Competency Standards for Caribbean Vocational Qualifications (CVQ)

CCMEM30404 Level III in Pipefitting

Unit Number	Unit Title	Mandatory /Elective	Hours
MEMCOR0051A	Perform related computations – (basic)	Mandatory	20
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
MEMCOR0131A	Undertake interactive workplace communication	Mandatory	20
MEMCOR0141A	Follow principles of Occupational Health and Safety (OH&S) in work environment	Mandatory	20
MEMCOR0161A	Plan to undertake a routine task	Mandatory	10
MEMCOR0171A	Use graduated measuring devices	Mandatory	10
MEMCOR0191A	Use hand tools	Mandatory	5
ITICOR0011A	Carry out data entry and retrieval procedures	Mandatory	40
MEMFAB0041A	Carry out mechanical cutting operations - (basic)	Mandatory	10
MEMFAB0051A	Perform brazing and/or silver soldering	Mandatory	20
MEMFAB0061A	Perform manual heating and thermal cutting	Mandatory	20
MEMFAB0071A	Undertake fabrication, forming, bending and shaping	Mandatory	40
MEMFAB0111A	Perform basic welding using manual metal arc welding process (MMAW)	Mandatory	50
MEMFAB0121A	Perform basic welding using oxyacetylene welding process (OAW) – fuel gas welding	Mandatory	50
MEMFAB0141A	Develop geometric shapes – (basic)	Mandatory	20
MEMFAB0151A	Prepare for oxyacetylene/metal arc welding processes	Mandatory	20
MEMMAH0071A	Perform manual handling and lifting	Mandatory	5
MEMMAH0081A	Perform housekeeping duties	Mandatory	10
MEMCOR0012A	Plan a complete activity	Mandatory	5
MEMCOR0022A	Perform related computations	Mandatory	20
MEMCOR0042A	Interpret standard specifications and manuals	Mandatory	5
MEMCOR0052A	Operate in an autonomous team environment	Mandatory	5
MEMCOR0092A	Mark off/out structural fabrications and shapes	Mandatory	30
MEMCOR0122A	Write technical reports (basic)	Mandatory	40
MEMCOR0023A	Write technical reports (advanced)	Mandatory	40
MEMCOR0093A	Plan and organise work	Mandatory	10
MEMCOR0103A	Maintain quality systems within a team	Mandatory	10
MEMFAB0042A	Perform advanced welding using manual metal arc welding process (MMAW)	Mandatory	40
MEMFAB0022A	Perform advanced manual thermal cutting, gouging and shaping	Mandatory	20

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CCMEM30404 Level III in Pipefitting (Cont'd.)

Unit Number	Unit Title	Mandatory /Elective	Hours
MEMFAB0072A	Perform advanced welding using oxyacetylene welding process (OAW)	Mandatory	40
MEMFAB0082A	Develop geometric shapes- (advanced) cylindrical/rectangular	Mandatory	40
MEMFAB0132A	Fabricate install and maintain industrial pipe work	Mandatory	60
MEMFAB0163A	Fabricate and install advanced pipe installation	Mandatory	60
MEMFAB0173A	Test piping systems and equipment	Mandatory	20
MEMFAB0183A	Fabricate and install special piping	Mandatory	40
MEMCOR0101A	Prepare basic engineering drawing	Elective	30
MEMSUF0061A	Prepare for the application of protective coatings	Elective	10
MEMMRD0191A	Assemble & disassemble scaffolding to enable access to the work area	Elective	20
MEMMAH0101A	Perform basic rigging work	Elective	20
MEMFAB0131A	Repair/replace/modify fabrications (basic)	Elective	20
MEMQUA0012A	Perform inspection (basic)	Elective	20
MEMMAH0042A	Order materials	Elective	20
MEMCOR0062A	Attend to breakdown	Elective	20
MEMFAB0062A	Weld using gas tungsten arc welding process GTAW - (Tungsten inert gas TIG)	Elective	40
BSBSBM0012A	Craft personal entrepreneurial strategy	Elective	50
MEMFAB0092A	Develop geometric shapes- (advanced) Conical/Transitional	Elective	40
MEMMAH0102A	Perform advanced rigging work	Elective	40
MEMMRD0722A	Install and maintain mechanical valves	Elective	20
MEMINS0182A	Install valves, regulators and metering devices	Elective	15
MEMFAB0013A	Monitor quality of production welding/fabrications	Elective	20
MEMFAB0023A	Perform advanced welding using gas metal arc welding process GMAW -(Metal inert gas- MIG)	Elective	40
MEMFAB0053A	Perform welding supervision	Elective	40
MEMFAB0063A	Perform welding/fabrication inspection	Elective	40
MEMASY0023A	Assemble distribution systems and components	Elective	40
MEMMAH0073A	Purchase materials	Elective	20
MEMCOR0013A	Assist in the provision of on the job training	Elective	30
MEMCOM0023A	Perform internal/external customer service	Elective	20
MEMPLN0063A	Coordinate and manage basic installation projects	Elective	20
MEMMAH0093A	Coordinate materials	Elective	20
MEMCOR0063A	Attend to breakdowns in hazardous areas	Elective	20
MEMCOR0083A	Estimate Projects	Elective	20
BSBFLM0053A	Support operational plan	Elective	20
BSBFLM0093A	Support continuous improvement systems and processes	Elective	20

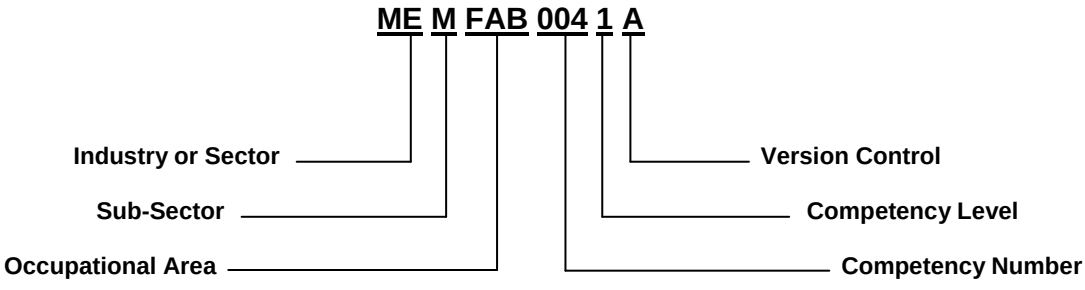
To be awarded this Caribbean Vocational Qualification (CVQ) all core competency standards must be achieved. Electives achieved with the qualification will be awarded unit statement of competency.

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

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Legend to Unit Code

Example: MEMFAB0041A



KEY: Man – Mandatory; BSB – Business Services; (Industry) SBM – Small Business Management (Sub-Sector) FAB – Fabrication; MAH – Material Handling; PLN – Planning; QUA – Quality; SUF – Surface Finishing; BSB - Business Services (Business); ITI - Information Technology (Industry)

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MEMCOR0051A: Perform related computations – (basic)

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

Competency Field: Maintenance and metal fabrication

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

RANGE STATEMENT

This unit applies to simple projects applicable to:

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

Calculations may be performed using:

- pen
- paper
- calculator
- protractor

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

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

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

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

During assessment the individual will:

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

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

(2) Pre-requisite Relationship of Units

- Nil

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMCOR0081A: Mark off/out (general engineering)

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

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Storage procedures include labelling and identification to standard operating procedures

Marking out covers but not limited to:

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

Equipment may include but not limited to:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0091A Draw and Interpret sketches and simple drawings

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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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.

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		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

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Geometric construction to include:

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

Multi-view (orthographic 2-D) drawings:

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

Pictorial (3-D) drawing to include:

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

Dimension reading:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

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(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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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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

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Applications may include power tools used for

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

Operations may include:

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

Outcomes to job specifications may include

- finish
- size
- shape

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

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

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(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.

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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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

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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

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0131A: Undertake interactive workplace communication

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

Competency Field: Metal, Engineering and Maintenance

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

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RANGE STATEMENT

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

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

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

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(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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

Competency Field: Metal, Engineering and Maintenance

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

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

RANGE STATEMENT

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

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

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

Quality Assurance requirements may include:

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

Personal protective equipment may include but is not limited to:

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

Emergency procedures include:

- fire fighting
- medical and first aid
- evacuation

Ladders and work platforms include:

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

Power connections include:

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

Safety responsibilities apply to:

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

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

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

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The following resources should be made available:

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

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(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0161A: Plan to undertake a routine task

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

Competency Field: Metal, Engineering and Maintenance

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

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RANGE STATEMENT

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

Instructions may include but not limited to:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

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(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0171A: Use graduated measuring devices

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

Measuring devices may include but not limited to:

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

Measurements undertaken may include but not limited to:

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

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

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

(2) Pre-requisite Relationship of Units

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

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0191A: Use hand tools

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

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Hand tools may include but not limited to:

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

Applications may include hand tools used for

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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ITICOR0011A: Carry out data entry and retrieval procedures

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

Competency Field: Information Technology and Communications - Operations

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

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3.	Retrieve data	3.1	The identity and source of information is established.
		3.2	Authority to access data is obtained where required.
		3.3	Files and data are correctly located and accessed.
		3.4	Integrity and confidentiality of data are maintained.
		3.5	The relevant reports or information retrieved using approved procedure.
		3.6	Formats to retrieved report or information conform to that required.
		3.7	Copy of the data is printed where required.
4.	Amend data	4.1	Source of data/information for amendment is established.
		4.2	Data to be amended is correctly located within the file.
		4.3	The correct data/Information is entered, changed or deleted using appropriate input device and approved procedures.
		4.4	The Integrity of data is maintained.
5.	Use document layout and data format facilities	5.1	Requirements for document are verified where necessary.
		5.2	The given format and layout are appropriately applied.
		5.3	Facilities to achieve the desired format and layout are correctly identified, accessed and used.
		5.4	Data manipulating facilities are used correctly.
		5.5	Format reflects accuracy and completeness.
6.	Monitor the operation of equipment	6.1	The system is monitored to ensure correct operation of tasks.
		6.2	Routine system messages are promptly and correctly dealt with.
		6.3	Non-routine messages are promptly referred in accordance with operating requirements.

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

RANGE STATEMENT

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

Equipment:

- install supplied computer
- install supplied peripherals

Work environment:

- equipment
- furniture
- cabling
- power supply

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Input devices:

- keyboard
- mouse
- scanner
- microphone
- camera

Software systems to include for:

- word processing
- spread sheet
- internet access

Files save on:

- network
- magnetic media
- personal PC

Data:

- textual
- numerical
- graphical

File operations:

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

Maintenance:

- cleaning: enclosures, screen, input devices, output devices
- checking cables, etc

EVIDENCE GUIDE

Competency is to be demonstrated by the ability to accurately carry out basic data entry and retrieva l operations on a computer system in accordance with the performance criteria and the range listed within the range of variables statement .

(1) Critical Aspects and Evidence

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

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

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(2) Pre-requisite Relationship of Units

The pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
knowledge of:

- safety for working with and around computers
- computer hardware and software systems
- procedure for initiating and closing down computer
- the operation of the data entry management system
- methods of locating files
- organisation's standards applicable to accessing files
- files operations and their applications
- file operation in database setting
- creating, locating and saving files
- using input devices
- using data checking devices
- formatting functions of software
- layout function of software
- graphic productions and manipulation
- regard for accuracy and security of information
- functions on the internet

Skills
The ability to:

- identify computer hardware
- manipulate data input devices
- access data
- use file operations
- key-in and format reports and letters
- retrieve data
- amend data
- print data
- save data
- search and receive data from the internet
- send and receive E-Mail

(4) Resource Implications

Files saved on network, magnetic media, personal Computer

Input devices: Keyboard, mouse, other selection devices

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(5) Method of Assessment

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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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

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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

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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).

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(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.

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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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.

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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

Heating medium and appropriate consumables can include:

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

Materials:

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

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

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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.

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(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.

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

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

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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

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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.

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(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.

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

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

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

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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.

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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

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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

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(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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMFAB0111A: Perform basic welding using manual metal arc welding process (MMAW)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform welding using basic manual arc welding processes and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare materials for 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 specification where required.
2.	Select welding machine settings and electrodes	2.1	Welding machine and electrodes are identified against pre determined welding procedures and specifications and/or technical drawings.
3.	Assemble and set up welding equipment	3.1	Welding equipment is assembled and set up safely and correctly in accordance with standard operating procedures.
		3.2	Test runs undertaken and verified in accordance with specifications.
4.	Identify distortion prevention measures	4.1	Distortion prevention measures are identified.
		4.2	Appropriate action taken to minimise and rectify distortion.
5.	Weld materials by correct process to quality described in General Purpose or equivalent	5.1	Welds are deposited correctly in flat, horizontal and vertical can position and to specifications.
		5.2	Distortion, preventative action taken where required.
		5.3	Joints are cleaned to specifications using correct and appropriate tools and techniques.

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6.	Inspect welds	6.1	Weld joints are visually inspected against specifications.
		6.2	Weld defects are identified.
7.	Correct faults	7.1	Defects are removed with minimum loss of sound metal using correct and appropriate techniques and tools.

RANGE STATEMENT

Manual metal arc welding (MMAW) would be carried out using a range of material for heavy or light fabrication.

Materials used may include carbon steel Material:
- low carbon steel plate up to 10 gauge
- low carbon steel plate up to 7mm
- steel and galvanised pipes up to 50mm

Hand tools to include:

- chipping hammer
- ball pein hammer
- wire brushes
- measuring tape
- steel rule
- files
- cold chisels
- tin snips
- centre punch
- scriber
- pliers
- adjustable wrenches
- allen keys
- vice grips
- slip joint pliers
- vice grip clamp
- divider
- compass
- screwdrivers

Protective clothing and equipment:

- safety boots
- coverall
- goggles
- dust mask
- safety helmet
- leggings
- welding helmet

Work activities may include:

- measuring
- marking
- cutting
- filing
- levelling
- hammering
- squaring
- straightening metal

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Preparation of materials may include:

- preheating
- setting up of jigs
- fixtures
- clamps etc.

Welding machines:

- AC and DC arc welding plant - electrical and portable engine driven

Joint preparation:

- lap joints
- vee joints
- butt joints
- tee joints

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Weld procedures may include

- amperage setting
- earthing
- electrode flux condition etc.

Machine attachments:

- welding leads
- grounding clamp
- electrode holder

Condition for satisfactory weld:

- pre-heating
- arc strike/travel/length
- electrode angle
- arc dynamic/electrical stability

Welding type may include:

- fillet weld
- lap weld
- butt weld

Welding position may include:

- flat
- vertical up and down horizontal

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.

Remedial action using thermal processes may include oxyacetylene and air arc equipment.

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.

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During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to perform manual arc and/or gas metal arc welding in the flat, horizontal and vertical position and to specifications.
- demonstrate correct procedures in setting up and shutting down manual arc welding equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(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
- MEMC0R0171A Use graduated measuring devices
- MEMCOR0081A Mark off/out (general engineering
- MEMCOR0091A Draw and interpret sketches and technical drawings
- MEMCOR0191A Use hand tools

Where welding is carried out in the overhead position, then UnitMEMFAB0042A (Perform advanced welding using manual metal arc welding process (MMAW), should also be selected.

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- metal classification
- welding technique
- welding processes
- manual welding equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to perform routine manual arc and/or gas metal arc welding
- manual handling and lifting
- measurement
- drawings, sketches and instructions

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Skills
The ability to:

- work safely to instructions
- communicate effectively
- interpret related drawings and instructions
- use power tools and hand tools
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding processes
- identify/select materials relative to manual arc and/or gas metal arc welding
- perform manual arc and/or gas metal arc welding

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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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

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
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.

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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

Heating medium and appropriate consumables can include:

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

Materials:

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

Location/condition:

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

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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

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(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

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMFAB0141A: Develop geometric shapes – (basic)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively develop basic geometric shapes and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Transfer dimensions from a sketch or simple drawing to work piece	1.1	Specifications and work requirements are identified and understood using correct and appropriate calculations.
		1.2	Development is carried out to specifications or standard operating procedures using appropriate tools and equipment.
		1.3	Datum points are correctly established.
2.	Make templates as required	2.1	Appropriate template material is chosen.
		2.2	Templates are produced to specification.
		2.3	Correct storage procedures are followed including labelling and identification to standard operating procedures.
3.	Develop patterns as required	3.1	Parallel line, radial line and triangulation development methods are chosen and applied.
		3.2	Allowances for fabrication and assembly are correctly transferred.
4.	Identify relevant codes, standards and symbols	4.1	Relevant standards/codes and symbols are identified.
		4.2	Requirements of standards/codes are applied to materials and processes.
5.	Collect quantities of materials from storage area	5.1	Materials are correctly identified.
		5.2	Quantities are estimated from sketches and simple drawings.
		5.3	Material wastage is minimised.

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RANGE STATEMENT

This unit applies to marking out of general fabrications using geometric development. Work is undertaken under supervision using predetermined standards of quality, safety and workshop procedures.

The task may be performed in the workshop or site. Marking out is undertaken using appropriate tools and equipment, and templates and patterns are produced as required.

Marking out covers but not limited to:

- engineering components
- jigs and fixtures
- castings
- templates
- dies and tooling
- marking out tables
- surface tables
- rotary tables
-

Equipment may include but not limited to:

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

Sketches or simple drawings may 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

Relevant codes/standards and symbols may include:

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

Patterns and templates made from:

- wood
- paper (firm)
- plastics

Measurement systems:

- inch/foot system
- metric(SI) system

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively by marking out of general fabrications using geometric development 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 fabrication 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 develop basic geometric shapes relative to the fabrication process
- communicate information about fabrication 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 tasks efficiently and to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and technical drawings
- MEMCOR0051A Perform related computations – (basic)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

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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 orally, or by other methods of communication:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMFAB0151A: Prepare for oxyacetylene/metal arc welding processes

Competency Descriptor: This unit deals with the skills and knowledge required to effectively prepare the process for carrying out oxyacetylene/metal arc welding processes and applies to individuals working in metal engineering and maintenance industry.

Competency Field: Metal Engineering and Maintenance

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

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3.	Prepare material selected for welding process	3.1	Activities for material preparation are identified from specifications or supervisor's instructions.
		3.2	Material preparation is carried out to satisfy requirements of welding process.
4.	Prepare work area suitable for welding process	4.1	Activities to be carried out in work area are identified from welding technique, method of welding and access to area.
		4.2	Work area is prepared for welding process according to supervisor's instructions.
5.	Set up tools, plant and equipment appropriate for welding process	5.1	Regular tools/measuring devices suitable for application processes are identified to job requirements.
		5.2	Regular tools/measuring devices are set up safely and effectively to carry out processes where applicable.
6.	Select materials, cut and prepare sections	6.1	Materials are obtained as per instruction.
		6.2	Correct manual handling techniques is used to move and place materials.
		6.3	Materials are safely moved to work area.
		6.4	Appropriate techniques used to accurately cut/bend/prepare/secure components to same length or 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.

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RANGE STATEMENT

This unit applies to the preparation processes carried out in preparing for welding processes using oxyacetylene and or metal arc welding techniques as per instructions.

Source of information:

- Specific work instructions/equipment manual
- health and safety requirements

Safety:

- personal safety
- hand tool safety
- welding safety
- manual lifting and handling

Types of hazards:

- faulty equipment
- premises,
- tools - obstructions
- hazardous substances
- faulty storage
- electrical wiring

Material to include:

- sheet metal
- steel plates
- pipes
- tubing

Work areas:

- fabrication layout
- maintenance
- welding
- finishing

Tools/equipment to include:

- power tools
- oxyacetylene welding and cutting equipment
- Angle grinders, pedestal grinders, surface grinders, rotary wire brushes
- hand and drill press
- cold chisel & files
- ball pein hammer
- arc welding equipment
- safety equipment
- work benches
- hack saw
- screwdrivers
- spirit level
- vices
- marking out tools
- chipping hammer

Protective clothing:

- coverall
- goggles
- gloves
- Safety boots
- safety helmet

Type of site and working conditions to include:

- workshop and on site
- at height as per industry standards
- in confined space
- indoors and out doors

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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 Statutory regulations.

EVIDENCE GUIDE

Competency is to be demonstrated by carrying out the safe and effective preparation for oxyacetylene/metal arc welding processes accordance with performance criteria using any of the range of materials and processes listed within the range of variables statement.

