance routines comply with manufacturers' recommendations (or other authorised recommendations) for required tests, checks for correct operation.
		2.2	Maintenance activities are carried out in a systematic and logical sequence of operations.
		2.3	Where components are not meeting performance expectations these are cleaned, repaired or replaced with components of equal technical capability.
		2.4	Components are cleaned using appropriate cleaning agents and equipment.
		2.5	Where cleaning agents are hazardous, appropriate protective clothing is worn.

- |    |  |  |
|----|--|--|
|    | 2.6  | System functions efficiently after maintenance procedure is carried out and items handled are not damaged. |
|    | 2.7  | Work activities are carried out in accordance with health and safety regulations and codes of practice.    |
| 3. | Diagnose and rectify faults in or damage to drainage systems | 3.1 The system is located using plans if available.  |
|    | 3.2  | The fault is diagnosed accurately and safely.  |
|    | 3.3  | Old system/piping is uncovered and damaged section removed.  |
|    | 3.4  | System is restored/reconstructed using appropriate material and supplies.                                  |
|    | 3.5  | System is checked for free flow and confirmed functional.  |
|    | 3.6  | Work activities are carried out in accordance with health and safety regulations and codes of practice.    |
| 4. | Inspect and notify completion of work                        | 4.1 Work is completed within acceptable time.  |
|    | 4.2  | Tools and equipment are cleaned, maintained and stored.  |
|    | 4.3  | Work area is left clean and tidy.  |

## RANGE STATEMENT

### Sources of information:

- Blueprints, schematic drawings, manufacturer's
- technical information, materials/equipment
- specifications, relevant standard regulations and
- codes of practice

### Tools and equipment:

- hand and power tools appropriate for the job
- specialized plumbing system maintenance tools

### Systems:

- domestic
- commercial
- industrial
- agricultural

### Appropriate personnel:

- apprentices
- trades man
- supervisor

Work processes may include but not limited to:

- determining and organising job requirements
- reading and interpreting relevant technical information
- changing specified system
- discharging specified system components simultaneously
- observing dynamics performance of system
- recording and comparing system dynamic performance with design specifications
- identifying types of installation and determining test required
- checking pipe -work installation, fixtures, components and equipment
- diagnosing cause of fault in specified plumbing system
- identifying and selecting tools, equipment and materials required
- rectifying faults to restore specified system
- preparing records of work completion
- co-ordinating and supervising work activities
- assigning work to and instructing workers

Safety:

- personal safety
- chemical
- gas
- steam and electrical hazards,
- hand and power tools
- operating procedure

## EVIDENCE GUIDE

### (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'

**Critical Aspects of Evidence (Cont'd)**

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to maintain the effective operation of storage and distribution 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;
- 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**

- MEMINS0061A Prepare for piping and tubing installation
- MEMASY0071A Assemble pipes and fittings for clients
- MEMINS0041A Install and maintain piping and tubing for clients

**(3) Underpinning Knowledge and Skills**Knowledge

Knowledge of:

- safety and work procedures:
- standards of quality
- maintenance tools and equipment
- materials used in maintenance
- components and fixtures
- maintenance techniques
- range of storage and distribution systems and applications

Skills

The ability to:

- handle ladders
- identify potential workplace hazards; preventative measures
- work with hand tools
- read and interpret sketches drawings manuals etc.
- measure accurately
- communicate effectively
- maintain the effective operation of storage and distribution systems
- test system to ensure equipment are functional and being installed properly

**(4) Resource Implications**

The following resources should be made available:

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

**(5) Method of Assessment**

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

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

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

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

**(6) Context of Assessment**

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

## CRITICAL EMPLOYABILITY SKILLS

Three levels of performance denote level of competency required to perform a task. These levels do not relate to the 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.
<ul style="list-style-type: none"> <li>Carries out established processes</li> <li>Makes judgement of quality using given criteria</li> </ul>	<ul style="list-style-type: none"> <li>Manages process</li> <li>Selects the criteria for the evaluation process</li> </ul>	<ul style="list-style-type: none"> <li>Establishes principles and procedures</li> <li>Evaluates and reshapes process</li> <li>Establishes criteria for evaluation</li> </ul>

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.