

Competency Standards for Caribbean Vocational Qualifications (CVQ)

CCMERA1007 CVQ Level 1 – Refrigeration and Air-Conditioning

Unit Code	Unit Title	Mandatory/ Elective
ME00151	Follow principles of occupational safety and health (OS&H) in the work environment	Mandatory
MEMCOR0131A	Undertake interactive workplace communication	Mandatory
ME00152	Use power tools	Mandatory
ME00153	Use hand tools	Mandatory
ME00154	Perform related computations (basic)	Mandatory
ME00155	Perform housekeeping duties	Mandatory
ME00156	Draw and interpret sketches and simple drawings	Mandatory
ME00157	Use graduated measuring devices	Mandatory
ME00158	Perform manual handling and lifting	Mandatory
ME00159	Use electrical/electronic measuring devices	Mandatory
MEMCOR0161A	Plan to undertake a routine task	Mandatory
ME00160	Perform mechanical procedures (residential)	Mandatory
ME00161	Perform electrical procedures (residential)	Mandatory
ME00162	Perform control and protection procedures (residential)	Mandatory
ME00163	Maintain system components (residential)	Mandatory
ME00164	Install air-conditioning, refrigeration and ventilation equipment and components (residential)	Mandatory
MEMCOM0023A	Perform internal/external customer service	Elective
BSBSBM0012A	Craft personal entrepreneurial strategy	Elective
MEMFAB0051A	Perform brazing and/or silver soldering	Elective
ME00165	Attach flexible cables and plugs to electrical machinery appliances and fixtures	Elective
ITICOR0011A	Carry out data entry and retrieval procedures	Elective

To achieve this qualification all mandatory competency standards and a minimum of any one (1) elective must be achieved.

ME00151: Follow Principles of Occupational Safety and Health (OS&H) in the work environment

Unit Descriptor:

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

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
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/mannufacturer'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 Safety and Health guidelines
		1.8	Occupational Safety and Health Commission guidelines demonstrated
2	Report workplace hazards	2.1	Workplace hazards identified during the course of work are reported to appropriate person according to standard operating procedures/factory act
3	Follow emergency procedures	3.1	Means of contacting the appropriate personnel and emergency services in the event of an accident demonstrated
		3.2	Emergency and evacuation procedure understood and carried out when required

RANGE STATEMENT

Equipment isolated in emergency procedures include : Basic numeracy includes:

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

Quality Assurance requirements include:

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

Personal protective equipment include:

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

Emergency procedures include:

- fire fighting
- medical and first aid
- evacuation

Power connections include:

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

Ladders and work platforms include:

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

Safety responsibilities include:

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

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are workplace and equipment safety requirements
2. what are material handling requirements
3. what are relevant acts, regulations and codes of practice
4. what is the company policy
5. how to work safely to instructions
6. how to use tools and equipment safely
7. how to select and use material, equipment and tools to standards
8. how to communicate effectively

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

- comply with Occupational Safety and Health regulations applicable to workplace operations
- apply organizational policies and procedures including Quality Assurance requirements where applicable
- carry out correct procedures prior to and during work activities
- use tools, plant and equipment safely and effectively
- carry out appropriate applications in accordance with regulatory and legislative requirements

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

MEMCOR0131A: Undertake interactive workplace communication

Competency Descriptor:

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

Competency Field:

Metal, Engineering and Maintenance

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

RANGE STATEMENT

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

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

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

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

Skills

The ability to:

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

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

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> 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.

ME00152: Use Power Tools

Unit 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.

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Select power tools	1.1	Select powered tools according to the task requirements
		1.2	Use power tools following a determined sequence of operations to produce desired outcomes
		1.3	Adhere to all safety requirements before, during and after use
2	Maintain power tools	2.1	Identify unsafe or faulty tools and mark for repair according to designated procedures
		2.2	Carry out operational maintenance of tools according to standard operational procedures, principles and techniques
		2.3	Store power tools safely in appropriate location according to standard operational procedures and manufacturer's recommendations

RANGE STATEMENT

Power tools include:

- drills
- grinders
- vacuum pump
- pressure washer

Operations include:

- clamping
- aligning
- adjusting

Applications include:

- adjusting
- dismantling
- assembling
- finishing
- cutting
- cleaning
- lubricating
- tightening

Outcomes include:

- finish
- size
- shape

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are workplace and equipment safety requirements and OSH guidelines
2. what are workshop procedures
3. what are technical applications
4. what are the power tools and equipment used
5. what are the materials used and how are they handled
6. how to work safely to instructions
7. how to apply appropriate hand-eye co-ordination in the use of tools
8. how to handle/hold materials during operation of tools
9. how to select appropriate tools for material usage
10. how to communicate effectively
11. how to use tools correctly

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

- use safe working practices at all times
- select and use appropriate power tools for hand held operations
- take responsibility for the quality of the 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) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

ME00153: Use Hand Tools

Unit 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.

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Select hand tools	1.1	Select appropriate hand tools according to the task requirements
		1.2	Use hand tools to produce desired outcomes to job specifications which may include finish, tension, size or shape
		1.3	Adhere to all safety requirements before, during and after use
2	Maintain hand tools	2.1	Identify unsafe or faulty tools and mark for repair according to designated procedures before, during and after use
		2.2	Carry out routine maintenance of tools, including hand sharpening according to standard operational procedures, principles and techniques
		2.3	Store hand tools safely in appropriate location according to standard operational procedures and manufacturer's recommendations

RANGE STATEMENT

Hand tools include:

- hacksaws
- hammers
- punches
- screwdrivers
- sockets
- wrenches
- scrapers
- chisels
- files of all cross-sectional shapes and types
- tube cutters
- flaring tools
- manifold gauge

Applications include:

- adjusting
- dismantling
- assembling
- finishing
- cutting
- scraping
- cleaning
- lubricating
- tightening
- simple tool repairs

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are workplace and equipment safety requirements and OSH guidelines
2. what are workshop procedures
3. what are technical applications
4. what are the hand tools and equipment used
5. how to handle materials whilst operating tools
6. how to work safely to instructions
7. how to apply appropriate hand-eye co-ordination in the use of tools
8. how to handle/hold materials during operation of tools
9. how to select appropriate tools for material usage
10. how to communicate effectively
11. how to use tools correctly

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

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

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

ME00154: Perform Related Computations (Basic)

Unit 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.