(1) Critical Aspects of Evidence

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

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- indicate compliance with organisational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of oxyacetylene/metal arc welding processes
- demonstrate safe working practices at all times
- demonstrate the ability to prepare for oxyacetylene/metal arc welding processes
- demonstrate the ability to apply appropriate principles/techniques to welding environment
- demonstrate the ability to carry out specific measurement and preparation procedures
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- use accepted engineering techniques, practices, processes and workplace procedures.
- 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

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

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(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 welding process
- materials handling
- measurement relative to welding process
- welding techniques consistent with oxyacetylene/metal arc welding processes
- 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 oxyacetylene/metal arc welding processes

(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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMMAH0071A: Perform manual handling and lifting

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

Competency Field: Material handling

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

RANGE STATEMENT

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

Moving/shifting equipment may include but not limited to:

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

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

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

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

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

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Skills
The ability to:

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMMAH0081A: Perform housekeeping duties

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

Competency Field: Maintenance

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

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

RANGE STATEMENT

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

Tools and equipment includes but is not limited to:

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

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- Engineering materials include but are not limited to:

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

Protection of stacked/stored materials may include:

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

Dust suppression procedures may include:

- spraying with water
- covering
- use of vacuum cleaner

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

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

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

Reporting of faults may be verbal or written.

EVIDENCE GUIDE

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

(1) Critical Aspects and Evidence

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

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

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(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0012A: Plan a complete activity

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

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

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

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

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Skills
The ability to:

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

(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMCOR0022A: Perform related computations

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

Competency Field: Metal, Engineering and Maintenance

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

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RANGE STATEMENT

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

Areas for discussion may include but not limited to:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0051 Perform computations basic

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0042A: Interpret standard specifications and manuals

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

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During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0091 Interpret sketches and technical drawings

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The candidate will be provided with:

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

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(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0052A: Operate in an autonomous team environment

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

Competency Field: Metal, Engineering and Maintenance

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

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

RANGE STATEMENT

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

EVIDENCE GUIDE

Competency is to be demonstrated by

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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(2) Pre-requisite Relationship of Units

- MEMCOR0031A Operate in a work based team environment

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

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

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

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

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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0092A: Mark off/out structural fabrications and shapes

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

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Transfer dimensions from a detail drawing to work	1.1	Specifications and work requirements are determined and understood using correct and appropriate calculations.
		1.2	Marking out is carried out to specifications or standard operating procedures using appropriate tools and equipment.
		1.3	Datum points are correctly established.
2.	Make templates as required	2.1	Appropriate template material is chosen.
		2.2	Templates are produced to specifications.
		2.3	Correct storage procedures are followed including labelling and identification to standard operating procedures.
3.	Develop patterns and/or transfer measurements to structures	3.1	Most appropriate development and/or measurement sequence chosen and applied.
		3.2	Allowances for fabrication and assembly are correctly determined and transferred.
4.	Interpret relevant codes, standards and symbols	4.1	Relevant standards/codes and symbols are interpreted.
		4.2	Requirements of standards/codes are interpreted and applied to materials and processes.
5.	Estimate quantities of materials from detail drawings	5.1	Materials are correctly identified.
		5.2	Quantities are estimated from drawing.
		5.3	Material wastage is minimised.

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RANGE STATEMENT

This unit applies to marking out of general fabrications and shapes. Work is undertaken autonomously using predetermined standards of quality, safety and workshop procedures. The task may be performed in the workshop or on site. Marking out is undertaken using appropriate tools and equipment. Templates and patterns are produced as required. Equipment may include marking out and surface tables, dividers, protractors, squares, etc. Marking out techniques may apply to a range of materials and shapes.

Marking out covers but not limited to:

- engineering components/drawings
- jigs and fixtures
- castings
- patterns
- dies and tooling
- structural components
- geometric shapes and transitions
- manufacturing applications

Equipment and supplies may include but not limited to:

- marking out tables
- surface tables
- rotary tables
- dividing heads etc.
- vee blocks
- cylinder squares
- patterns
- templates
- regular/irregular geometric shapes
- sine bars and the like
- vernier height gauges
- protractors
- straight edge
- set squares
- marking out tools
- engineering drawings
- metallic/non metallic materials

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of the marking off/out techniques used for the transfer of dimensions for structural fabrications and shapes 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 structural fabrications and shapes 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 structural fabrications and shapes accurately

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During assessment the individual will: (Cont'd)

- 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

- MEMCOR0081A Mark off/out (general engineering)
- MEMCOR0051A Perform computations – (basic)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- apparatus
- drawing interpretation
- basic numeracy
- marking off/out techniques
- marking out procedures
- tools and equipment relevant to marking out process
- materials relevant to the engineering process
- types of structural fabrications
- geometric shapes and transitions
- 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
- mark off/out structural fabrications and shapes

(4) Resource Implications

The following resources should be made available:

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

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(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0122A: Write technical reports (basic)

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

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

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

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

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

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Grammar and usage may include:

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

Communication skills may include:

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

Mechanics, vocabulary and spelling may include:

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

Writing skills may include:

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

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive work place communication

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

(4) Resource Implications

The candidate will be provided with:

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

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(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMCOR0023A: Write technical reports (Advanced)

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

Competency Field: Metal, Engineering and Maintenance

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

RANGE STATEMENT

The Range Statement adds definition to the unit by elaborating critical or significant aspects of the performance requirements of the unit. The Range Statement establishes the range of indicative meanings or applications of these requirements in different operating contexts and conditions.

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

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

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

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

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

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive work place communication
- MEMCOR0122A Write technical reports (basic)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- sentence power – (descriptive, narrative)
- grammar and mechanics
- spelling
- punctuation
- words & phases
- writing styles (technical or non-technical)
- reports – (progress, completion, final)
- correspondence including letters, graphs, charts, tables
- statements, manuals & procedures
- expressions – technical & organisational
- techniques of verbal presentations
- techniques of visual presentations

Skills
The ability to:

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

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(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

The candidate will be required to:

- answer questions put by the assessor.
- 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 both.

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

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

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MEMCOR0093A: Plan and organise work

Competency Descriptor: This unit deals with the skills and knowledge required to effectively plan and organise tasks to be undertaken by the team and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify activity requirements	1.1	Instructions as to objectives and performance required are identified.
		1.2	Relevant specifications for activity outcomes are obtained, understood and where necessary clarified.
		1.3	Activity outcomes are identified.
		1.4	Activity requirements, including overall timeframe for activity, quality requirements and criteria for acceptable completion are identified.
2.	Plan process to complete activity	2.1	Based on instructions as to objectives, performance requirements and specifications, the individual components of the activity are identified and prioritised.
3.	Coordinate work	3.1	Permits are requested/received, interpreted, clarified and signed and conveyed to appropriate parties in accordance with enterprise procedures and job requirements
		3.2	Tasks are assigned and monitored to ensure compliance with plans, work requirements and enterprise procedures
		3.3	Work is conducted in accordance with sustainable energy principles
		3.4	Provision for the re-cycling or re-use of materials is undertaken where possible
		3.5	Job requirements are modified to meet unforeseen requirements, resources reallocated/rescheduled and the extent of change communicated promptly to all those affected in accordance with job requirements

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4.	Modify plan	4.1	Plan if necessary may be modified to overcome unforeseen difficulties or developments that occur as work progresses.
5	Complete work	5.1	Finalisation of work and restoration of the site is monitored and ensured in accordance with enterprise procedures and job requirements
		5.2	Permits are signed off and appropriate parties are notified of work completion in accordance with enterprise procedures and job requirements
		5.3	Job records, costing data and necessary reports are prepared/finalised in accordance with enterprise procedures

RANGE STATEMENT

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

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

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

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

Coordination issues may include team briefing, public notification, notice of intended work, safety coordination, fuel and rest stops, accommodation, liaison with other divisions/clients and preparing work plan

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- quality systems in a workplace
- work planning and organisation theory
- team goals
- team resource acquisition processes and procedures
- Occupational health and safety
- enterprise permit procedures
- relevant plant and equipment
- relevant statutory requirements
- appropriate engineering and design practices and procedures
- enterprise recording procedures
- appropriate tools, equipment and materials required to do the work
- team communication process
- time management techniques

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Skills
The ability to:

- develop and implement work plan
- co-ordinate/sequence work requirements
- assess team capabilities and capacities
- review job progress against agreed goals
- modify team work plan
- communicate information to others
- prepare and interpret work procedures
- estimate materials and resource requirements
- monitor team
- apply data analysis techniques and tools.

(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

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

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

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

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

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

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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

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MEMCOR0103A: Maintain quality systems within a team

Competency Descriptor: This unit deals with the skills and knowledge required to effectively maintain quality systems within a team and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Formulate team aspects of the quality system	1.1	Team quality assurance requirements/targets are identified or modified from an analysis of enterprise needs
		1.2	Team performance indicators, identified during team consultations, are agreed or referred to the appropriate party for approval in accordance with job requirements
		1.3	Compatibility between total team and total individual indicators is effectively co-ordinated in accordance with job requirements
		1.4	Activity requirements, including overall timeframe for activity, quality requirements and criteria for acceptable completion are identified.
		1.5	Site and team quality systems documentation is obtained, edited and summarised as required and made available to all members in accordance with job requirements
		1.6	Where appropriate, the teams and individuals roles and responsibilities within the team are identified , where required, assist in the provision of the on-the-job training
2.	Facilitate team quality systems	2.1	Team members are provided with encouragement and training in team quality systems matters in accordance with job requirements
		2.2	The application of quality systems is monitored regularly both in the workplace and with customers in accordance with job requirements
		2.3	Instances of inability to satisfy key indicators are recorded, investigated and referred to team mechanisms and appropriate authorities for remedial in accordance with enterprise procedures

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2.4 Quality systems are regularly reviewed with the team to ensure their currency and continuing relevance in accordance with enterprise procedures

2.5 Team quality systems records are maintained and made available to interested parties in accordance with enterprise procedures

RANGE STATEMENT

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

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

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

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

Coordination issues may include team briefing, public notification, notice of intended work, safety coordination, fuel and rest stops, accommodation, liaison with other divisions/clients and preparing work plan

EVIDENCE GUIDE

Competency is to be demonstrated by individuals maintaining quality systems within a team in accordance with the performance criteria and as related to the work environment.

(1) Critical Aspects of Evidence

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

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During assessment the individual will:

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

(2) Pre-requisite Relationship of Units

- MEMCOR0161A Plan to undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- quality systems in a workplace
- work planning and organisation theory
- team goals
- team resource acquisition processes and procedures
- Occupational health and safety
- enterprise permit procedures
- relevant plant and equipment
- relevant statutory requirements
- appropriate engineering and design practices and procedures
- enterprise recording procedures
- appropriate tools, equipment and materials required to do the work
- team communication process
- time management techniques
- international standards related to quality
- industry standards related to quality
- quality management theory
- team quality systems and procedures including: responsibilities and prerogatives, documentation system including quality manual and quality plan, quality records processes, and achievement audits, elementary quality systems design processes
- communication procedures

Skills
The ability to:

- access, interpret and apply enterprise quality systems procedures and practices
- formulate elementary quality systems
- formulate quality practices for the team operations
- establish quality indicators for teams and site work
- conduct and analyse the results of quality systems audits
- co-ordinate the development and maintenance of team competency in quality systems
- co-ordinate the modification of team systems based on quality systems findings
- communicate effectively
- apply data analysis techniques and tools

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(4) Resource Implications

The candidate will be provided with:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

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MEMFAB0042A: Perform advanced welding using manual metal arc welding process (MMAW)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform advanced welding using manual arc welding processes and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Select welding settings and electrodes	1.1	Welding machine settings and electrodes are selected against job requirements, welding procedures, specifications and/or technical drawings.
2.	Assemble welding equipment	2.1	Welding equipment is prepared correctly and safely according to standard operating procedures including all leads, cables, etc.
3.	Weld joint to meet quality as described in relevant standards for structural purpose or equivalent	3.1	Instructions, symbols, specifications are interpreted correctly including bead size, bead placement, reinforcement etc. and standard operating procedures.
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 correct application and appropriate techniques and tools to meet relevant industry.
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 cleaned.
		7.2	Waste and unwanted materials disposed of safely.
		7.3	Tools and equipment cleaned, maintained and stored.

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RANGE STATEMENT

The person would work autonomously or in a team environment using predetermined standards of quality, safety and welding procedures. Advanced manual metal arc welding (MMAW) carried out using a range of plate and pipe for general fabrication and may include low carbon steel, stainless steel and cast iron, low alloy steel etc.

Source of information:

- Working drawings/sketches
- oral/written work instruction
- manufacturer's specifications
- safety regulations for MIG welding

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Welding machines:

- AC and DC arc welding plants - shielded and flux cored - fixed and portable, engine driven

Machine attachments:

- welding cables,
- welding clamps
- electrode holders

Tools and equipment:

- appropriate type and size wrenches
- chipping hammers
- wire brushes

Welding position:

- flat
- vertical up and down
- horizontal
- overhead

Joint preparation:

- lap joints
- vee joints
- butt joints
- tee joints

Type of weld:

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

Work activities:

- welding
- chipping
- Cleaning
- examining

Conditions for satisfactory weld:

- pre-heating
- arc cleanly initiated
- arc travel length
- arc dynamically/electrically stable
- electrode angle adjusted

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Materials:

- low carbon steel (mild steel) up to 12mm
- high carbon steel up to 12mm
- aluminium up to 12mm
- stainless steel up to 12mm
- steel and galvanised pipes up to 12mm
- cast iron up to 25mm
- flat, angled, hollow, round, square, solid profile

Specifications:

- welding procedure
- root
- side wall/inter-run penetrations
- no excessive undercut
- tack weld included
- even weld profile
- sufficient reinforcement
- no craters

EVIDENCE GUIDE

Competency is to be demonstrated by effectively performing advanced welding using manual arc welding processes and the efficient use of the welding techniques 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 manual metal arc welding 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 identify defects/faults in the welding process
- demonstrate the ability to perform manual metal arc welding in the flat, horizontal, vertical and overhead position and to specifications
- demonstrate correct procedures in setting up and shutting down manual metal arc welding equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures and specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMFAB0111A Weld using manual metal arc welding process
- MEMCOR0121A Classify engineering materials

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- metal classification
- welding techniques
- welding processes
- welding defects/faults
- distortion prevention measures
- manual metal arc welding equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to perform manual metal arc welding
- 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 power tools and hand tools
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding processes
- identify/select materials relative to manual metal arc welding
- perform manual metal arc welding

(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.

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMFAB0022A: Perform advanced manual thermal cutting, gouging and shaping

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform advanced manual thermal cutting, gouging and shaping 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 thermal cutting, gouging and shaping	1.1	Appropriate cutting process and procedure for material being worked is selected.
		1.2	Accessories and equipment are correctly selected and assembled.
		1.3	All connections are tested and confirmed free from leakage.
		1.4	Work area is free from flammable materials and obstructions.
2.	Select equipment settings and consumables	2.1	Correct equipment settings and consumables are selected from the appropriate standard operating procedures.
3.	Operate hand held thermal cutting and shaping equipment	3.1	All safety procedures are observed.
		3.2	Equipment starts up procedures are followed correctly to standard operating procedures.
		3.3	Material is cut to specification Shape/profile/surface finish to accepted workplace standards.
		3.4	Cutting defects are recognised and corrective action taken to standard operating procedures.
		3.5	Material is removed with minimum loss of sound metal
4.	Clean-up	4.1	Area around work activity is cleaned.
		4.2	Waste and unwanted materials are disposed of safely.
		4.3	Tools and equipment are cleaned, maintained and stored.

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RANGE STATEMENT

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

The manual thermal cutting process is used to produce complex internal and external profiles that satisfy predetermined shape, size and surface finish specifications.

Items are cut, shaped or gouged by a variety of methods which may include cutting with:

- air carbon arc cutting equipment
- oxyacetylene, oxy/hydrogen cutting equipment
- plasma arc, etc.

Source of information:

- Working drawings/sketches
- oral/written work instructions
- health and safety requirements

Cutting methods:

- free hand
- guided and machine cutting

Protective clothing:

- safety boots
- aprons or coverall, gloves
- goggles
- leggings
- safety helmet

Fuel type:

- acetylene
- propane
- natural, gas,
- hydrogen - high and low pressure

Safety:

- oxyacetylene equipment operation
- personal safety
- first-aid kit
- fire extinguisher
- fire precaution during welding
- prevention and treatment of burns
- torches
- open-end wrenches
- profile cutting equipment assembly
-

Tools and cutting equipment:

- Cylinder bottles
- manifold connection
- regulators
- gauges
- hoses
- nozzles
- wire brush
- flint lighter
- tip cleaners

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Materials to include:

- High carbon steel up to 12mm
- Aluminium up to 12mm
- Stainless steel up to 12mm
- Steel and galvanised pipes up to 12mm thick
- Flat
- Angled
- Hollow
- round profiles

Work activities:

- Positioning equipment
- connecting hose and torch,
- testing equipment
- Lighting torch
- adjusting flames
- cutting metal

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively performing advanced thermal cutting gouging and shaping in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

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

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- show compliance with organizational policies and procedures including Quality Assurance requirements
- adopt and carry out correct procedures prior to undertaking task
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the ability to prepare equipment for cutting process
- demonstrate correct procedures in performing advanced manual thermal cutting, gouging and shaping
- give particular attention to safety and elimination of hazards
- demonstrate safe handling/storage of material/supplies/equipment
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0121A Classify engineering materials
- MEMCOR0191A Use hand tools
- MEMCOR011A Use power tools
- MEMFAB00151A Prepare for oxyacetylene/metal arc welding processes
- MEMFABOO61 Perform manual heating and thermal cutting

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- heating medium/technique
- heating/cutting processes
- oxy-fuel equipment identification, transportation and storage
- air carbon arc cutting equipment identification, transportation and storage
- plasma arc cutting 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
- perform advanced manual thermal cutting, gouging and shaping efficiently

(4) Resource Implications

The following resources should be made available:

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

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(5) Method of Assessment

The candidate will be required to:

- 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.

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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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

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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

Heating medium and appropriate consumables can include:

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

Materials:

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

Location/condition:

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

Types of welding:

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

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

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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

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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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMFAB0082A: Develop geometric shapes – (advanced) Cylindrical/Rectangular

Competency Descriptor: This unit deals with the skills and knowledge required to effectively develop cylindrical and rectangular geometric shapes and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Transfer dimensions from a sketch or simple drawing to work piece	1.1	Specifications and work requirements determined and understood using correct and appropriate calculations
		1.2	Development carried out to specifications or standard operating procedures using appropriate tools and equipment
		1.3	Datum points correctly established and indicated
		1.4	Allowances are correctly determined and marked (thickness, bend, pitch, angle, circumference, perimeter)
2.	Make templates as required	2.1	Appropriate template material chosen
		2.2	Templates are produced to specification.
		2.3	Allowances determined and transferred
		2.4	Templates for rolling, bending, pressing, drilling and profiling accurately produced
		2.5	Correct storage procedures followed including labelling and identification to standard operating procedures
3.	Develop patterns as required	3.1	Most appropriate development method chosen and applied
		3.2	Allowances correctly determined and transferred
		3.3	Relevant standards/codes and symbols interpreted
		3.4	Requirements of standards/codes interpreted and applied to materials and processes

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4.	Estimate quantities of materials from engineering drawings	4.1	Materials correctly identified
		4.2	Quantities estimated from drawings
		4.3	Material wastage minimised

RANGE STATEMENT

This unit applies to marking out of complex cylindrical/rectangular fabrications. This unit requires advanced skills in parallel line developments.

All work undertaken in compliance with legislative and regulatory requirements to previously determined standards of safety, quality and standard operating procedures.

This unit applies to marking out of general fabrications using geometric development Individuals may work autonomously or in a team environment using predetermined standards of quality, safety and workshop procedures.

The task may be performed in the workshop or site. Marking out is undertaken using appropriate tools and equipment, and templates and patterns are produced as required.

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

Sketches or simple drawings may 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

Relevant codes/standards and symbols may include:

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

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Patterns and templates made from:

- wood
- paper (firm)
- plastics

Fabrications may include
- hoppers
- chutes
- compound bends
- double offsets.

Measurement systems:

- inch/foot system
- metric(SI) system

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively by marking out of general fabrications using geometric development 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 fabrication 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 develop cylindrical and rectangular geometric shapes relative to the fabrication process
- communicate information about fabrication 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 tasks efficiently and to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and technical drawings
- MEMCOR0051A Perform related computations – (basic)

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- fabrication/marking out tools
- drawing interpretation
- basic numeracy
- marking off/out techniques
- materials relevant to the engineering process
- basic operations in simple geometry measurement and calculations
- basic development processes
- the use of templates for fabricated assemblies
- practical developments in sheet metal
- universal sheet metal working

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

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

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

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMFAB0132A: Fabricate install and maintain industrial pipe work

Competency Descriptor: This unit deals with the skills and knowledge required to effectively install, maintain, and fabricate industrial pipe work and may involve fault finding and repairs 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 work	1.1	Work requirement are determined from job sheet, instruction or visual inspection.
		1.2	Specifications and drawings are obtained, interpreted understood and inspected
		1.3	Resources required to satisfy the work plan are identified,
		1.4	Correct size, type and quantity of materials/components are determined
2.	Assess and process material requirements	2.1	Material requirements are assessed in accordance with relevant codes, manufacturer's specifications and standard operating procedures.
		2.2	Materials are obtained/requisitioned in accordance with standard operating procedures.
		2.3	Tool and equipment requirements are assessed and obtained, where required
3.	Fabricate pipe work	3.1	Fabrications are prepared in accordance with specifications using acceptable workplace practices, tools and equipment.
		3.2	Materials are marked out and prepared to specifications with minimum wastage.
		3.3	Material or item for repair, replacement and/or modification is cut, bent, rolled, shaped or formed to specifications
		3.4	Where required, items are marked for identification.
		3.5	Pipe work is fabricated using appropriate techniques and equipment in accordance with the work plan

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4.	Install pipe work	4.1	Required isolations are confirmed, where appropriate, in accordance with site requirements.
		4.2	Pipe runs are identified, calculations performed and sketches made of the planned installation in accordance with the work plan
		4.3	Pipe work is levelled and aligned and installed/coupled in accordance with the work plan
5.	Maintain industrial pipe work	5.1	Using appropriate clamping methods, equipment, jigs and fixtures, materials are positioned and clamped for welding.
		5.2	Pre-tack checks are undertaken and compliance with specifications determined prior to tack welding in position.
		5.3	Welding equipment is prepared and settings adjusted according to requirements.
		5.4	Immediate work site environment is checked to ensure compliance with safety requirements and procedures.
		5.5	Material or item is tack-welded using appropriate distortion minimisation techniques and procedures.
		5.6	Material or item is checked against specifications prior to welding.
		5.7	Material or item is welded to specifications using appropriate techniques and procedures.
6.	Complete work	6.1	Work is completed and appropriate personnel notified
		6.2	Work area is cleared of waste, cleaned, restored and secured
		6.3	Plant, tools and equipment are maintained and stored
		6.4	Work completion details are finalised

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RANGE STATEMENT

Pipe work may be fabricated from diverse material including, ABS, PVC, polyurethane, copper, stainless steel, galvanised steel, black steel, copper/nickel, concrete and mineral fibre

Fittings/components may include couplings, screw fittings and flanges

Pipes may contain or have contained water, gas, air or chemicals of a hazardous nature

Pipe work may be protected by protective coatings

Details of maintenance may be clarified by diagnosis and work place inspection

Maintenance may include repair, inspection, modification and overhaul

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil

Isolations can refer to electrical/mechanical or other associated processes

Work may be carried out in workshop or on-site environments utilising welding and fabrication techniques, processes, tools, equipment and procedures on a range of materials.

Processes may involve the simple mark out of materials, setting up and operation of a variety of welding and cutting plant/equipment.

Tools and equipment may include:

- stocks
- dyes
- threading machine
- hydraulic benders
- hand benders
- hand and power cutters
- welders
- plastic heat gun
- spirit level
- grinders
- jigs and lifting devices

Materials and supplies may include:

- low carbon steel(mild steel) sheet up to 10 gauge
- low carbon steel plate up to 7mm
- steel and galvanized pipes up to 50mm
- appropriate size welding electrodes
- appropriate type and size welding filler rods
- aluminum sections/sheet

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Setting up may include the correct connection of:

- hoses
- blowpipes
- regulators
- settings of gas mixtures
- welding machine (AC and DC arc welding plants)
- welding machine (MIG welding plants)
- welding cables and welding clamps/holders
- welding tip preparation
- auxiliary equipment

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 (lap, vee, butt and tee)

Location/condition may include:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Protective clothing may include:

- safety boots
- safety helmet
- welding helmet
- coverall
- leggings
- gloves

Work activities may include but not limited to:

- reading and interpreting drawings and other technical information
- setting up and/or checking pipe joints and fittings
- welding pipe joints in all positions
- fabricating pipe work supports
- assembling and tack welding 30 , 45, 60 and 90 degree elbows
- assembling and tack welding pipe fitting Tees
- assembling and tack welding 30, 45, 60, 90 degree bends
- assembling and tack welding crosses
- assembling and tack welding branches
- assembling and tack welding offsets
- assembling and tack welding reducers
- preparing rigs and slings
- lifting, moving and re-rigging loads
- fitting, aligning and tightening bolted flanged joints
- examining assembled joints to verify integrity
- installing pipe support devices
- installing and tackwelding low pressure pipe work and components
- installing and tackwelding high pressure pipe work joints and components
- installing and connecting flanged pipe work connections
- installing and connecting compression joint pipe work connections

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively fabricate install and maintain industrial pipework 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 fabricating installing and maintaining industrial pipe work and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the correct procedures in fabricating installing and maintaining industrial pipe work
- 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 repair, replacement and/or modification of fabrications or other units requiring the exercise of the skills and knowledge covered by this unit.

(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
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools
- MEMFAB0111A Weld using manual metal arc welding process (MMAW)
- MEMFAB0121A Weld using oxyacetylene welding process (OAW) fuel gas welding

Where additional or more complex marking out skills are required, refer to Unit MEMCOR0092A (Mark off/out structural fabrications and shapes). If machines and equipment for forming, bending or shaping are required, Unit MEMFAB0071A (Undertake fabrication, forming, bending and shaping) should be accessed.

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- fabrication techniques
- assemble equipment
- pipe work materials and their applications; precision measuring equipment
- seals and gaskets
- valves and fittings
- quality assurance/quality control
- specialised tools and jigs
- levelling and alignment
- rigging and lifting
- relevant materials and components
- technical drawings and blue print reading
- data recording techniques
- hand and portable power tools
- testing methods
- testing techniques
- relevant plant and systems
- isolation procedures
- communication principles;
- principles of fluid power
- protective coatings
- hand tools and equipment
- jigs, fixtures, tools and measuring equipment relative to fabricating installing and maintaining industrial pipe work
- materials preparation
- manual handling
- measurement
- basic plumbing
- pipefitting standards codes and specifications

Skills
The ability to:

- work safely to instructions
- plan to undertake a routine fabrication task
- interpret relative drawings and instructions
- use power tools and hand tools
- select tools and fixtures for repairing, replacing and modifying fabrications
- measure relative to the fabrication processes
- apply occupational health and safety standards
- identify and use measuring equipment
- apply pipe work fabrication and installation techniques
- manufacture and install seals and gaskets
- apply levelling and alignment techniques
- use technical drawings and data
- identify and select materials and components
- apply data analysis techniques
- apply relevant testing techniques
- apply dismantling and reassembling techniques
- apply relevant maintenance procedures
- recognise worn/damaged components
- communicate effectively
- apply relevant tools and jigs
- apply fluid power principles
-

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

Collect, analyse and organise information	Level 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.

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MEMFAB0163A: Fabricate and install advanced pipe installation

Competency Descriptor: This unit deals with the skills and knowledge required to effectively fabricate and install advanced pipe installation and may involve fault finding and repairs. 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 work	1.1	Work requirement are determined from job sheet, instruction or visual inspection.
		1.2	Specifications and drawings are obtained, interpreted understood and inspected
		1.3	Resources required to satisfy the work plan are identified,
		1.4	Correct size, type and quantity of materials/components are determined
2.	Assess and process material requirements	2.1	Material requirements are assessed in accordance with relevant codes, manufacturer's specifications and standard operating procedures.
		2.2	Materials are obtained/requisitioned in accordance with standard operating procedures.
		2.3	Tool and equipment requirements are assessed and obtained, where required
3.	Fabricate pipe work	3.1	Fabrications are prepared in accordance with specifications using acceptable workplace practices, tools and equipment.
		3.2	Materials are marked out and prepared to specifications with minimum wastage.
		3.3	Material or item for repair, replacement and/or modification is cut, bent, rolled, shaped or formed to specifications
		3.4	Where required, items are marked for identification.
		3.5	Pipe work is fabricated using appropriate techniques and equipment in accordance with the work plan

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4	Install pipework	4.1	Required isolations are confirmed, where appropriate, in accordance with site requirements.
		4.2	Pipe runs are identified, calculations performed and sketches made of the planned installation in accordance with the work plan
		4.3	Pipe work is levelled and aligned and installed/coupled in accordance with the work plan
5.	Complete work	5.1	Work is completed and appropriate personnel notified
		5.2	Work area is cleared of waste, cleaned, restored and secured
		5.3	Plant, tools and equipment are maintained and stored
		5.4	Work completion details are finalised

RANGE STATEMENT

Pipe work may be fabricated from diverse material including, ABS, PVC, polyurethane, copper, stainless steel, galvanised steel, black steel, copper/nickel, concrete and mineral fibre

Fittings/components may include couplings, screw fittings and flanges

Pipes may contain or have contained water, gas, air or chemicals of a hazardous nature

Pipe work may be protected by protective coatings

Details of installations may be clarified by diagnosis and work place inspection

Installations may include repair, inspection, modification and overhaul

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil

Isolations can refer to electrical/mechanical or other associated processes

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Work may be carried out in workshop or on-site environments utilising welding and fabrication techniques, processes, tools, equipment and procedures on a range of materials.

Processes may involve the simple mark out of materials, setting up and operation of a variety of welding and cutting plant/equipment.

Tools and equipment may include:

- stocks
- dyes
- threading machine
- hydraulic benders
- hand benders
- hand and power cutters
- welders
- plastic heat gun
- spirit level
- grinders
- jigs and lifting devices

Materials and supplies may include:

- low carbon steel(mild steel) sheet
- low carbon steel plate
- steel and galvanized pipes
- appropriate size welding electrodes
- appropriate type and size welding filler rods
- aluminum sections/sheet

Setting up may include the correct connection of:

- hoses
- blowpipes
- regulators
- settings of gas mixtures
- welding machine (AC and DC arc welding plants)
- welding machine (MIG welding plants)
- welding cables and welding clamps/holders
- welding tip preparation
- auxiliary equipment

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 (lap, vee, butt and tee)

Location/condition may include:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Protective clothing may include:

- safety boots
- safety helmet
- welding helmet
- coverall
- leggings
- gloves

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Work activities may include but not limited to:

- reading and interpreting drawings and other technical information
- setting up and/or checking pipe joints and fittings
- welding pipe joints in all positions
- fabricating pipe work supports
- assembling and tack welding 30 , 45, 60 and 90 degree elbows
- assembling and tack welding pipe fitting Tees
- assembling and tack welding 30, 45, 60, 90 degree bends
- assembling and tack welding crosses
- assembling and tack welding branches
- assembling and tack welding offsets
- assembling and tack welding reducers
- preparing rigs and slings
- lifting, moving and re-rigging loads
- fitting, aligning and tightening bolted flanged joints
- examining assembled joints to verify integrity
- installing pipe support devices
- installing and tack welding low pressure pipe work and components
- installing and tack welding high pressure pipe work joints and components
- installing and connecting flanged pipe work connections
- installing and connecting compression joint pipe work connections
- Calculating simple piping offsets
- Calculating three-line, 45-degree, equal-spread offsets around a vessel
- Calculating three-line, 45-degree, unequal-spread offsets.
- Fabricating tank heating coils
- Performing mitering procedures
- Laying out three- and four-piece mitered turns
- Laying out 45-degree laterals using references
- Fabricating dummy legs and trunions out of pipe, using references
- Performing geometric layout of pipe laterals and supports

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively fabricate and install advanced pipe installations 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 fabricating and installing industrial pipe work and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the correct procedures in fabricating and installing industrial pipe work
- 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 repair, replacement and/or modification of fabrications or other units requiring the exercise of the skills and knowledge covered by this unit.

(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
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools
- MEMFAB0111A Weld using manual metal arc welding process (MMAW)
- MEMFAB0121A Weld using oxyacetylene welding process (OAW) fuel gas welding

Where additional or more complex marking out skills are required, refer to Unit MEMCOR0092A (Mark off/out structural fabrications and shapes). If machines and equipment for forming, bending or shaping are required, Unit MEMFAB0071A (Undertake fabrication, forming, bending and shaping) should be accessed.

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- fabrication techniques
- calculating simple piping offsets
- calculating three-line, 45 degree
- laying out mitered turns
- laying out 45-degree laterals
- geometric layout of pipe laterals and supports.
- assemble equipment
- pipe work materials and their applications; precision measuring equipment
- seals and gaskets
- valves and fittings
- quality assurance/quality control
- specialised tools and jigs
- levelling and alignment
- rigging and lifting
- relevant materials and components
- technical drawings and blue print reading
- data recording techniques
- hand and portable power tools
- testing methods
- recognise worn/damaged components
- communicate effectively
- apply relevant tools and jigs
- apply fluid power principles
- testing techniques
- relevant plant and systems
- isolation procedures
- communication principles;
- principles of fluid power
- protective coatings
- hand tools and equipment
- jigs, fixtures, tools and measuring equipment relative to fabricating installing and maintaining industrial pipe work
- materials preparation
- manual handling
- measurement
- basic plumbing
- pipefitting standards codes and specifications

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Skills
The ability to:

- work safely to instructions
- plan to undertake a routine fabrication task
- interpret relative drawings and instructions
- use power tools and hand tools
- select tools and fixtures for repairing, replacing and modifying fabrications
- measure relative to the fabrication processes
- apply occupational health and safety standards
- identify and use measuring equipment
- apply pipe work fabrication and installation techniques
- manufacture and install seals and gaskets
- apply levelling and alignment techniques
- use technical drawings and data
- identify and select materials and components
- apply data analysis techniques
- apply relevant testing techniques
- apply dismantling and reassembling techniques
- apply relevant maintenance procedures
- solve a simple piping offset
- calculate a three-line, 45-degree, equal and unequal-spread offset
- lay out and fabricate a tank coil
- layout and fabricate a three and four-piece, 90-degree, mitered turn
- layout and fabricate a 45-degree lateral, using reference charts.
- layout and fabricate a type 1 pipe support
- layout a 45-degree lateral by performing geometric layout.

(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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
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.

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MEMFAB0173A: Test piping systems and equipment

Competency Descriptor: This unit deals with the skills and knowledge required to effectively test piping systems and equipment and may involve fault finding and repairs. 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 work	1.1	Work requirement are determined from job sheet, instruction or visual inspection.
		1.2	Specifications and drawings are obtained, interpreted understood and inspected
		1.3	Resources required to satisfy the work plan are identified,
		1.4	Correct size, type and quantity of materials/components are determined
2.	Assess and process material requirements	2.1	Material requirements are assessed in accordance with relevant codes, manufacturer's specifications and standard operating procedures.
		2.2	Materials are obtained/requisitioned in accordance with standard operating procedures.
		2.3	Tool and equipment requirements are assessed and obtained, where required
3.	Test piping systems and equipment	3.1	Pre-test requirements are performed in accordance with specifications using acceptable workplace practices, tools and equipment.
		3.2	Service test and check for leaks is carried out.
		3.3	Material or tools for carrying out testing is to specifications
		3.4	Where required, items are marked for identification.
		3.5	Piping systems and equipment is tested using appropriate techniques and equipment in accordance with the work plan

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4.	Complete work	4.1	Work is completed and appropriate personnel notified
		4.2	Work area is cleared of waste, cleaned, restored and secured
		4.3	Plant, tools and equipment are maintained and stored
		4.4	Work completion details are finalised

RANGE STATEMENT

Testing details may be obtained from job sheet, instruction or visual inspection.

Pipe work may be fabricated from diverse material including, ABS, PVC, polyurethane, copper, stainless steel, galvanised steel, black steel, copper/nickel, concrete and mineral fibre

Fittings/components may include couplings, screw fittings and flanges

Pipes may contain or have contained water, gas, air or chemicals of a hazardous nature

Pipe work may be protected by protective coatings

Testing may include pretest field inspection, service, flow, mechanical, pneumatic, head pressure and hydrostatic test

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil

Isolations can refer to electrical/mechanical or other associated processes

Work may be carried out in workshop or on-site environments utilising testing techniques, processes, tools, equipment and procedures on a range of piping installations.

Tools and equipment may include:

- testing equipment/machinery
- liquid dies
- grinders
- jigs and lifting devices
- appropriate size welding electrodes
- appropriate type and size welding filler rods
- aluminum sections/sheet

Materials and supplies may include:

- low carbon steel(mild steel) sheet
- low carbon steel plate
- steel and galvanized pipes

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Location/condition may include:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Protective clothing may include:

- safety boots
- safety helmet
- welding helmet
- coverall
- leggings
- gloves

Work activities may include but not limited to:

- Performing pre-testing requirements
- Performing service and flow tests
- Performing head pressure tests
- Performing hydrostatic tests
- Performing mechanical tests

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively testing pipe installations 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 testing industrial pipe work and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the correct procedures in testing industrial pipe work
- give particular attention to safety and elimination of hazards
- demonstrate safe handling testing equipment
- 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 repair, replacement and/or modification of fabrications or other units requiring the exercise of the skills and knowledge covered by this unit.

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(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
- MEMCOR0091A Draw and interpret sketches and simple drawings

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- testing techniques
- testing equipment
- pipe work materials and their applications precision measuring equipment
- seals and gaskets
- specialised tools and jigs
- levelling and alignment
- rigging and lifting
- relevant materials and components
- technical drawings and blue print reading
- data recording techniques
- hand and portable power tools
- jigs, fixtures, tools and measuring equipment relative to testing and industrial pipe work
- materials preparation
- manual handling
- measurement
- pipefitting standards codes and specifications

Skills
The ability to:

- work safely to instructions
- plan to undertake a routine fabrication task
- interpret relative drawings and instructions
- use power tools and hand tools
- select tools and fixtures for testing piping systems
- apply occupational health and safety standards
- identify and use testing equipment
- apply pipe work testing techniques
- apply levelling and alignment techniques
- use technical drawings and data
- Identify the details about a piping system from a piping drawing
- Perform pretest field inspection, using a punch list
- perform a service test and check for leaks
- perform a flow test and check for leaks
- install pneumatic test plugs in a pipeline
- install mechanical test plugs in a pipeline
- perform a head pressure test and check for leaks
- Install a slip blind in a system
- perform a hydrostatic test on a piping system or spool
- explain how to perform a steam blow test

(4) Resource Implications

The following resources should be made available:

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

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(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 3	
Use technology	Level 2	

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

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MEMFAB0183A: Fabricate and install special piping

Competency Descriptor: This unit deals with the skills and knowledge required to effectively fabricate and install special piping and may involve fault finding and repairs. 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 work	1.1	Work requirement are determined from job sheet, instruction or visual inspection.
		1.2	Specifications and drawings are obtained, interpreted understood and inspected
		1.3	Resources required to satisfy the work plan are identified,
		1.4	Correct size, type and quantity of materials/components are determined
2.	Assess and process material requirements	2.1	Material requirements are assessed in accordance with relevant codes, manufacturer's specifications and standard operating procedures.
		2.2	Materials are obtained/requisitioned in accordance with standard operating procedures.
		2.3	Tool and equipment requirements are assessed and obtained, where required
3.	Fabricate pipe work	3.1	Fabrications are prepared in accordance with specifications using acceptable workplace practices, tools and equipment.
		3.2	Materials are marked out and prepared to specifications with minimum wastage.
		3.3	Material or item for repair, replacement and/or modification is cut, bent, rolled, shaped or formed to specifications
		3.4	Where required, items are marked for identification.
		3.5	Pipe work is fabricated using appropriate techniques and equipment in accordance with the work plan

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4.	Install pipe work	4.1	Required isolations are confirmed, where appropriate, in accordance with site requirements.
		4.2	Pipe runs are identified, calculations performed and sketches made of the planned installation in accordance with the work plan
		4.3	Pipe work is levelled and aligned and installed/coupled in accordance with the work plan
5.	Complete work	5.1	Work is completed and appropriate personnel notified
		5.2	Work area is cleared of waste, cleaned, restored and secured
		5.3	Plant, tools and equipment are maintained and stored
		5.4	Work completion details are finalised

RANGE STATEMENT

Pipe work may be fabricated from diverse material including, ABS, PVC, polyurethane, copper, stainless steel, galvanised steel, black steel, copper/nickel, concrete and mineral fibre

Fittings/components may include couplings, screw fittings, flanges, flared and compression joints

Pipes may contain or have contained water, gas, air or chemicals of a hazardous nature

Pipe work may be protected by protective coatings

Details of installations may be clarified by diagnosis and work place inspection

Installations may include repair, inspection, modification and overhaul

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil

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Isolations can refer to electrical/mechanical or other associated processes.

Work may be carried out in workshop or on-site environments utilising welding and fabrication techniques, processes, tools, equipment and procedures on a range of materials.

Processes may involve the simple mark out of materials, setting up and operation of a variety of welding and cutting plant/equipment.

Tools and equipment may include:

- stocks
- dyes
- threading machine
- hydraulic benders
- hand benders
- hand and power cutters
- welders
- plastic heat gun
- spirit level
- grinders
- jigs and lifting devices

Materials and supplies may include:

- low carbon steel(mild steel) sheet
- low carbon steel plate
- steel and galvanized pipes
- copper tubing
- appropriate size welding electrodes
- appropriate type and size welding filler rods
- aluminum sections/sheet

Setting up may include the correct connection of:

- hoses
- blowpipes
- regulators
- settings of gas mixtures
- welding machine (AC and DC arc welding plants)
- welding machine (MIG welding plants)
- welding cables and welding clamps/holders
- welding tip preparation
- auxiliary equipment
- soldering and brazing equipment

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 (lap, vee, butt and tee)
- bending

Location/condition may include:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Protective clothing may include:

- safety boots
- safety helmet
- welding helmet
- coverall
- leggings
- gloves

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Work activities may include but not limited to:

- reading and interpreting drawings and other technical information
- setting up and/or checking pipe joints and fittings
- welding pipe joints in all positions
- fabricating pipe work supports
- assembling and tack welding 30 , 45, 60 and 90 degree elbows
- assembling and tack welding pipe fitting Tees
- assembling and tack welding 30, 45, 60, 90 degree bends
- assembling and tack welding crosses
- assembling and tack welding branches
- assembling and tack welding offsets
- assembling and tack welding reducers
- preparing rigs and slings
- lifting, moving and re-rigging loads
- fitting, aligning and tightening bolted flanged joints
- examining assembled joints to verify integrity
- installing pipe support devices
- installing and tackwelding low pressure pipe work and components
- installing and tackwelding high pressure pipe work joints and components
- installing and connecting flanged pipe work connections
- installing and connecting flared and compression joins using copper tubing
- Calculating simple piping offsets
- Calculating three-line, 45-degree, equal-spread offsets around a vessel
- Calculating three-line, 45-degree, unequal-spread offsets.
- Fabricating tank heating coils
- Performing mitering procedures
- Laying out three- and four-piece mitered turns
- Laying out 45-degree laterals using references
- Fabricating dummy legs and trunions out of pipe, using references
- Performing geometric layout of pipe laterals and supports

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively fabricate and install advanced pipe installations 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 fabricating and installing industrial pipework and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate the correct procedures in fabricating and installing industrial pipework
- 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 repair, replacement and/or modification of fabrications or other units requiring the exercise of the skills and knowledge covered by this unit.

(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
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools
- MEMFAB0111A Weld using manual metal arc welding process (MMAW)
- MEMFAB0121A Weld using oxyacetylene welding process (OAW) fuel gas welding

Where additional or more complex marking out skills are required, refer to Unit MEMCOR0092A (Mark off/out structural fabrications and shapes). If machines and equipment for forming, bending or shaping are required, Unit MEMFAB0071A (Undertake fabrication, forming, bending and shaping) should be accessed.

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S guidelines and regulations
- fabrication techniques
- special piping – copper tubing, glass lined pipe
- joint types – solder and braze
- couplings – grooved piping
- calculating simple piping offsets
- calculating three-line, 45 degree
- laying out mitered turns
- laying out 45-degree laterals
- geometric layout of pipe laterals and supports
- assemble equipment
- pipe work materials and their applications; precision measuring equipment
- seals and gaskets
- valves and fittings
- quality assurance/quality control
- specialised tools and jigs
- levelling and alignment
- rigging and lifting
- relevant materials and components
- technical drawings and blue print reading
- data recording techniques
- hand and portable power tools
- testing methods
- recognise worn/damaged components
- communicate effectively
- apply relevant tools and jigs
- apply fluid power principles
- testing techniques
- relevant plant and systems
- isolation procedures
- communication principles;
- principles of fluid power
- protective coatings
- hand tools and equipment
- jigs, fixtures, tools and measuring equipment relative to fabricating installing and maintaining industrial pipe work
- materials preparation
- manual handling
- measurement
- basic plumbing
- pipefitting standards codes and specifications

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Skills
The ability to:

- work safely to instructions
- plan to undertake a routine fabrication task
- interpret relative drawings and instructions
- use power tools and hand tools
- select tools and fixtures for repairing, replacing and modifying fabrications
- measure relative to the fabrication processes
- apply occupational health and safety standards
- identify and use measuring equipment
- apply pipe work fabrication and installation techniques
- manufacture and install seals and gaskets
- apply levelling and alignment techniques
- use technical drawings and data
- identify and select materials and components
- apply data analysis techniques
- apply relevant testing techniques
- apply relevant maintenance procedures
- solve a simple piping offset
- calculate a three-line, 45-degree, equal and unequal-spread offset
- lay out and fabricate a tank coil
- layout and fabricate a three and four-piece, 90-degree, mitered turn
- layout and fabricate a 45-degree lateral, using reference charts.
- layout and fabricate a type 1 pipe support
- layout a 45-degree lateral by performing geometric layout.
- Install flared and compression joints using copper tubing
- Solder and braze joints using copper tubing
- Bend pipe to a specified radius
- Install glass-lined pipe
- Install grooved piping couplings

(4) Resource Implications

The following resources should be made available:

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

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(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
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.

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MEMCOR0101A: Prepare basic engineering drawing

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

Competency Field: Metal, Engineering and Maintenance

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

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RANGE STATEMENT

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

- mechanical
- electrical/electronic
- fabrication

Consultations may include reference to appropriate personnel including

- technical supervisory
- manufacturers
- suppliers
- contractors
- customers

Drawing records may include

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

Specifications may be obtained from

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

Copies may be issued as:

- hard copy
- photographic
- slide or transparency form
- presentation
- a single drawing and/or
- with other drawings
- support documentation as a package

Drawing instruments and supplies:

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

Geometric construction to include:

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

Alphabet of line:

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

Multi-view (orthographic 2-D) drawings:

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

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Pictorial (3-D) drawing to include:

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

Dimension reading:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

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

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

(2) Pre-requisite Relationship of Units

- MEMCOR0091A Draw and interpret sketches and simple drawings

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

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

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMSUF0061A: Prepare for the application of protective coatings

Competency Descriptor: This unit deals with the skills and knowledge required for effectively carrying out preparation for application of protective coatings 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 process	1.1 Quality Assurance requirements of company's/manufacturer's protective coating operations are recognised and adhered to.
	1.2 Preparation and planning requirements are identified from drawings and/or plans.
	1.3 Occupational Health and Safety (OH&S) requirements are determined and adhered to in accordance with application tasks and workplace environment.
	1.4 Safety hazards are identified and correct procedures adopted to minimise risk to self and others.
	1.5 Materials are selected according to supervisor's instructions and safely handled, stored and ready for application.
	1.6 Appropriate personal protective equipment are selected, correctly fitted and used.
	1.7 Tools and equipment are selected and is consistent with job requirements.
	1.8 Tools and equipment are checked for serviceability and any faults reported to supervisor.
	1.9 Fixing/fasteners/jigs selected are consistent with job requirements and checked for serviceability.
2. Prepare materials selected for protective coating process	2.1 Activities for material preparation are identified from specifications or supervisor's instructions.
	2.2 Fasteners/fixing are prepared for installation.
	2.2 Material preparation is carried out to satisfy requirements of fabrication/manufacturing process.

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3.	Prepare work area suitable for protective coating process	3.1	Activities to be carried out in work area are identified from surfaces to be finished and height to be accessed.
		3.2	Work area is prepared for protective coating process to supervisors instructions.
4.	Use tools, plant and equipment appropriate for protective coating	4.1	Regular hand and power tools suitable for the application process is identified with job requirements.
		4.2	Hand and power tools are used safely and effectively to carry out processes.
5.	Assist with initial preparation of surfaces for protective coating	5.1	Sound surfaces are prepared by sanding, blasting, brushing and/or washing
		5.2	Unsound surfaces are prepared by scraping and/or sanding.
6.	Assist with preparing surfaces for final finish	6.1	Stopping/filling materials are applied to a flush and even finish.
		6.2	Surface is sanded by hand/tools.
		6.3	Primer/sealer/undercoats are applied to surface by brush and/or roller.
7.	Clean up	7.1	Materials are stacked /stored for re-use or disposal.
		7.2	Work area is cleared.
		7.3	Tools and equipment are cleaned and stored in a cool place.
		7.4	Waste is disposed of using appropriate method according to National Environmental Protection Agency (NEPA) requirements.

RANGE STATEMENT

This unit applies to the work undertaken in a team environment for the preparation and subsequent application of protective for metal engineering and maintenance trade areas.

Process includes:

- worksite preparation
- surface preparation
- application of prime and intermediate coatings

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Tools and equipment may include but not limited to:

- scrapers
- filling
- knives/blades
- putty knives
- duster brushes
- hand sanders
- mechanical sanders
- paint stirrers
- drop sheets
- wire brushes
- hammer
- nail punches
- paint pans/buckets
- spray paint equipment and accessories
- brush-ware accessories
- roller frames
- covers
- roller accessories
- ladders
- trestles
- planks
- hop-ups
- aluminium mobile scaffolding

Materials may include:

- preparatory products
- paints – solvent-borne (alkyd, urethane, urethane/alkyd, urethane oil or modified alkyd resins) and latex (PVA, PVA/acrylic, acrylic and styrene acrylic)

Surfaces to be treated may include common profiles encompassing:

- ply
- building boards (including MDF and particle board)
- fibre cement products, iron and steel
- zinc coated and zinc alloy coated steel products
- masonry products
- clay bricks
- concrete blocks
- concrete surfaces
- cement render
- set plaster
- plaster glass products
- paper-faced gypsum plaster board
- previously coated/treated surfaces
- fabricated steel products

EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective preparation of materials using the processes listed within the range of variables statement.

(1) Critical Aspects of Evidence

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

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- indicate compliance with organizational policies and procedures including Quality Assurance requirements
- carry out correct procedures carried out prior to and during application of construction process
- use tools, plant and equipment safely and effectively
- Processes comply with preparation of surfaces for protective coating

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(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
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements
- portable power tools
- hand tools and equipment
- materials relevant to application of protective coating
- materials handling
- measurement and calculation
- interpreting simple diagrams
- fixing and fasteners consistent with painting and decorating requirements
- workplace communication requirements

Skills
The ability to:

- work safely to instructions
- use power and hand tools
- handle material
- select material
- communicate effectively
- measure relative to the process
- prepare for the application of protective coating

(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.

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMMRD0191A: Assemble & Disassemble scaffolding to enable access to the work area

Competency Descriptor: This unit deals with the skills and knowledge required to effectively assemble & disassemble scaffolding to enable access to the work area and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for the assembly and disassembly of scaffolding	1.1 Assembly and disassembly of scaffolding is planned and prepared to ensure OH&S policies and procedures are followed.
	1.2 The work is appropriately sequenced in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure the work is co-ordinated effectively with others involved on the work site.
	1.4 Scaffold assembly and disassembly is checked against job requirements.
	1.5 Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements.
	1.6 Tools and equipment needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
	1.7 Preparatory work is checked to ensure no unnecessary damage has occurred and complies with requirements.
2. Assemble and disassemble scaffolding	2.1 OH&S policies and procedures for assembly and disassembly of scaffolding are followed.
	2.2 Scaffold is assembled and disassembled in accordance with requirements, without damage or distortion to the surrounding environment or services.
	2.3 Unplanned events or conditions are responded to in accordance with established procedures.

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		2.4 Approval is obtained in accordance with established procedures from appropriate personnel before any contingencies are implemented.
		2.5 On-going checks of the quality of the work are undertaken in accordance with established procedures.
3.	Inspect and notify completion of work	3.1 Final inspections are undertaken to ensure the work conforms to requirements.
		3.2 Work is completed within acceptable time.
		3.3 Work area is left clean and tidy.
		3.4 Work completion is notified in accordance with established procedures.

RANGE STATEMENT

This unit applies to the erection of scaffolding up to 4m in height, which must be constructed in accordance with:

Personal protective equipment may include:

- overalls
- jacket
- boots
- hard hat
- safety glasses
- gloves
- ear plugs/muffs
- dust masks

The range of scaffolding equipment associated with this unit includes:

- standing prefabricated tower scaffolds
- tube and fitting scaffolds to 4 metres height
- fall protection devices
- catch platforms
- bracket scaffolds

Work is to be undertaken in accordance with standard regulatory and legislative requirements for Occupational Health and Safety. Work must be supervised and undertaken in a team situation. Supervision instruction may involve:

- verbal direction/instruction
- written instruction
- provision of sketch/drawing and details
- reports of faults may be verbal or written

Tools and equipment may include:

- spanners
- shovels
- hammers
- picks
- crow bars
- ladders

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

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EVIDENCE GUIDE

Competency is to be demonstrated by the safe and effective erection and dismantling of different types of restricted height scaffolding listed within the range of variables statement relevant to the work orientation.

(1) Critical Aspects of Evidence

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

- demonstrate compliance with Occupational Health and Safety regulations applicable to workplace operations
- indicate compliance with organizational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of process
- demonstrate safe and effective operational use of scaffolding tools and equipment
- erect scaffolding plumb and brace for stability
- interactively communicate with others to ensure safe and effective erection and dismantling operations

(2) Pre-requisite Relationship of Units

- MEMCOR00141A Apply principles of Occupational Health and Safety OH&S in work environment
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- OH&S procedures and codes of practice
- workplace and equipment safety requirements
- materials and materials handling
- vertical and horizontal concepts
- applications of standards, regulations, specifications, procedures and other installation requirements
- characteristics, capabilities, uses and limitation of the type of scaffolding being used
- environmental and site management *requirements*
- procedures for working at heights
- basic engineering principles related to scaffolding
- permitted clearances from energised conductors and equipment and *apparatus*
- selection and use of hand and power tools related to scaffolding
- engineering practices related to scaffolding
- communication principles
- inspection techniques
- lifting and slinging techniques

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Skills
The ability to:

- work safely to instructions
- use hand tools
- handle material
- select material
- communicate effectively
- assemble & disassemble scaffolding to enable access to the work area apply basic engineering principles relating to scaffolding

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMMAH0101A: Perform basic rigging work

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform rigging work associated with, but not limited to, movement of plant and equipment, particular hoists, safety nets and static lines, safety screens and shutters. It applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Material Handling

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/rigging materials/goods, non-toxic waste is selected and is consistent with job requirements.
	1.5	Tools and equipment for rigging materials/goods is checked for serviceability and any faults reported to supervisor.
	1.6	Relevant plans, drawings and text are selected and interpreted in accordance with the work plan.
	1.7	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications
	1.8	Work is planned in detail including sequencing & prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements
	1.9	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work

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2.	Perform basic rigging operations	2.1	Load weight calculated/determined and confirmed in accordance with the work plan
		2.2	Appropriate lifting or pulling devices for the movement of load are assembled or erected in accordance with the work plan
		2.3	Loads are connected to movement device using appropriate techniques and load connection equipment in accordance with the work plan
		2.4	Materials are stored, stacked/stockpiled and protected clear of traffic ways so they can be easily identified and retrieved
		2.5	Loads are lifted/moved in accordance with appropriate methods, techniques, hazard prevention and control measures, and manufacturer's recommendations/ specifications
		2.6	Communications and signal methods appropriate to the work are selected and used in accordance with relevant industry standards/requirements
		2.7	Load is directed to required position using appropriate signals in accordance with industry standards/requirements
		2.8	Load is lowered to required position and fixed/anchored in position using appropriate methods in accordance with manufacturer's specifications and work plan
		2.9	Load shifting equipment is dismantled, removed and inspected for wear in accordance with accepted codes of practice and the work plan
3.	Complete work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements
		3.2	Work area is cleared of waste, cleaned, restored and secured in with site/enterprise procedures
		3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
		3.4	Work completion details are finalised in accordance with site/enterprise procedures

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RANGE STATEMENT

Tools and equipment includes but is not limited to:

- spanners
- hammers
- chain blocks
- pull lifts
- winches
- pinch bars
- clamps
- pulleys
- jacks
- skids
- rollers
- cradle timbers
- chocks and wedges packers
- fish plates and bolts
- feeler gauges
- turfers and turn buckles

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

Potential hazards may include:
Overhead services such as:

- steam
- gas
- water
- telephone
- power cables
- uneven or unstable ground, trees
- underground services
- buildings and structures

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

Lifting equipment may include:

- chains
- spreader beams
- ropes
- wire ropes
- shackles and eye bolts

Resources may include:

- cranes
- hoists
- drawings/plans and personnel

Work completion details may include

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

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Other personnel and environmental influences such as:

- lighting
- noise
- temperature
- wind

Fixing and anchoring methods may include bolting

- wedging
- riveting and tying

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 rigging processes
- demonstrate the ability to apply basic rigging techniques
- demonstrate the ability to select and assemble lifting gear
- demonstrate the ability to apply anchoring techniques
- demonstrate the ability to sling and direct loads
- demonstrate the ability to calculate load weights
- 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

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(3) Underpinning Knowledge and Skills

Knowledge
knowledge of:

- workplace and equipment safety requirements including relevant codes and regulations
- Occupational health and safety standards
- relevant standards, industry requirements and codes of practice
- various types of slings and chains and their safe working load
- slinging techniques
- lifting gear/equipment
- hazard identification and control techniques
- load calculation techniques
- steel fixing techniques
- various cranes and hoists and their limitations
- various bolts and their tightening procedures
- safety equipment
- signalling methods
- communication principles
- range of communication mediums (verbal and non-verbal)

Skills
The ability to:

- work safely to instructions
- use hand and portable tools
- apply occupational health and safety standards
- apply relevant standards
- apply industry requirements and codes of practice
- interpret and apply plans and procedures
- select and assemble lifting gear
- sling and direct loads
- calculate load weights
- Identify and apply hazard control measures
- use hand tools
- bolt and fix steel work
- work at heights
- Interpret and apply appropriate signaling techniques
- apply anchoring techniques
- apply basic rigging techniques
- carry out work completion details
- communicate effectively

(4) Resource Implications

The following resources should be made available:

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

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(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.

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMFAB0131A: Repair/replace/modify fabrications (Basic)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively repair/replace/modify fabrications and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Assess and process repair /replacement/modification requirement	1.1 Work requirement are determined from job sheet, instruction or visual inspection.
	1.2 Specifications and drawings are obtained, interpreted and understood where required.
	1.3 Fabrications are inspected and suitability for repair/replacement /modification determined.
2. Assess and process material requirements	2.1 Material requirements are assessed in accordance with relevant codes, manufacturer's specifications and standard operating procedures.
	2.2 Materials are obtained/requisitioned in accordance with standard operating procedures.
	2.3 Tool and equipment requirements are assessed and obtained, where required
3. Prepare materials	3.1 Fabrication for repair/replacement and/or modification is prepared in accordance with specifications using acceptable workplace practices, tools and equipment.
	3.2 Materials are marked out and prepared to specifications with minimum wastage using correct principles, tools, equipment and procedures.
	3.3 Material or item for repair, replacement and/or modification is cut, bent, rolled, shaped or formed to specifications using appropriate fabrication techniques/procedures, tools and equipment.
	3.4 Where required, items are marked for identification.

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4.	Repair/replacement or modification carried out	4.1	Using appropriate clamping methods, equipment, jigs and fixtures, materials are positioned and clamped for welding.
		4.2	Pre-tack checks are undertaken and compliance with specifications determined prior to tack welding in position.
		4.3	Welding equipment is prepared and settings adjusted according to requirements.
		4.4	Immediate work site environment is checked to ensure compliance with safety requirements and procedures.
		4.5	Material or item is tack-welded using appropriate distortion minimisation techniques and procedures.
		4.6	Material or item is checked against specifications prior to welding.
		4.7	Material or item is welded to specifications using appropriate techniques and procedures.
5.	Repair, replacements and/or modification finished and inspected	5.1	Repair, replacement and/or modification cleaned and finished to specifications using appropriate workplace practices.
		5.2	Welds are visually inspected to assess weld quality against predetermined specifications.
		5.3	Completed repair, replacement and/or modification are assessed against specifications.
		5.4	Maintenance report is prepared and lodged in accordance with standard operating procedures.

RANGE STATEMENT

This unit should be selected where an integrated level of skills in fabrication maintenance and repair is required. This unit is intended to build on skills covered by the specialist prerequisites.

If individual skills are required specialist units only should be selected. Work undertaken under supervision or in a team environment using predetermined standards of quality, safety and workplace procedures in the repair, replacement and/or modification of fabrications.

Work may be carried out in workshop or on-site environments utilising welding and fabrication techniques, processes, tools, equipment and procedures on a range of materials.

Processes may involve the simple mark out of materials, setting up and operation of a variety of welding and cutting plant/equipment.

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Materials and supplies may include:

- low carbon steel(mild steel) sheet up to 10 gauge
- low carbon steel plate up to 7mm
- steel and galvanized pipes up to 50mm
- appropriate size welding electrodes
- appropriate type and size welding filler rods
- aluminum sections/sheet

Setting up may include the correct connection of:

- hoses
- blowpipes
- regulators
- settings of gas mixtures
- welding machine (AC and DC arc welding plants)
- welding machine (MIG welding plants)
- welding cables and welding clamps/holders
- welding tip preparation
- auxiliary equipment

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 (lap, vee, butt and tee)

Location/condition may include:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Protective clothing may include:

- safety boots
- safety helmet
- welding helmet
- coverall
- leggings
- gloves

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively repair/replace/modify fabrications 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 repairing/replacing/modifying fabrications and during the process
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in repairing/replacing/modifying fabrications
- 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 repair, replacement and/or modification of fabrications or other units requiring the exercise of the skills and knowledge covered by this unit.

(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
- MEMCOR0091A Draw and interpret sketches and simple drawings
- MEMCOR0191A Use hand tools
- MEMCOR0111A Use power tools
- MEMFAB0111A Weld using manual metal arc welding process (MMAW)
- MEMFAB0121A Weld using oxyacetylene welding process (OAW) fuel gas welding

Where additional or more complex marking out skills are required, refer to Unit MEMCOR0092A (Mark off/out structural fabrications and shapes). If machines and equipment for forming, bending or shaping are required, Unit MEMFAB0071A (Undertake fabrication, forming, bending and shaping) should be accessed.

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(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

Skills
The ability to:

- work safely to instructions
- plan to undertake a routine fabrication task
- interpret relative drawings and instructions
- use power tools and hand tools
- select tools and fixtures for repairing, replacing and modifying fabrications
- measure relative to the fabrication processes
- communicate effectively
- repair, replace and modify fabricated components efficiently

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to 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.

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMQUA0012A: Perform inspection (basic)

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

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Inspect completed task	1.1 Job is tested for conformance to specifications in accordance with standard engineering/maintenance procedures.
2. Keep records	2.1 Test status identification is made on conforming and non-conforming products and records accurately kept using standard operating procedures.
3. Provide feedback	3.1 Job is tested/inspected/measured after rework or repair.
	3.2 Deficiencies or deviations are reported to standard operating procedures.

RANGE STATEMENT

This unit applies to those whose duties include the basic inspection of completed or partly completed engineering and maintenance task completed by others. These may include but not limited to:

- installation applications
- maintenance applications

Inspection is carried out in accordance to engineering/maintenance standards or specifications, and applies to a range of metal engineering and maintenance techniques. These may include but not limited to the use of:

- specialized tools/equipment
- measuring equipment/devices/tools

Inspection/verification process may include but not limited to:

- visual inspection
- daily maintenance checks
- production run
- in service test and monitoring

Inspection may involve "first piece inspection", fixed interval, sample etc. Depending on the inspection process other technical units may need to be accessed, for example, appropriate measurement units.

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EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to perform basic quality inspection
- demonstrate the ability to interpret instructions manuals quality specifications and/or technical drawings
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- plan tasks in all situations and review task requirements as appropriate;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0141A Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

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Skills
The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions
- apply quality procedures
- read and interpret instructions manuals quality specifications and/or technical drawings
- plan a routine task
- undertake a routine task
- perform basic quality inspection

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

Tasks involved will be completed within reasonable timeframes relating to typical workplace activities
Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge.

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMMAH0042A: Order materials

Competency Descriptor: This unit deals with the skills and knowledge required to effectively order materials relevant to related trade and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Prepare purchase order/list	1.1 Purchase order/list is prepared to standard operating procedure.
	1.2 Material specifications, price limitations, quantities and delivery requirements are determined from instructions, requisitions etc.
2. Order materials	2.1 Supplier/vendor is informed of requirements and specifications according to standard operating procedure.
	2.2 Supplier/vendor orders are followed up to achieve delivery as required.
	2.3 Where appropriate, goods are directly received and checked for damage.
	2.4 Records/files are completed accurately according to standard operating procedure.

RANGE STATEMENT

Competency is to be demonstrated by effectively performing routine ordering of materials in accordance with the range listed within the range of variables statement.

This unit applies to purchasing activities carried out by other than the purchasing officer eg: maintenance, service, stores and warehouse personnel. The work is undertaken autonomously or as part of team.

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EVIDENCE GUIDE

(1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to order materials as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0161A Plan and undertake a routine task
- ICTCOR0011A Carry out data entry and retrieval procedures

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- written/oral communication techniques
- basic computation methods
- documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate to ordering materials
- supplier/vendor/sources for required material
- purchase orders

Skills
The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- prepare order for materials

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0062A: Attend to breakdown

Competency Descriptor: This unit deals with the skills and knowledge required to effectively attend to break down and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

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

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		2.7	Arrange repair work by appropriate personnel, where necessary.
3.	Confirm completion	3.1	Apparatus and systems are inspected and tested after repairs completed to ensure requirements are met.
		3.2	Appropriate personnel are notified of the completion of the repair work and details are documented in accordance with established procedures and requirements.

RANGE STATEMENT

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

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

Source of information:

- Working drawings/sketches
- Oral/written work instructions
- Maintenance schedules
- Maintenance records

Locations/conditions:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

- demonstrating consistent performance for each element of the unit.
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace.
- demonstrating an understanding of the Underpinning knowledge and skills identified in the section, of this unit titled ‘Underpinning knowledge’.

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During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to attend to breakdown as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0141A Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0191A Use hand tools

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

- use company documentation and record systems including the use of computers, information systems and business equipment technologies
- operate plant and equipment associated with a given workplace
- attend to breakdown as related to the metal engineering and maintenance industry

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

Competency will be determined on evidence of having consistently performed across a representative range of activities and where required support the outcomes of other units within a qualification structure

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMFAB0062A: Weld using gas tungsten arc welding process GTAW – (Tungsten inert gas TIG)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform welding using gas tungsten arc welding processes GTMA and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare materials for 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 specification where required.
2.	Select welding machine settings and electrodes	2.1	Welding machine settings and consumables are selected against job requirements, welding procedures, specifications and/or technical drawings.
3.	Assemble and set up welding equipment	2.2	Welding equipment are assembled and set up safely and correctly in accordance with standard operating procedures.
		2.3	Test runs are undertaken and verified in accordance with specifications.
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 processed to recommended standards	5.1	Welds are deposited correctly in flat, horizontal and vertical can position to specifications.
		5.2	Distortion is minimised.
		5.3	Joints are cleaned to specifications using correct and appropriate tools and techniques.

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6.	Inspect welds	6.1	Weld joints are visually inspected against specifications.
		6.2	Weld defects are identified.
7.	Correct faults	7.1	Defects are removed with minimum loss of sound metal using correct and appropriate tools and techniques.
8.	Maintain weld records	8.1	Weld records are maintained in accordance with specifications and standard operating procedures.
9.	Clean-up	9.1	Area around work activity cleaned.
		9.2	Waste and unwanted materials disposed of safely.
		9.3	Tools and equipment cleaned, maintained and stored.

RANGE STATEMENT

The person would work autonomously 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.
Gas tungsten arc welding (GTAW) would be carried out using a range of material for heavy or light fabrication.
Preparation of materials would include amperage setting, earthing, secondary circuits, electrode gouging with selection conditioning etc.
Remedial action using thermal processes may include oxyacetylene and air arc equipment. Grinding devices may also be used.

Source of information:

- Working drawings/sketches
- oral/written work instruction
- manufacturer's specifications
- safety regulations for MIG welding

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Welding machines:

- TIG welding plants - fixed and portable
- engine driven

Machine attachment:

- welding cables
- welding clamps
- torch and nozzle
- electrode tip cleaner

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Tools and equipment:

- appropriate type and size wrenches
- chipping hammers
- wire brushes

Joint preparation:

- Lap joints
- vee joints
- butt joints
- tee joints

Work activities:

- Welding
- Chipping
- Cleaning
- examining

Materials:

- low carbon steel (mild steel) up to 12mm
- high carbon steel up to 12mm
- aluminium up to 12mm
- stainless steel up to 12mm
- steel and galvanised pipes up to 12mm
- cast iron up to 25mm
- flat, angled, hollow, round, square, solid profile

Welding position:

- flat
- vertical up and down
- horizontal

Type of weld:

- Fillet weld
- lap weld
- butt weld
- vee weld-single and multi-run

Conditions for satisfactory weld:

- Pre-heating
- arc cleanly initiated
- arc travel length
- arc dynamically/electrically stable
- electrode angle adjusted

Specifications:

- welding procedure
- root
- side wall/inter-run penetrations
- no excessive undercut
- tack weld included
- even weld profile
- sufficient reinforcement
- no craters

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 gas metal arc welding 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 gas metal arc welding in the flat, horizontal and vertical position and to specifications.

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During assessment the individual will: (Cont'd)

- demonstrate correct procedures in setting up and shutting down gas tungsten arc welding equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMFAB0111A Weld using manual metal arc welding process
- MEMCOR0121A Classify engineering materials

Where welding is carried out in the overhead position, then Unit MEMFAB0023A (Perform advanced welding using tungsten metal arc welding process (GMAW)) should also be selected.

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- metal classification
- welding techniques
- welding processes
- welding defects/faults
- distortion prevention measures
- gas tungsten arc welding equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to perform gas tungsten arc welding
- 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 power tools and hand tools
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding processes
- identify/select materials relative to gas tungsten arc welding process
- perform gas tungsten arc welding process

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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BSBSBM0012A: Craft personal entrepreneurial strategy

Competency Descriptor: This unit deals with the skills and knowledge required to craft an entrepreneurial strategy that fits with the attitudes, behaviours, management competencies and experience necessary for entrepreneurs to meet the requirements and demands of a specific opportunity.

Competency Field: Small Business Operations

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Demonstrate knowledge of the nature of entrepreneurship	1.1 Concepts associated with entrepreneurship are clearly defined.
	1.2 Factors which influence entrepreneurship in and outside of Jamaica are correctly identified and explained.
	1.3 The importance of entrepreneurship to economic development and employment is explained clearly.
	1.4 The findings of research conducted on entrepreneurial ventures and successes in the Caribbean region are clearly presented in an appropriate format.
	1.5 Differences between wage employment and entrepreneurial ventures are correctly stated.
2. Identify and assess entrepreneurial characteristics	2.1 Relevant research is carried out and required entrepreneurial characteristics identified.
	2.2 Entrepreneurial characteristics identified are assessed and ranked.
	2.3 An understanding of the process and discipline that enable an individual to evaluate and shape choices and to initiate effective action is correctly demonstrated.
	2.4 Factors that will help an entrepreneur to manage the risk and uncertainties of the future, while maintaining a future orientated frame of mind, are identified.

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3.	Develop self-assessment profile	3.1	Self-assessment tools/methods to identify personal entrepreneurial potential are identified and properly used.
		3.2	The ability to apply creativity, problem-solving techniques and principles to solve business related problems are demonstrated.
		3.3	Feedback from others for the purpose of becoming aware of blind spots and for reinforcing or changing existing perceptions of strengths/ weaknesses is appropriately obtained.
4.	Craft an entrepreneurial strategy	4.1	A profile of the past that includes accomplishments and preferences in terms of life and work styles, coupled with a look into the future and an identification of what one would like to do is developed.
		4.2	Commitment, determination and perseverance; orientation towards goals; taking initiative and accepting personal responsibility; recognizing management competencies and identifying areas for development are determined.
		4.3	Written guidelines to obtain feedback that is solicited, honest, straightforward, and helpful but not all positive or negative are developed to facilitate reviews.
		4.4	Framework and process for setting goals which demand time, self-discipline, commitment, dedication and practice are developed.
		4.5	Goals established are specific and concrete, measurable, relate to time, realistic and attainable.
		4.6	Priorities, including identifying conflicts and trade-offs and how these may be resolved are established.
		4.7	Potential problems, obstacles and risks in meeting goals are identified.
		4.8	Specified action steps that are to be performed in order to accomplish goals are identified.
		4.9	The method by which results will be measured is indicated.

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4.10 Milestones for reviewing progress and tying these to specific dates on a calendar are established.

4.11 Sources of help to obtain resources are identified.

4.12 Evidence of the ability to review process and periodically revise goals is demonstrated.

RANGE STATEMENT

At this stage of the entrepreneurial process the entrepreneur must be able to conduct a self-assessment profile, examine the frame work for self assessment, develop a personal entrepreneurial strategy, identify data to be collected in the self-assessment process and learn about receiving feedback and setting goals.

Concepts associated to include:

- risk
- entrepreneurship
- macro-screening
- micro-screening
- competition
- wage employment

Influencing factors to include:

- market conditions
- markets – demand/supply
- global trends
- level of economic activities
- funding
- economic stability
- social stability
- resources availability

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The entrepreneur must be able to:

- understand the extreme complexity in predicting or aligning him/herself to specific careers in an environment of constant change
- determine the kind of entrepreneur he or she wants to become based on attitudes, behaviours, competencies, experience and how these fit with the requirements and demands for a specific opportunity
- evaluate thoroughly his or her attraction to entrepreneurship
- effectively develop personal plan
- utilize available information that will enhance his or her ability to achieve success

The entrepreneur may encounter setbacks if the planning process is not effectively pursued.

Pitfalls may include:

- proceeding without effective planning which may result in commitment to uncertainty
- commitment to a premature path with the desirability of flexibility can lead to disaster
- personal plans fail for the same reasons as business plans including frustration if the plan appears not to be working immediately and the challenges of changing behaviour from an activity-oriented routine to one that is goal oriented
- developing plans that fail to anticipate obstacles, and those that lack progress milestones and reviews

EVIDENCE GUIDE

Competency is to be demonstrated when the entrepreneur is able to undertake a personal entrepreneurial assessment exercise to determine if he or she possesses the necessary credentials to be a successful entrepreneur. This stage of the entrepreneurial process is critical since experience has shown that the founder is one of the deciding forces if the venture is to succeed and prosper.

(1) Critical Aspects of Evidence

The entrepreneur will be assessed by his/her action in developing an orchestrated plan in order to effectively pursue the business concept.

(2) Pre-requisite Relationship of Units

- Nil

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- personal entrepreneurial profile systems
- effective management systems: marketing, operations/productions, finance, administration, law
- how to measure feedback
- the method of developing a personal plan
  and a business plan
- understanding the difference between entrepreneurial culture and management culture

Skills
The ability to:

- determine barriers to entrepreneurship
- minimize exposure to risk
- exploit any available resource pool
- tailor reward systems to meet a particular situation
- effectively plan and execute activities
- use computer technology to undertake assessments

(4) Resource Implications

The following resources should be made available:

Personal computer with access to the internet and appropriate software that will enable one to conduct the necessary analysis using the internet

(5) Method of Assessment

A useful method of assessment is to determine if the venture can stand up to the test of critical evaluation.

(6) Context of Assessment

This stage of the entrepreneurial process is assessed when comparisons are made between actual outcomes and plans/projections.

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CRITICAL EMPLOYABILITY SKILLS

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

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

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MEMFAB0092A: Develop geometric shapes – (advanced) Conical/Transitional

Competency Descriptor: This unit deals with the skills and knowledge required to effectively develop conical and trans geometric shapes and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Transfer dimensions from a sketch or simple drawing to work piece	1.1	Specifications and work requirements determined and understood using correct and appropriate calculations
		1.2	Development carried out to specifications or standard operating procedures using appropriate tools and equipment
		1.3	Datum points correctly established and indicated
		1.4	Allowances are correctly determined and marked (thickness, bend, pitch, angle, circumference, perimeter)
2.	Make templates as required	2.1	Appropriate template material chosen
		2.2	Templates are produced to specification.
		2.3	Allowances determined and transferred
		2.4	Templates for rolling, bending, pressing, drilling and profiling accurately produced
		2.5	Correct storage procedures followed including labelling and identification to standard operating procedures
3.	Develop patterns as required	3.1	Most appropriate development method chosen and applied
		3.2	Allowances correctly determined and transferred
		3.3	Relevant standards/codes and symbols interpreted
		3.4	Requirements of standards/codes interpreted and applied to materials and processes

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4.	Estimate quantities of materials from engineering drawings	4.1	Materials correctly identified
		4.2	Quantities estimated from drawings
		4.3	Material wastage minimised

RANGE STATEMENT

This unit applies to marking out of complex cylindrical/rectangular fabrications. This unit requires advanced skills in parallel line developments.

All work undertaken in compliance with legislative and regulatory requirements to previously determined standards of safety, quality and standard operating procedures.

This unit applies to marking out of general fabrications using geometric development Individuals may work autonomously or in a team environment using predetermined standards of quality, safety and workshop procedures.

The task may be performed in the workshop or site. Marking out is undertaken using appropriate tools and equipment, and templates and patterns are produced as required.

Marking out covers but not limited to:

- engineering components
- jigs and fixtures
- castings
- templates
- dies and tooling
- marking out tables
- surface tables
- rotary tables
-

Equipment may include but not limited to:

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

Sketches or simple drawings may 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

Relevant codes/standards and symbols may include:

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

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Patterns and templates made from:

- wood
- paper (firm)
- plastics

Measurement systems:

- inch/foot system
- metric(SI) system

Fabrications may include

- hoppers
- chutes
- elliptical shapes
- patterns
- round/rectangular branch
- compound bends
- double offsets.
- curves
- spirals
- intersections

This unit requires advanced skills for the calculation of:

- cutting
- bending lines
- developments

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively by marking out of general fabrications using geometric development 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 fabrication 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 develop cylindrical and rectangular geometric shapes relative to the fabrication process
- communicate information about fabrication 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 tasks efficiently and to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0171A Use graduated measuring devices
- MEMCOR0091A Draw and interpret sketches and technical drawings
- MEMCOR0051A Perform related computations – (basic)

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- fabrication/marking out tools
- drawing interpretation
- basic numeracy
- marking off/out techniques
- development (circular and transitional pieces)
- materials relevant to the engineering process
- standard operations in simple geometry measurement and calculations
- complex development processes
- the use of templates for fabricated assemblies
- practical developments in sheet metal
- universal sheet metal working

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

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

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

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMMAH0102A: Perform advanced rigging work

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform rigging work associated with, but not limited to, movement of plant and equipment, particular hoists, safety nets and static lines, safety screens and shutters. It applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Material handling

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/rigging materials/goods, non-toxic waste is selected and is consistent with job requirements.
	1.5	Tools and equipment for rigging materials/goods is checked for serviceability and any faults reported to supervisor.
	1.6	Relevant plans, drawings and text are selected and interpreted in accordance with the work plan.
	1.7	Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications.
	1.8	Work is planned in detail including sequencing & prioritising and considerations made where appropriate for the maintenance of plant security and capacity in accordance with system/site requirements.
	1.9	Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.

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2.	Perform advanced rigging operations	2.1	Load weight calculated/determined and confirmed in accordance with the work plan.
		2.2	Appropriate lifting or pulling devices for the movement of load are assembled or erected in accordance with the work plan.
		2.3	Loads are connected to movement device using appropriate techniques and load connection equipment in accordance with the work plan.
		2.4	Materials are stored, stacked/stockpiled and protected clear of traffic ways so they can be easily identified and retrieved.
		2.5	Loads are lifted/moved in accordance with appropriate methods, techniques, hazard prevention and control measures, and manufacturer's recommendations/ specifications.
		2.6	Communications and signal methods appropriate to the work are selected and used in accordance with relevant industry standards/requirements.
		2.7	Load is directed to required position using appropriate signals in accordance with industry standards/requirements.
		2.8	Load is lowered to required position and fixed/anchored in position using appropriate methods in accordance with manufacturer's specifications and work plan.
		2.9	Load shifting equipment is dismantled, removed and inspected for wear in accordance with accepted codes of practice and the work plan.
3.	Complete work	3.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
		3.2	Work area is cleared of waste, cleaned, restored and secured in with site/enterprise procedures.
		3.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
		3.4	Work completion details are finalised in accordance with site/enterprise procedures.

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RANGE STATEMENT

Tools and equipment includes but is not limited to:

- spanners
- hammers
- chain blocks
- pull lifts
- winches
- pinch bars
- clamps
- pulleys
- jacks
- skids
- rollers
- cradle timbers
- chocks and wedges packers
- fish plates and bolts
- feeler gauges
- turfers and turn buckles

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

Lifting equipment may include:

- chains
- spreader beams
- ropes
- wire ropes
- shackles and eye bolts

Resources may include:

- cranes
- hoists
- drawings/plans and personnel

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Potential hazards may include:
overhead services such as:

- steam
- gas
- water
- telephone
- power cables
- uneven or unstable ground, trees
- underground services
- buildings and structures

Other personnel and environmental influences such as:

- lighting
- noise
- temperature
- wind

Fixing and anchoring methods may include bolting

- wedging
- riveting and tying

Work completion details may include

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

Advanced rigging work may include:

- movement of plant and equipment
- steel erection
- particular hoists
- placement of pre-cast concrete
- safety nets and static lines
- mast climbers
- perimeter safety screens and shutters
- cantilevered crane loading platforms
- slinging and directing of loads
- rigging of cranes
- conveyors
- dredgers and excavators
- tilt slabs
- demotion and dual lifts, rigging of gin poles
- shear legs
- flying foxes and cableways
- guyed derricks and structures
- suspended scaffolds and fabricated hung scaffolds

Hazards which may affect demolition may include:

- corroded members
- impact forces
- undermined foundations
- hidden voids
- unidentified services
- hazardous substances and unstable structures

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.

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(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 rigging processes
- demonstrate the ability to apply advanced rigging techniques
- demonstrate the ability to select and assemble lifting gear
- demonstrate the ability to apply anchoring techniques
- demonstrate the ability to sling and direct loads
- demonstrate the ability to calculate load weights
- 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
- Occupational health and safety standards
- relevant standards, legislative requirements and codes of practice
- various types of slings and chains and their safe working load
- slinging techniques
- lifting gear/equipment
- hazard identification and control techniques
- load calculation techniques

Skills
The ability to:

- work safely to instructions
- use hand and portable tools
- apply occupational health and safety standards
- apply relevant standards
- legislative requirements and codes of practice
- Interpret and apply plans and procedures
- select and assemble lifting gear
- sling and direct loads
- calculate load weights
- Identify and apply hazard control measures

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Underpinning Knowledge and Skills (Cont'd.)

- steel fixing techniques
- various cranes and hoists and their limitations
- various bolts and their tightening procedures
- safety equipment
- signaling methods
- demolition rigging techniques
- communication principles

range of communication mediums (verbal and non-verbal)

- use hand tools
- bolt and fix steel work
- work at heights
- Interpret and apply appropriate signaling techniques
- apply anchoring techniques
- apply advanced rigging techniques
- apply demolition rigging techniques
- carry out work completion details
- communicate effectively.

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

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

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

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

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

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(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.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

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

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

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MEMMRD0722A: Install and maintain mechanical valves

Competency Descriptor: This unit refers to the skills and knowledge required for the fault finding, diagnosis, repair and/or overhaul of mechanical valves, but excluding any associated servo or actuating unit as applied to the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare for the work	1.1 Work requirements are identified from request/work orders or equivalent clarified/confirmed with appropriate parties or by site inspection.
	1.2 Work requirements are clarified/confirmed with appropriate parties or by site inspection.
	1.3 Occupational health and safety standards are identified, applied and monitored throughout the work procedure.
	1.4 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications.
	1.5 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan.
	1.6 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications.
	1.7 Work is planned in detail including sequencing and prioritizing for the maintenance of plant security and capacity.
	1.8 Co-ordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work.
	1.9 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures.

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2.	Remove valves for maintenance	2.1	Required isolations are confirmed where appropriate in accordance with site requirements.
		2.2	Valve is disconnected in accordance with the work plan.
		2.3	Valve is removed in a manner, which will assist in replacement in accordance with the work plan.
		2.4	Valve is inspected for abnormalities in accordance with the work plan.
3.	Perform valve maintenance	3.1	Maintenance is performed in accordance with manufacturers specifications and the work plan.
		3.2	Valve is dismantled, clearly marked for identification and relevant sketches drawn in accordance with the work plan.
		3.3	Components are correlated in preparation for re-assembly in accordance with manufacturers drawings/manuals.
		3.4	New components are inspected to ensure compliance with manufacturers specifications.
		3.5	Dimensional inspection is performed with precision measuring devices to ensure compliance with manufacturers specifications and site requirements.
		3.6	Components are reassembled for testing in accordance with manufacturers specifications and site requirements.
		3.7	Modifications/alterations are undertaken in accordance with manufacturers specifications and site requirements.
		3.8	Components are leveled, aligned, coupled and connected in accordance with manufacturers specifications and site requirements.
		3.9	Valves are pressure tested, monitored and adjusted if required in accordance with manufacturers specifications and the work plan.
4.	Replace/install valves	4.1	Site is prepared for valve replacement in accordance with the work plan.
		4.2	Valve is replaced in accordance with the work plan and manufacturers specifications.

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	4.3	Valve is connected in accordance with the work plan and manufacturers specifications.
	4.4	Final job inspection is completed and any permits relinquished in accordance with the work plan.
5. Complete the work	5.1	Work is completed and appropriate personnel notified in accordance with site/enterprise requirements.
	5.2	Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures.
	5.3	Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures.
	5.4	Work completion details are finalised in accordance with site/enterprise procedures.

RANGE STATEMENT

Valves may include:

- high and low pressure temperature valves that are flanged and bolted
- dampers and hydro regulating valves
- gate
- globe
- wafer
- uni-flow
- plug
- ball
- knife
- rotary
- piston (ported)
- diaphragm
- non-return
- pinch
- pressure relief
- regulating
- isolating
- slide dampers
- isolating and regulating blade dampers
- gas regulating or isolating dampers
- hydro turbine guide vanes
- and shutters

Testing may include:

- pressure testing (hydraulic and vacuum),
- blue check

Valve may control solutions which may include :

- gases
- solids
- fluids and chemicals such as caustic soda, chlorine
- ammonia
- sulphuric acid
- sodium hypochlorite
- hydrazine
- diethylamine
- citric acid
- hydrofluoric acid
- ammonium molydate
- trisodium phosphate
- hydrogen
- nitrogen
- carbon dioxide
- water
- fly-ash
- slurry
- compressed air

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Precision measuring devices may include:

- inside/outside micrometers
- verniers
- engineers rule
- dial gauges
- depth gauges and feeler gauges
- brine
- oil
- steam (superheated and saturated), hydrogen, propane and carbon dioxide
-

Valve drives may include:

- electrical
- mechanical
- pneumatic
- hydraulic or manual

Work completion details may include:

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

Isolations can refer to:

- electrical/mechanical
- or other associated processes

Details of maintenance may be clarified by diagnosis and workplace inspection

Maintenance may include:

- repair
- inspection
- modification, overhaul
- lubrication
- servicing
- test running
- sealing
- machining

identifying and replacing defective components and valve packing

Work site environment may be affected by nearby plant or processes, e.g.

- chemical
- heat
- dust
- noise
- gas and oil
-

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively carrying out the installation and maintenance of mechanical valves 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 installation and maintenance of mechanical valves
- demonstrate safe and effective operational use of tools, plant and equipment
- demonstrate correct procedures in performing installation of mechanical valves
- demonstrate correct procedures in maintaining mechanical valves
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- interactively communicate with others to ensure safe operations
- demonstrate effective engineering techniques to produce designed outcome

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Follow principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMMAH0071A Perform manual handling and lifting

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- valve operating and seating arrangements;
- hydraulic and pneumatic principles;
- measuring equipment;
- glands,
- seals and gaskets;
- bearings;
- occupational health and safety standards;
- quality assurance/quality control;
- specialised tools and jigs;
- levelling and aligning
- rigging and lifting equipment
- valve materials and components
- technical drawings and data
- data recording techniques
- hand and portable power tools
- diagnostic and testing techniques
- protective coatings
- plant and systems
- communication principles

Skills
The ability to:

- identify and use precision measuring equipment
- manufacture and install seals and gaskets
- apply dismantling and assembly techniques
- select appropriate maintenance techniques
- manufacture and use specialised tools and jigs
- level and align mechanical valves and components
- use and update technical drawings and data
- identify and select materials and components
- use hand and portable power tools
- apply diagnostic and testing techniques and rectify faults
- interpret and apply valve operational techniques
- apply occupational health and safety procedures
- recognise worn/damaged components and parts
- apply effective maintenance procedures
- apply data analysis techniques and tools
- communicate effectively

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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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.

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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.

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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:

- hand and power hack saws
- pipe dies
- pipe threading machine
- pipe wrenches
- pipe cutters
- wenches
- screwdrivers
- masonry trowel
- shovels
- cold chisels
- pickaxes
- hand drills
- pipe reamers
- swaging tools
- files
- flaring tool
- tube cutters
- hammers
- soldering and brazing equipment

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Materials and supplies:

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

Valves, regulatory and metering devices:

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

Safety:

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

Appropriate personnel:

- apprentices
- supervisor

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

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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

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(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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMFAB0013A: Monitor quality of production welding/fabrications

Competency Descriptor: This unit deals with the skills and knowledge required to monitor the quality of production welding/fabrications as applied the metal engineering and maintenance industry.

Competency Field: Metal Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Monitor quality of welded products	1.1	Weld requirements identified from specifications and/or weld requirements can be identified drawings
		1.2	Information is coordinated/collected in accordance with statutory, industry and company requirements
		1.3	Inspection procedures carried out in accordance with standard operating procedures
		1.4	Tools and equipment are correctly identified and acquired
		1.5	Non-conforming welds are reported and corrective action defects can be identified Those weld defects that initiated in accordance with standard operating procedures
		1.6	Preset gauges used to monitor quality of welded product preset gauges appropriate to the welded product can
2	Initiate testing when required	2.1	Implement test requirements in accordance with standard requirements appropriate to the welded product can operating procedures and any guidelines or regulatory requirements
		2.2	Analyse technical and operational information in a logical and sequential manner.
3	Undertake procedures' reporting	3.1	Information and data are collected and documented according to standard operating procedure
		3.2	Weld data to be collected can be identified
		3.3	Prepare reports as required

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3.4 Actions necessary to rectify loss of efficiency are recommended to the appropriate personnel.

3.5 Implementation of recommendations are monitored to ensure efficiency

RANGE STATEMENT

This unit applies to those whose duties include the basic inspection of completed or partly completed welded fabrications produced by others in a production environment.

Work would be carried out in a team environment using predetermined standards of quality, safety and standard operating procedures and to established welding procedures.

Duties are to be carried out in consultation with appropriately qualified supervisor or engineer.

This competency would be used in a production welding environment, monitoring the quality of production fabrication work where knowledge of the welding techniques and testing procedures is required.

Source of information:

- Working drawings/sketches
- oral/written work instruction
- manufacturer's specifications
- safety regulations for welding

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Welding methods/techniques may include:

SMAW	MMAW
GMAW	FCAW
1G – 6G positions	OAW

Monitoring methods may include:

- visual inspection
- comparison with pre determined standards
- non destructive testing/inspection

(1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to perform quality inspection
- demonstrate the ability to interpret instructions manuals quality specifications and/or technical drawings

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During assessment the individual will: (Cont'd)

- 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:

- relevant occupational health and safety regulations
- communication principles
- basic numeracy
- task requirements (monitoring and inspection)
- work place operating procedures
- the use of work schedules, charts, work bulletins and memos
- drawings and welding symbols
- welding specifications (AWS & ASME)
- welding methods and techniques
- welding terms and definitions
- cutting terms and definitions
- welding codes/standards (AWS & ASME)
- weld ability
- welding inspection and testing methods/techniques
- fabrication inspection and testing methods/techniques

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
- monitor quality of production welding/fabrications

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 2	

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

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MEMFAB0023A: Perform advanced welding using gas metal arc welding process GMAW - (Metal inert gas –MIG)

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform advanced welding using gas metal arc welding processes GMAW and applies to individuals working in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare materials for 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 specification where required.
2.	Select welding machine settings and electrodes	2.1	Welding machine settings and consumables are selected against job requirements, welding procedures, specifications and/or technical drawings.
3.	Assemble and set up welding equipment	3.1	Welding equipment are assembled and set up safely and correctly in accordance with standard operating procedures.
		3.2	Test runs are undertaken and verified in accordance with specifications.
4.	Identify distortion prevention measures	4.1	Distortion prevention measures are identified.
		4.2	Appropriate action taken to minimise and rectify distortion.
5.	Weld joints processed to recommended standards	5.1	Welds are deposited correctly in flat, horizontal and vertical can position to specifications.
		5.2	Welds are deposited correctly in 1G, 2G, 5G and 6G positions using open-root V-groove joints
		5.3	Distortion is minimised.

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		5.4	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	Defects are removed with minimum loss of sound metal using correct and appropriate tools and techniques.
8.	Maintain weld records	8.1	Weld records are maintained in accordance with specifications and standard operating procedures.
9.	Clean-up	9.1	Area around work activity is cleaned.
		9.2	Waste and unwanted materials are disposed of safely.
		9.3	Tools and equipment are cleaned, maintained and stored.

RANGE STATEMENT

The person would work autonomously 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. Gas metal arc welding (GMAW) would be carried out using a range of material for heavy or light fabrication.
Preparation of materials would include amperage setting, earthing, secondary circuits, electrode gouging with selection conditioning etc.

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

Source of information:

- working drawings/sketches
- oral/written work instruction
- manufacturer's specifications
- safety regulations for MIG welding
- GMAW Equipment and filler metal specifications

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Welding machines:

- MIG welding plants - fixed and portable engine driven or direct current

Machine attachment:

- welding cables
- welding clamps
- torch and nozzle
- electrode tip cleaner

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Tools and equipment:

- appropriate type and size wrenches
- chipping hammers
- wire brushes

Welding position:

- flat
- vertical up and down
- horizontal
- overhead

Joint preparation:

- lap joints
- open root vee joints
- butt joints
- tee joints

Type of weld:

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

Work activities:

- welding
- chipping
- cleaning
- examining

Conditions for satisfactory weld:

- pre-heating
- arc cleanly initiated
- arc travel length
- arc dynamically/electrically stable
- electrode angle adjusted

Materials:

- low carbon steel (mild steel plate) up to 12mm
- low carbon steel (mild steel pipe)
- high carbon steel up to 12mm
- aluminium up to 12mm
- stainless steel up to 12mm
- steel and galvanised pipes up to 12mm
- cast iron up to 25mm
- flat, angled, hollow, round, square, solid profile
- Solid and flux cored wire electrodes

Specifications:

- welding procedure
- root
- side wall/inter-run penetrations
- no excessive undercut
- tack weld included
- even weld profile
- sufficient reinforcement
- no craters

Specific requirements may include:

- procedures for welding in the 1G, 2G, 5G and 6G positions
- techniques for welding in the 1G, 2G, 5G and 6G positions
- AWS and or ASME welding/testing requirements

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EVIDENCE GUIDE

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the gas metal arc welding 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 gas metal arc welding in the flat, horizontal, vertical and overhead position and to specifications.
- demonstrate the ability to perform gas metal arc welding in the 1G, 2G, 5G and 6G positions and to specifications
- demonstrate correct procedures in setting up and shutting down gas metal arc welding equipment
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Pre-requisite Relationship of Units

- MEMFAB0111A Weld using manual metal arc welding process
- MEMFAB0023A Perform advanced welding using gas metal arc welding process (GMAW))
- MEMCOR0121A Classify engineering materials

Where welding is carried out only in the flat, horizontal, vertical position, then Unit MEMFAB0052A should be selected.

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- workplace and equipment safety requirements including relevant OH&S legislation and regulations
- metal classification
- layout/fitup principles and practice
- codes/standards
- welding techniques
- welding specifications
- welding inspection and testing
- welding in the 1G, 2G, 5G and 6G positions
- welding processes
- welding defects/faults
- distortion prevention measures
- gas metal arc welding equipment identification, transportation and storage
- hand tools and equipment
- materials /consumables relative to perform gas metal arc welding
- 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 power tools and hand tools
- identify/select material
- identify/select welding processes
- handle material, tools and equipment
- measure relative to welding processes
- identify/select materials relative to gas metal arc welding process
- perform gas metal arc welding process in the flat, horizontal, vertical and overhead position and to specifications
- perform gas metal arc welding process in 1G, 2G, 5G and 6G positions.

(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.

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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 related to welding

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

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

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MEMFAB0053A: Perform welding supervision

Competency Descriptor: This unit relates to those competencies required to satisfy the code requirements relating to welding supervision procedures as applied to the metal and engineering industry

Competency Field: Metal Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1	Prepare and determine welding procedure	1.1	Instruction to welders are carried out to procedure.
		1.2	Welding parameters are determined in accordance with procedures.
		1.3	Variables and sequence checks are planned against documentation.
		1.4	Appropriate documentation are prepared for record keeping welding records to be kept can be identified
2	Qualify welders to required procedures	2.1	Welders are trained regarding procedures.
		2.2	Welders are tested regarding procedures.
		2.3	Reports on the welder's performance regarding procedures are maintained.
3	Monitor/maintain quality assurance and safety procedures	3.1	Internal QA plan monitored.
		3.2	Traceability of materials ensured.
		3.3	Welding supervised to ensure compliance with prescribed specifications and/or documented procedures welding process can be given The specifications of and/or safety procedures.
4	Arrange for non-destructive testing and destructive testing	4.1	Conducting of appropriate testing is ensured.
		4.2	Verify that non-destructive testing/destructive testing.

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5	Perform welding supervision	5.1	Welding procedures are established and validated.
		5.2	The characteristics and application of welding, cutting and gouging processes are determined.
		5.3	Deviations from procedures are identified and appropriate actions are taken according to requirements.
		5.4	The progress of the welding is monitored to confirm it meets industry and enterprise procedures.
		5.5	Test results are analysed, documented and verified in accordance with the prescribed procedures.
		5.6	Required action following results of test welds and analysis of previous test procedures is identified and reported.
6	Coordinate repair and modify welding work	6.1	Discontinuities in inspection and test data are identified in accordance with job requirements and specification.
		6.2	Repairs and/or modifications are co-ordinated in accordance with requirements.
		6.3	Requirements for personnel and equipment to conduct the work are identified to meet the required standard.
		6.4	Retesting of repairs and/or modifications are confirmed and carried out in accordance with prescribed procedures and standards.
		6.5	Required reports and documentary evidence are formulated in accordance with procedures or work standards.
7	Undertake documentation procedures	7.1	Information and data are documented according to standard operating procedure.
		7.2	Weld data to be collected can be identified
		7.3	Prepare reports as required.
		7.4	Actions necessary to rectify loss of efficiency are recommended to the appropriate personnel.
		7.5	Implementation of recommendations are monitored to ensure efficiency.

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RANGE STATEMENT

Competencies in this unit are based on wide knowledge of welding science, processes, procedures and technical requirements. Individuals working in this field would hold at least one certificate satisfying the requirements of industry specified welding.

Competencies and procedures are determined by recognised codes and standards such as AWS and ASME Standard

All work would be conducted in accordance with job requirements, technical specifications, guidelines and regulatory requirements.

Source of information:

- Working drawings/sketches
- oral/written work instruction
- manufacturer's specifications
- safety regulations for welding

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

Activities may include:

- Determining consumables which may include gases, welding rods, fluxes and tips
- Determining use of processes and materials as defined by Standards
- Planning and preparing for welding inspections and supervision

Welding methods/techniques may include:

- SMAW
- GMAW
- 1G – 6G positions
- MMAW
- FCAW
- OAW

Monitoring methods may include:

- visual inspection
- comparison with pre determined standards
- non destructive testing/inspection

Test procedures may include dye penetrant, magnetic particle, thickness testing, radiographic, ultrasonic and pressure tests

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EVIDENCE GUIDE

(1) Critical Aspects of Evidence

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the 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 welding supervision
- 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

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- welding science and parameters
- relevant standards of weld
- inspection techniques and procedures
- metallurgy
- welding hardware
- welding practice
- mechanical properties of welded joints
- heat treatment procedures
- welding consumables and materials
- fabrication techniques
- engineering techniques
- characteristics of welding
- cutting and gouging
- support systems (pipe work and duct work)
- structural steel work and tanks
- pressure retaining equipment and pipe work
- non-destructive testing methods

Skills
The ability to:

- apply occupational health and safety standards
- observe relevant statutory requirements and codes of practice
- recognise welding faults
- use drawings and plans
- use relevant standards and codes of practice
- apply inspection techniques, procedures and processes
- inspect welding and materials
- communicate effectively
- identify welding consumables
- apply welding, cutting and gouging
- apply supervision/inspection techniques and practices
- produce formal reports of a technical nature
- co-ordinate staff
- oversee and/or conduct non-destructive testing processes.

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 2	

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

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MEMFAB0063A: Perform welding/fabrication inspection

Competency Descriptor: This unit relates to those competencies required to satisfy the code requirements relating to welding/fabrication inspection as applied to the metal and engineering industry

Competency Field: Metal Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Prepare and determine welding procedure	1.1	Instruction to welders are carried out to procedure
		1.2	Welding parameters are determined in accordance with procedures
		1.3	Variables and sequence checks are planned against documentation
		1.4	Appropriate documentation are prepared for record keeping welding records to be kept can be identified The
2.	Qualify welders to required procedures	2.1	Welders are trained regarding procedures
		2.2	Welders are tested regarding procedures
		2.3	Reports on the welder's performance regarding procedures are maintained.
3.	Monitor/maintain quality assurance and safety procedures	3.1	Internal QA plan monitored
		3.2	Traceability of materials ensured
		3.3	Welding supervised to ensure compliance with prescribed specifications and/or documented procedures welding process can be given The specifications of and/or safety procedures
4.	Arrange for non-destructive testing and destructive testing	4.1	Conducting of appropriate testing is ensured
		4.2	Verify that non-destructive testing/destructive testing
5.	Perform welding inspections	5.1	Monitor QA procedures are being followed in accordance with work requirements
		5.2	Testing requirements are identified and implemented to meet the required standard

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		5.3 Calibration of test equipment is verified in accordance with work requirements
		5.4 Deviations from work requirements are investigated and reported in accordance with requirements
		5.5 Testing, inspection and verification data is viewed and interpreted
		5.6 Final inspection(s) against specifications are performed in accordance with prescribed procedures
6	Undertake documentation procedures	6.1 Information and data are documented according to standard operating procedure
		6.2 Weld data to be collected can be identified
		6.3 Prepare reports as required
		6.4 Actions necessary to rectify loss of efficiency are recommended to the appropriate personnel.
		6.5 Implementation of recommendations are monitored to ensure efficiency

RANGE STATEMENT

Competencies in this unit are based on wide knowledge of welding science, processes, procedures and technical requirements. Individuals working in this field would hold at least one certificate satisfying the requirements of industry specified welding.

Competencies and procedures are determined by recognised codes and standards such as AWS and ASME Standard

All work would be conducted in accordance with job requirements, technical specifications, guidelines and regulatory requirements.

Source of information:

- Working drawings/sketches
- oral/written work instruction
- manufacturer's specifications
- safety regulations for welding

Location/condition:

- workshops
- plants
- in the field
- confined spaces
- elevated positions
- damp and wet situations

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Activities may include:

- Determining consumables which may include gases, welding rods, fluxes and tips
- Determining use of processes and materials as defined by Standards
- Planning and preparing for welding inspections and supervision

Welding methods/techniques may include:

- SMAW
- GMAW
- 1G – 6G positions
- MMAW
- FCAW
- OAW

Monitoring methods may include:

- visual inspection
- comparison with pre determined standards
- non destructive testing/inspection

Test procedures may include dye penetrant, magnetic particle, thickness testing, radiographic, ultrasonic and pressure tests

(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 welding supervision
- 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.

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(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:

- Occupational health and safety standards
- relevant statutory requirements and codes of practice
- welding science and parameters
- relevant standards of weld
- inspection techniques and procedures
- metallurgy
- welding hardware
- welding practice
- mechanical properties of welded joints
- heat treatment procedures
- welding consumables and materials
- fabrication techniques
- engineering techniques
- characteristics of welding
- cutting and gouging
- support systems (pipe work and duct work)
- structural steel work and tanks
- pressure retaining equipment and pipe work
- non-destructive testing methods

Skills
The ability to:

- apply occupational health and safety standards
- observe relevant statutory requirements and codes of practice
- recognize welding faults
- use drawings and plans
- use relevant standards and codes of practice
- apply inspection techniques, procedures and processes
- inspect welding and materials
- communicate effectively
- identify welding consumables
- apply welding, cutting and gouging
- apply inspection techniques and practices
- produce formal reports of a technical nature
- co-ordinate staff
- oversee and/or conduct non-destructive testing processes.

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

Collect, analyse and organise information	Level 2	
Communicate ideas and information	Level 3	
Plan and organise activities	Level 2	
Work with others and in team	Level 3	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 2	

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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

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
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.

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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

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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.

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(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

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(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.
• Carries out established processes • Makes judgement of quality using given criteria	• Manages process • Selects the criteria for the evaluation process	• Establishes principles and procedures • Evaluates and reshapes process • Establishes criteria for evaluation

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

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MEMMAH0073A: Purchase materials

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

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Determine purchasing requirements	1.1 Consulted with client, customer or user as appropriate.
	1.2 Material specifications are determined from orders, instructions and/or technical drawings.
	1.3 Quantities, price limitations and delivery requirements are determined from orders/instructions.
2. Prepare purchase order/list	2.1 Purchase order/list is developed to standard operational procedure.
3. Purchase material	3.1 Standard operational procedures are followed.
	3.2 Supplier/vendor is informed of requirements and specifications.
	3.3 Purchasing schedules are adjusted where required to standard operational procedures.
	3.4 Appropriate paperwork/contracts are exchanged to standard operational procedure.
	3.5 Records/files are maintained accurately using standard operating procedures.

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RANGE STATEMENT

Purchasing schedules developed to operating procedures and for pre-contracted suppliers/vendors.

Contracts/paperwork generated manually or electronically utilising on-site system.

Purchasing can cover one-off or multiple quantities of raw materials, components, equipment etc.

Purchasing specifications are determined from standard engineering drawings and data sheets, instructions written or verbal.

All work and work practices undertaken to regulations or standard requirements.

EVIDENCE GUIDE

Competency is to be demonstrated by purchasing materials within the range statement relative to the work orientation

(1) Critical Aspects of Evidence

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

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0042A Interpret standard specifications and manuals
- MEMMAH0042A Order materials
- ICTCOR0011A Carry out data entry and retrieval procedures)

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- written/oral communication techniques
- basic computation methods
- interpreting standard specifications and manuals
- documentation and record systems including the use of computers, information systems and business equipment technologies, as appropriate to ordering and purchasing of materials
- supplier/vendor/sources for required material
- purchase orders

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Skills
The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- interpret orders, instructions manuals quality specifications and/or technical drawings
- purchase materials relevant to related area

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

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

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMCOR0013A: Assist in the provision of on the job training

Competency Descriptor: This unit applies to the skills and knowledge necessary to assist in the provision of on the job training in a wide range of different contexts in the metal engineering and maintenance industry

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Plan for delivery of on-the-job training	1.1	Objectives of training and competency to be achieved are identified.
		1.2	Role in provision of training is clarified.
2.	Deliver on-the-job training	2.1	Training objectives are explained to trainee.
		2.2	Training is carried out using appropriate techniques.
		2.3	Trainee progress is monitored and constructive feedback provided to trainee.
3.	Review training program	3.1	Training program is evaluated according to standard operating procedure.
		3.2	Training data is recorded according to standard operating procedure.
		3.3	Training is reported on according to standard operating procedure.
		3.4	Training is promoted according to standard operating procedure.

RANGE STATEMENT

Training is delivered in a one-to-one or small group situation.

The training may be structured or informal and based on co-operation between trainer and other training personnel.

The training covers both underpinning knowledge and practical skills.

Training may be applied to technical, orientation, OH&S, or other areas.

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

- sketches
- drawings
- charts and maps
- logical presentation
- feedback
- production schedules
- written machine or job instructions
- client instructions
- signage
- memos
- work schedules/work bulletins
- explanation
- sound communication methods
- demonstration/practice

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively assisting in the provision of on the job training in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

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

During assessment the individual will:

- demonstrate safe working practices at all times
- demonstrate the ability to assist in the provision of on the job training as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment
- take responsibility for the quality of their own work
- perform all tasks in accordance with standard operating procedures
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A undertake interactive workplace communication

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

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

Skills
The ability to:

- work safely to instructions
- convey information in simple English to invoke correct actions
- assist in the provision of on the job training

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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

(6) Context of Assessment

Competency will be determined on evidence of having consistently performed across a representative range of activities and where required support the outcomes of other units within a qualification structure

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CRITICAL EMPLOYABILITY SKILLS

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

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

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MEMCOM0023A: Perform internal/external customer service

Competency Descriptor: This unit deals with the skills and knowledge required to effectively perform internal/external customer service at the workplace, and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY		PERFORMANCE CRITERIA	
1.	Identify customer requirements	1.1	Customer requirements are identified from verbal or written communication.
		1.2	Degree to which customer requirements can be met is clearly communicated including details such as cost, delivery date, quantity or quality.
		1.3	Alternatives are proposed for any inability to completely satisfy customer requirements.
2.	Action customer requirements	2.1	Appropriate action is taken to implement customer requirements.
		2.2	Customer requirements that cannot be met are recorded and followed up on.

RANGE STATEMENT

This unit covers the knowledge and skills required for the provision of assistance to internal/external customers across a range of products and services.

Situations covered would go beyond simple sales and enquiries and could include taking one-off or special orders requiring detailed descriptions or handling of complaints.

Customers liaison can be undertaken through telephone, written, e-mail or face to face contact.

Typical applications of this unit would be found in service and maintenance departments.

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EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively performing internal/external customer service duties in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

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

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- organizations policy and procedures
- client services techniques
- the use of work schedules, charts, work bulletins and memos

Skills
The ability to:

- listen effectively
- work safely to instructions
- convey information in simple English to invoke correct actions
- perform internal/external customer service duties

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

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(6) Context of Assessment

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

The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work.

The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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MEMPLN0063A: Coordinate and manage basic installation projects

Competency Descriptor: This unit applies to the skills and knowledge necessary to coordinate and manage basic installation projects in a wide range of different contexts in the metal engineering and maintenance industry

Competency Field: Planning

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan and prepare to manage projects	1.1 Management of projects OH&S policies and procedures are planned and prepared to ensure these are followed.
	1.2 Project schedules are managed in accordance with requirements.
	1.3 Appropriate personnel are consulted to ensure projects are managed effectively.
	1.4 Projects are managed against requirements.
	1.5 Contribution is made to determine human resource and procurement management plans for projects in accordance with established procedures and checked against requirements.
2. Manage projects	2.1 Mechanisms are used to measure, record and report progress of activities in relation to the agreed project schedules and plans.
	2.2 Projects are managed in accordance with established procedures and requirements to achieve designated objectives.
	2.3 Records and documentation of project activities are maintained in accordance with established procedures to facilitate quality management and to provide an audit trail.
	2.4 Results of project activities are documented and evaluated in accordance with established procedures to determine compliance with agreed quality standards.
	2.5 Shortfalls in quality outcomes are reported in accordance with established procedures to enable appropriate action to be initiated.

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3.	Inspect and notify completion of work	3.1	Quality management issues and responses are reported in accordance with established procedures.
		3.2	Completion of projects are notified in accordance with established procedures.

RANGE STATEMENT

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

Project objectives may include:

- project manager responsibility
- behavioral aspect of project in terms of project personnel and coordinator
- work breakdown structure in coordinating projects
- tools and techniques for keeping the project on course
- pros and cons of working on projects

Nature of project may include:

- project plan
- project control
- project schedule (Gantt Chart/ Pert/CPM schedule network)
- the budget control

Projects may include:

- computer systems
- electrical equipment and systems
- electronics apparatus and systems
- instrumentation systems
- mechanical systems
- metal fabrication
- refrigeration and air conditioning systems

EVIDENCE GUIDE

Competency is to be demonstrated by the effective use of techniques to coordinate and manage basic installation projects within the range statement relative to the work orientation.

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(1) Critical Aspects of Evidence

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

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

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- OH&S policies and procedures
- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- organizations policy and procedures
- project schedules
- mechanisms used to measure, record and report progress of activities in relation to the agreed project schedules and plans
- tools and techniques for keeping the project on course
- pros and cons of working on projects
- budget control

Skills
The ability to:

- listen effectively
- work safely to instructions
- convey information in simple English to invoke correct actions
- prepare project schedules
- perform project control activities
- Coordinate and manage basic installation projects

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(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

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

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

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

(6) Context of Assessment

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

The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work.

The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

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CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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MEMMAH0093A: Coordinate materials

Competency Descriptor: This unit applies to the skills and knowledge necessary to coordinate 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. Plan for activities	1.1 Work activities are identified to comply with enterprise/site requirements
	1.2 Work, plant and resource requirements are identified from relevant information and documents
	1.3 Pre-operational checks are carried out in accordance with enterprise and site requirements
2. Control material requirements	2.1 Material request are adjusted to meet demands whilst observing enterprise requirements.
	2.2 Material details/requirements are monitored and assessed from orders, instructions and/or technical drawings.
	2.3 Quantities, price limitations and delivery requirements are assessed from orders/instructions.
3. Coordinate material	3.1 Systems are operated to meet requirements whilst observing limitations and ensuring standard operational procedures are followed.
	3.2 Systems are monitored and observed to detect deviations from requirements
	3.2 Causes of deviations are identified by analysing the technical and operational information.
	3.3 Corrective actions taken to rectify system deviations are in accordance with enterprise and site requirements. Purchasing schedules are adjusted where required to standard operational procedures.
	3.4 System integrity, personnel safety and continuity of material supply are maintained throughout

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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/material ordering schedules monitored and assessed to operating procedures and for pre-contracted suppliers/vendors.

Contracts/paperwork generated manually or electronically utilising on-site system.

Purchasing/ordering 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.

Work activities may include but not limited to:

- Managing materials – capacity, ordering, purchasing, forecasting, storage and distribution
- Planning materials – resources, requirements and control systems
- Scheduling materials – planning

Capacity management may include:

- making plans
- scheduling orders
- managing capacity requirement planning

Purchasing may include:

- selecting suppliers
- price determination
- establishing specification

Forecasting may include:

- collection and preparation of data
- using forecasting techniques
- tracking forecasts

Storage and distribution may include:

- inventory management
- warehouse management
- physical distribution system

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Control systems may include:

- data requirements
- order preparation
- scheduling

Order quantities may include:

- variations of order quantity
- order points
- stock levels

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 coordination 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
- material management
- material planning system
- material scheduling
- material requirement planning
- material activity control
- material purchasing
- material forecasting
- material order quantities and ordering systems
- material storage and distribution

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Skills
The ability to:

- work safely and accurately to instructions
- communicate effectively
- order materials relevant to related trade
- use documentation and record systems including the use of computers, information systems and business equipment technologies
- interpret orders, instructions manuals quality specifications and/or technical drawings
- purchase materials relevant to related area
- coordinate 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:

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

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

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

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

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

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(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

Collect, analyse and organise information	Level 3	
Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

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MEMCOR0063A: Attend to breakdowns in hazardous areas

Competency Descriptor: This unit applies to the skills and knowledge necessary to attend to breakdowns in hazardous areas in a wide range of different contexts in the metal engineering and maintenance industry.

Competency Field: Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA	
1. Prepare to attend breakdown	1.1	Nature of the breakdown is confirmed with appropriate personnel to establish the need to enter the hazardous area.
	1.2	Safety plan to enter the hazardous area is established in accordance with established procedures and
	1.3	Relevant clearance to do the work is obtained.
	1.4	Testing devices and tools, anticipated as being needed for the work, are obtained and checked for correct operation and safety.
2. Evaluate extent of work	2.1	OH&S policies and procedures for working in a hazardous area are followed.
	2.2	Other personnel required to determine cause and rectify breakdown is ascertained from available evidence and arrangements made for their attendance where applicable.
	2.3	Extent of repair work is ascertained from available evidence and confirmed with appropriate personnel.
	2.4	Limits of repair work that can be carried out in-situ are established with regards to explosion risk and in accordance with established procedures and requirements.
3. Arrange repair work	3.1	Equipment is isolated in accordance with established procedures.
	3.2	Circuits of equipment being withdrawn from service are terminated or isolated safely and in manner approved for the classification of the area.

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		3.3	Certification documentation for replacement equipment is sighted to ensure that it is identical with the equipment it replaces and is in accordance with the explosion-protection system design.
4	Confirm completion	4.1	Explosion-protected equipment and systems are inspected and tested after repairs are completed to ensure the integrity of the system.
		4.2	Appropriate personnel are notified of the completion of the repair work and details are documented in accordance with established procedures and requirements.

RANGE STATEMENT

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

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

Source of information:

- Working drawings/sketches
- Oral/written work instructions
- Maintenance schedules
- Maintenance records

Locations/conditions:

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

EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively attending to breakdown in hazardous areas in accordance with the range listed within the range of variables statement.

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(1) Critical Aspects of Evidence

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

- demonstrating consistent performance for each element of the unit.
- meeting the performance criteria associated with each element of competence by employing the techniques, procedures, information and resources available in the workplace.
- demonstrating an understanding of the Underpinning knowledge and skills identified in the section, of this unit titled 'Underpinning knowledge'.

Competence must be demonstrated in relation to the technique for which competency is sought. It is essential that working safely in a potentially hazardous area is demonstrated in relation to:

- work permits and clearance
- hazard monitoring and evacuation procedures
- plant and electrical isolation
- evaluating extent of breakdown
- interpreting certification documentation in relation to repair and replacement
- following established breakdown procedures

During assessment the individual will:

- demonstrate safe working practices at all times;
- demonstrate the ability to attend to breakdown in hazardous areas as related to the metal engineering and maintenance industry
- communicate information about tasks being undertaken to ensure a safe and efficient working environment;
- take responsibility for the quality of their own work;
- perform all tasks in accordance with standard operating procedures;
- perform all tasks to specification;
- use accepted engineering techniques, practices, processes and workplace procedures.

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication
- MEMCOR0141A Follow principles of occupational health and safety (OH&S) in work environment
- MEMCOR0161A Plan and undertake a routine task
- MEMCOR0191A Use hand tools
- MEMCOR0062A Attend to break down

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(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- Safe working requirements and procedures
- definition of a hazardous area;
- conditions that lead to an explosion meaning of the terms "combustion", "detonation" and "propagation"
- OH&S& NEPA responsibilities;
- parties responsible for safety of hazardous areas;
- definition of classes and zones
- combustible properties of materials
- electrical protection devices
- temperature limitations of wiring and equipment
- limitations on non-metallic and specific alloy enclosures
- requirements for detailed initial/sample and close/visual inspections standards and procedures for terminating and connecting cables
- standards and requirements for the installation of equipment and wiring
- selection and application of sealing compounds
- standards for wiring systems in hazardous areas
- arrangements for approval for use of equipment in a hazardous area

Skills
The ability to:

- use company documentation and record systems including the use of computers, information systems and business equipment technologies
- operate plant and equipment associated with a given workplace
- attend to breakdown as related to the metal engineering and maintenance industry
- identify classes, zones and groups characteristics of a hazardous areas
- Identify the responsibilities of OH&S & NEPA
- Attend to breakdowns in hazardous areas efficiently.

(4) Resource Implications

The following resources should be made available:

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

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(5) Method of Assessment

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

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

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

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

(6) Context of Assessment

Competency will be determined on evidence of having consistently performed across a representative range of activities and where required support the outcomes of other units within a qualification structure.

CRITICAL EMPLOYABILITY SKILLS

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Levels of Competency		
Level 1.	Level 2.	Level 3.
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Communicate ideas and information	Level 2	
Plan and organise activities	Level 2	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 1	
Solve problems	Level 2	
Use technology	Level 1	

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MEMCOR0083A: Estimate projects

Competency Descriptor: This unit deals with the skills and knowledge required for the evaluation of tenders, performing quantities take off, estimating and costing a project as outlined in scope of works. It is designed for individuals working in the maintenance and engineering industry.

Competency Field: Project Management

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Determine the methods of measurement.	1.1 The need for consistency in the approach for measurement of scope of work is determined.
	1.2 The standard methods of measurement for scope of work are identified; their structure and format are determined correctly.
2. Produce measured quantities from working drawings.	2.1 Measurement schedules are produced from secondary sources.
	2.2 Correct method of taking off quantities from drawings is identified and followed.
	2.3 Appropriate mathematical techniques are used to calculate measurements from working drawings.
	2.4 Item quantities are measured to two decimal places from working drawings.
	2.5 Item quantities for the specified activities are calculated.
3. Prepare bills of quantities for scope of works.	3.1 Standardised process in the preparation of bills of quantities is identified.
	3.2 Items are identified and described using common workplace terminology.
	3.3 Sizes and tolerance of items are established and documented in accordance with workplace procedures.
	3.4 Quantities are calculated and documented in accordance with workplace procedures.
	3.5 Measured types and quantities meet job requirements.

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		3.6	The bill of quantities is accurately produced, checked and verified.
4.	Prepare the estimate for bills of quantities.	4.1	Sources of information for pricing of work are identified.
		4.2	Units of measurements are clearly identified.
		4.3	Net unit rates are calculated for item descriptions in the bill of quantities.
		4.4	Gross unit rates are calculated for item descriptions in the bill of quantities.
		4.5	An estimate for the bill of quantities is accurately prepared using secondary sources of information.
5.	Determine payment details for a specified building project.	5.1	Methods of payment for project are described.
		5.2	Procedures for calculating interim valuations are described.
		5.3	Methods for calculating variations are described.
		5.4	Preparation of the final account is described.
6.	Document details and verify where necessary.	6.1	Details of costs are documented in accordance with organisational practice.
		6.2	Costs, calculations and/or other details are verified in accordance with organisational practice.
		6.3	Client quotation is prepared.
		6.4	Details are documented for future reference in accordance with organisational practice.

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RANGE STATEMENT

The range statement provides details of the scope of the elements and performance criteria to allow for differences within organisations and workplaces including practices, knowledge and requirements. The range statement also provides a focus for assessment and relates to the unit as a whole.

The following variables may be present for this particular unit:

Consistency of approach:

- layout - description unit of measurement dimensions
- requirement - coverage, definition, costing, uniformity

Standard methods of measurement:

- Jamaica Standard Methods of Measurement for Building Work (JSMM)
- Civil Engineering Standard Method of Measurement (CESMM3)

Structure of standard methods of measurement:

- JSMM (work sections)
- CESMM3 (work classifications)

Format of standard methods of measurement:

- JSMM (classification table, measurement, definition and coverage rules supplementary information)
- CESMM3 (first division, second division, third division notes)

Measurement schedules to include:

- doors
- windows
- finishes
- drainage
- roadways
- structures

Data to include:

- specifications
- working drawings
- manufacturer's product information

Mathematical techniques:

- arithmetic - addition, subtraction, multiplication, division, ratios, proportions, percentages
- geometric areas (square, triangles, trigonometric - Sin A, Cos A, tan A, Cosec A, Sec A, Cot A, sine rule, area of any triangle

Working drawings to include:

- plans
- elevations
- cross-sections
- details (two-store domestic building)

Items to include:

- windows
- doors – external/internal
- roof finishes
- pavement finishes

Quantities to include:

- linear
- square
- volume

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Process for preparing bill of quantities:

- abstracting
- billing

Bill of quantities to include:

- substructure and superstructure
  - earthwork
  - insitu concrete
  - masonry
  - reinforcement
  - drainage
  - pavement
  - preliminaries

Net unit rates:

- labour output for different soil types
- plant/machine output for different soil types
- materials

Calculated rates to include:

- earthwork excavation
- concrete
- reinforcement
- masonry block-work
- roof/ceiling and floor
- finishes – rendering, painting, paving

Calculations to include:

- ratios
- percentages
- additions
- subtraction
- multiplication
- division proportions

Specified building:

- specified section for two-storey domestic building

Measured quantities:

- description dimension

Sources of pricing information include:

- published price books
- manufacturers' prices
- hardware merchants' prices
- other contracts
- breakdown of labour and material costs

Gross unit rates:

- labour
- plant
- materials
- profit
- overheads and government/taxes

Price book rates to include:

- excavation
- earthwork

Secondary sources:

- calculated rates
- price book rates
- other contracts

Methods of payment:

- interim variations
- final account

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Procedures for interim valuations:

- measured work
- materials on site
- materials off-site
- variations
- prime cost sums
- provisional sums
- retentions
- intervals for payment

Final account:

- documentation
- final calculations
- payment of retention
- defects liability period

Methods of variations:

- bill rates
- pro-rata rates
- star rates
- day works
- contractor's quote

EVIDENCE GUIDE

The evidence guide relates directly to the performance criteria and range statement for this unit and will inform and provide guidance for assessment of the unit in the workplace and/or training programme.

In order to ensure consistency of performance, evidence is to be collected with a range of situations over a period of time.

(1) Critical Aspects of Evidence

- Compliance with occupational health and safety regulations applicable to workplace operations.
- Application of organisational management policies and procedures including quality assurance requirements where applicable.
- Demonstration of an understanding of the structure, format of standard methods of measurement for the construction industry
- Interpret drawings and specifications of plans and items of specified construction project.
- Document and communicate work-related information including: project requirements, products, materials and labour required, costing calculations for products, materials and labour, and special conditions.
- Use of calculators, computer programs and other aids in the estimation and cost calculation processes.

Measure and cost work for sections of two-story domestic building including:

- quantities of material required
- types and amount of labour required
- plant and equipment
- estimate overheads associated with the job

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(2) Pre-requisite Relationship of Units

Pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- the structure/format of standard methods of measurement used in the order of magnitude estimating – purpose and limitations
- concept of whole life cost
- time/cost/quality relationships
- direct cost/indirect cost/allowances
- methods of increasing accuracy of costs and estimates
- which areas of estimates have the most influence on accuracy of total estimate
- means of specifying resources in the categories of : finance, human resources, materials
- use of computer spread-sheet application
- producing payment details for construction work based on standard form of contract
- abstracting quantities for roadwork

Skills
The ability to:

- collect, organise and understand drawings, plans and other related documentations in order to take of measurements and prepare bill of quantities for construction work
- use mathematical ideas and techniques to correctly complete measurements, estimate material, labour and overhead requirements and accurately cost the project
- work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity
- use workplace technology related to measurement and costing of construction projects
- communicate ideas and information to enable confirmation of work requirements and specifications and the reporting of work outcomes and problems

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(4) Resource Implications

This refers to the resources that are necessary for undertaking the assessment.

If workplace based, the resources should relate specifically to organisation policies, guidelines, requirements, resources and equipment.

If an off the job or simulated work environment is used then resources should be generic and be applicable to a variety of work environments. Resources may include:

- access is required to real or appropriately simulated situations involving measurement and costing of construction projects
- access is required to specifications and costs of relevant of products, equipment and materials and information on labour costs, safety procedures, regulations, quality standards, and enterprise procedures
- access is required to all necessary facilities and associated equipment including calculators, computers and relevant software

(5) Method of Assessment

Assessment in a setting that stimulate the conditions of performance described in the elements, performance criteria and range statements that make up this unit

Assessment in the workplace, taking into account the range on variables affecting performance

Self-assessment on the same terms as those described above

Simulated assessment or critical incident assessment, provided that the critical incident involves assessment against performance criteria and an evaluation of underpinning knowledge and skill required to achieve the required performance outcomes

(6) Context of Assessment

Evidence may be gathered in a real or simulated environment on or off the job or by examination of a portfolio that could include examples of work, reports from clients, reports from management.

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CRITICAL EMPLOYABILITY SKILLS

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Levels of Competency		
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Communicate ideas and information	Level 2	
Plan and organise activities	Level 3	
Work with others and in team	Level 2	
Use mathematical ideas and techniques	Level 2	
Solve problems	Level 2	
Use technology	Level 2	

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BSBFLM0053A Support operational plan

Competency Descriptor: This unit deals with the skills and knowledge required for the frontline supervisor to actively engaged in planning, implementing, monitoring and recording performance to achieve the business plans of the team/organisation.

Competency Field: Business Management Services

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Plan resource use	1.1 Resource information for use in operational plans is collected, analysed and organised in consultation with colleagues and specialist resource managers.
	1.2 Operational plans contribute to the achievement of the organisation's performance/business plan.
	1.3 Key performance indicators are developed within operational plans.
	1.4 Contingency plans are prepared in the event that initial plans need to be varied.
2. Acquire resources	2.1 Employees are recruited and/or inducted within the organisation's human resource management policies and practices.
	2.2 Physical resources and services are acquired within the organisation's polices, practices and procedures.
3. Monitor operational performance	3.1 Performance systems and processes are monitored to assess progress in achieving profit/productivity plans and targets.
	3.2 Budget and actual financial information is analysed and interpreted to monitor profit/productivity performance.
	3.3 Unsatisfactory performance is identified and prompt action is taken to rectify the situation.
	3.4 Mentoring and coaching is provided to support individuals/teams use resources to the required standard.

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3.5 Recommendations for variation to operational plans are negotiated and approved by the designated persons/groups.

3.6 Systems, procedures and records associated with documenting performance are managed in accordance with the organisation's requirements.

RANGE STATEMENT

The scope and context of this unit of competence allow for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Legislation, codes and national standards relevant to the workplace, which may include

- award and enterprise agreements and relevant industrial instruments
- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- relevant industry codes of practice

NVQJ level 3 supervisors will normally be engaged in a workplace context where they:

- engage in short term planning within the department's business plans. For example, prepares a weekly schedule of outputs and/or outcomes to be achieved
- take responsibility for own outputs in work and learning. For example, assesses own performance and identifies the competencies which need to be upgraded/developed
- take limited responsibility for the output of others. For example, provides coaching support to assist individuals meet their performance requirements
- demonstrate some relevant theoretical knowledge. For example, explains the purpose of Key Performance Indicators to others
- perform a defined range of skills, usually within known routines, methods and procedures and within known time constraints. For example, provides services to internal customers within an agreed schedule
- apply known solutions to a variety of predictable problems. For example, within the organisation's standard procedures considers the options and, using some discretion and judgement, selects the preferred action to rectify faulty service to a customer
- interpret available information, using some discretion and judgement in work responsibilities. For example, interprets the continuous improvement processes, procedures and documentation used by the team and decides how to apply them to own work function

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Frontline management at level III normally operate in a relatively simple and routine workplace environment in which they use the organisation's:

- goals, objectives, plans, systems and processes
- business and performance plans
- access and equity principles and practice
- ethical standards
- quality and continuous improvement processes and standards
- defined resource parameters

OHS considerations may include:

- provision of information about OHS and the organisation's OHS policies, procedures and programs
- employee induction
- systems, procedures and records
- organisation's procedures for dealing with hazardous events
- key performance indicators include OHS

The organisation's policies, practices and procedures are:

- those which govern the acquisition of resources, for example, the purchase of equipment

Designated persons/groups may include:

- those who have the authority to make decisions and/or recommendations about varying operations

Resources may include:

- people
- power/energy
- information
- finance
- buildings/facilities
- equipment
- technology
- time

Operational plans are:

- the short term plans developed by the department/section to describe product/service performance

Colleagues and specialist resource managers may include:

- persons at the same level or more senior managers, and may include people from a wide range of social, cultural and ethnic backgrounds
-

EVIDENCE GUIDE

The critical aspects, underpinning knowledge and skills identified must be demonstrated to confirm competence for this unit.

(1) Critical Aspects of Evidence

- produces short term plans for department/section
- plans, acquires and uses resources
- monitors and adjusts operational performance
- reports performance

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(2) Pre-requisite Relationship of Units

Pre-requisites for this unit are:

- BSBFLM0023A Support leadership in the workplace
- BSBFLM0033A Contribute to effective workplace relationships
- BSBFLM0043A Participate in work teams
- BSBFLM0063A Provide workplace information and resourcing plans
- BSBCMN0113A Maintain workplace safety
- BSBFLM0093A Support continuous improvement systems and processes

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of:

- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- the principles and techniques of:
- planning operations
- resource planning
- resource management systems
- budgeting and financial analysis and interpretation
- monitoring performance
- reporting performance
- problem identification and resolution
- alternative approaches to improving resource usage and eliminating resource inefficiencies and waste
- ways of supporting individuals/teams who have difficulty in performing to the required standard

Skills
The ability to:

- access and use workplace information
- maintain a safe workplace and environment
- access and use feedback to improve operational performance
- prepare recommendations to improve operations
- access and use established systems and processes
- use coaching and mentoring skills to provide support to colleagues
- relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities

(4) Resource Implications

The following resources should be provided:

- access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

In order to achieve consistency of performance, evidence should be collected over a set period of time, which is sufficient to include dealings with an appropriate range and variety of situations

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(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statement.

Assessment must take account of the endorsed assessment guidelines in the Business Services Competency Package.

Assessment of performance requirements in this unit should be undertaken in an actual workplace or simulated environment.

Assessment should reinforce the integration of the Critical Employability Skills and the Business Services Common Competencies for the particular NVQ Level.

CRITICAL EMPLOYABILITY SKILLS

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

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

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

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

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BSBFLM0093A Support continuous improvement systems and processes

Competency Descriptor: This unit deals with the skills and knowledge required for the frontline supervisor to have an active role in managing the continuous improvement process in achieving the organisation's objectives.

Competency Field: Business Management Services

ELEMENT OF COMPETENCY	PERFORMANCE CRITERIA
1. Implement continuous improvement systems and processes	1.1 The manager actively encourages and supports team members to participate in decision making processes and to assume responsibility and authority.
	1.2 The organisation's continuous improvement processes are communicated to individuals/teams.
	1.3 The manager's mentoring and coaching support ensures that individuals/teams are able to implement the organisation's continuous improvement processes.
2. Monitor, adjust and report performance	2.1 The organisation's systems and technology are used to monitor progress and to identify ways in which planning and operations could be improved.
	2.2 Customer service is strengthened through the use of continuous improvement techniques and processes.
	2.3 Plans are adjusted and communicated to those who have a role in their development and implementation.
3. Consolidate opportunities for further improvement	3.1 Team members are informed of savings and productivity/service improvements in achieving the business plan.
	3.2 Work performance is documented and the information is used to identify opportunities for further improvement.
	3.3 Records, reports and recommendations for improvement are managed within the organisation's systems and processes.

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RANGE STATEMENT

The scope and context of this unit of competence allow for differences between enterprises and workplaces. It relates to the unit as a whole and facilitates holistic assessment.

The following variables may be present for this particular unit:

Legislation, codes and national standards relevant to the workplace, which may include:

- award and enterprise agreements and relevant industrial instruments
- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
- relevant industry codes of practice

NVQJ level 3, frontline supervisors will normally be engaged in a workplace context where they:

- engage in short term planning within the department's business plans. For example, prepares a weekly schedule of outputs and/or outcomes to be achieved
- take responsibility for own outputs in work and learning. For example, assesses own performance and identifies the competencies which need to be upgraded/developed
- take limited responsibility for the output of others. For example, provides coaching support to assist individuals meet their performance requirements
- demonstrate some relevant theoretical knowledge. For example, explains the purpose of Key Performance Indicators to others
- perform a defined range of skills, usually within known routines, methods and procedures and within known time constraints. For example, provides services to internal customers within an agreed schedule
- apply known solutions to a variety of predictable problems. For example, within the organisation's standard procedures considers the options and, using some discretion and judgement, selects the preferred action to rectify faulty service to a customer
- interpret available information, using some discretion and judgement in work responsibilities. For example, interprets the continuous improvement processes, procedures and documentation used by the team and decides how to apply them to own work function

Frontline supervisors at this level III normally operate in a relatively simple and routine workplace environment in which they use the organisations:

- goals, objectives, plans, systems and processes
- business and performance plans
- access and equity principles and practice
- ethical standards
- quality and continuous improvement processes and standards
- defined resource parameters

Technology will be:

- that readily available in the workplace and will be appropriate to frontline management's roles and responsibilities

Customer service may be:

- internal or external, to existing or new clients

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OHS considerations may include:

- implement and monitor participative arrangements for the management of OHS
- delegation and reporting complies with requirements of OHS legislation
- the continuous improvement processes of any OHS management system are implemented and monitored

EVIDENCE GUIDE

The critical aspects, underpinning knowledge and skills identified must be demonstrated to confirm competence for this unit.

(1) Critical Aspects of Evidence

- adjusts plans, processes and procedures to improve performance
- supports others to implement the continuous improvement system/processes
- identifies opportunities for further improvement

(2) Pre-requisite Relationship of Units

Pre-requisites for this unit are:

- BSBFLM0023A Support leadership in the workplace
- BSBFLM0043A Participate in work teams
- BSBFLM0053A Support operational plan
- BSBCMN0103A Deliver and monitor a service to customers
- BSBCMN0113A Maintain workplace safety.
- BSBCMN0123A Support innovation and change
- BSBFLM0113A Support a workplace learning environment

(3) Underpinning Knowledge and Skills

Knowledge
Knowledge of

- relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, and industrial relations
- the principles and techniques associated with:
  - continuous improvement systems and processes, benchmarking, and best practice
  - the benefits of continuous improvement
  - the quality approaches which the organisation may implement
  - the methods that can be used in continuous improvement
  - the barriers to continuous improvement

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Skills
The ability to:

- access and use workplace information
- use communication skills including researching, analysing and interpreting information from a variety of people and reporting
- monitor and evaluate systems, processes and procedures
- gain the commitment of individuals/teams to continuous improvement
- Consolidate opportunities for improvement
- deal with people openly and fairly
- use consultation skills effectively
- use coaching and mentoring skills to provide support to colleagues
- relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities

(4) Resource Implications

The following resources should be provided:

- access to appropriate documentation and resources normally used in the workplace

(5) Method of Assessment

In order to achieve consistency of performance, evidence should be collected over a set period of time, which is sufficient to include dealings with an appropriate range and variety of situations

(6) Context of Assessment

Competency is demonstrated by performance of all stated criteria, including paying particular attention to the critical aspects and the knowledge and skills elaborated in the Evidence Guide, and within the scope as defined by the Range Statement

Assessment must take account of the endorsed assessment guidelines in the Business Services Competency Package

Assessment of performance requirements in this unit should be undertaken in an actual workplace or simulated environment

Assessment should reinforce the integration of the Critical Employability Skills and the Business Services Common Competencies for the particular NVQ Level.

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CRITICAL EMPLOYABILITY SKILLS

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Use mathematical ideas and techniques	Level 1	
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Use technology	Level 1	

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