ELEMENTS

PERFORMANCE CRITERIA

Candidates must be able to:

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/percentages and mixed numbers using the four basic rules

RANGE STATEMENT

Simple projects include:

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

Basic numeracy includes:

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

Skills include:

- measurement
- calculations with fractions and decimals
- interpretation of drawings
- interpretation of diagrams
- interpretation of mathematical statements and formulae
- interpretation of numbers and arithmetic operations

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are drawings and specifications
2. what are measurement and calculations
3. how to perform numbers and arithmetic operations
4. how to perform calculations with fractions and decimals
5. what are percentages (some applications)
6. what are mathematical statements and formulae
7. how to read and interpret drawings
8. how to measure and calculate manually
9. how to record measurements
10. how to operate electronic calculating devices
11. how to communicate effectively

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- take responsibility for the quality of 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

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

ME00155: Perform Housekeeping Duties

Unit 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

ELEMENTS

PERFORMANCE CRITERIA

Candidates must be able to:

- | | | |
|---|--|---|
| 1 | Plan and prepare work | <ul style="list-style-type: none"> 1.1 Occupational Safety and Health (OSH) 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 are recognized and adhered to 1.4 Tools and equipment for handling materials/goods, nontoxic waste is selected and is consistent with job requirements 1.5 Tools and equipment for handling materials/goods are checked for serviceability and any faults reported to supervisor |
| 2 | Handle, sort and stack engineering /construction material manually | <ul style="list-style-type: none"> 2.1 Common engineering materials are recognized and selected for sorting and stacking/stockpiling to supervisor's instructions and/or specifications 2.2 Handling characteristics of materials are identified and appropriate handling techniques applied 2.3 Specific handling requirements for hazardous materials are applied 2.4 Materials are stored, stacked/stockpiled and protected clear of traffic ways so they can be easily identified and retrieved 2.5 Appropriate signage and barricades are erected where applicable in order to isolate stored materials from workplace traffic or access 2.6 Correct manual handling techniques are used |
| 3 | Handle and remove waste safely | <ul style="list-style-type: none"> 3.1 Waste materials are handled correctly and safely according to OSH and regulatory authorities requirements 3.2 Hazardous materials are identified for separate handling |

- 3.3 Non-toxic materials are removed using correct procedures
- 3.4 Dust suppression procedures are used to minimise health risk to work personnel and others
- 4 Clean up
 - 4.1 Tools and equipment are cleaned, maintained, and stored
 - 4.2 Unused materials are safely stacked/stockpiled and stored
 - 4.3 Waste materials are disposed of safely
 - 4.4 Site is cleaned and cleared of debris and unwanted material

RANGE STATEMENT

Tools and equipment include:

- brooms
- hoses
- shovels
- rakes
- wet and dry industrial vacuum cleaners
- wheel barrows
- pallet trolley
- materials hoists
- buckets

Protection of stacked/stored materials include:

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

Engineering materials include:

- 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

Dust suppression procedures include:

- spaying with water
- covering
- use of vacuum cleaner

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are workplace and equipment safety requirements including relevant codes and regulations
2. what are hand tools and equipment
3. what are the materials used and how to use them
4. what are quality assurance procedures
5. what is the range of communication mediums (verbal and non-verbal)
6. how to work safely to instructions
7. how to use hand and portable tools
8. how to handle materials
9. how to identify and select material
10. how to take measurements
11. how to communicate effectively
12. how to dispose of material safely
13. how to use disposal equipment and tools as required

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- adhere to Occupational Safety and Health regulations and Industry guidelines applicable to workplace operations
- comply with organisational policies and procedures including Quality Assurance requirements
- carry out correct procedures prior to and during application of materials handling processes
- follow safe and effective operational use of tools and equipment
- clean up area following safety requirements
- communicate with others to ensure safe and effective operations

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to

refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

ME00156: Draw and Interpret Sketches and Simple Drawings

Unit 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 engineering and maintenance industry

ELEMENTS

PERFORMANCE CRITERIA

Candidates must be able to:

- | | | | |
|---|--|-----|--|
| 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 |

RANGE STATEMENT

Technical drawing techniques include:

- perspective
- exploded views
- hidden view

Alphabet of line includes:

- object line
- hidden line
- centre line
- dimension

Drawing instrument and supplies include:

- drawings
- modules
- photographs

Measurement systems include:

- inch/foot system
- metric (SI) system

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are the types and use of drawing instruments and supplies
2. how to identify alphabet of lines, line type variation, order of usage and application on drawings
3. what are the types of scale and proportion and how they are used for measurement
4. what are the symbols, dimensions and terminology, types of drawings and their applications
5. how to estimate measurements
6. how to read and interpret simple drawings
7. how to measure accurately
8. how to communicate effectively

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

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

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

ME00157: Use Graduated Measuring Devices

Unit Descriptor:

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

ELEMENTS

PERFORMANCE CRITERIA

Candidates must be able to:

- | | | | |
|---|---|-----|---|
| 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 such as "zeroing" |

RANGE STATEMENT

Measuring devices include:

- pressure gauges
- squares
- levels
- thermometers
- measuring tapes

Measurements undertaken include:

- length /width/depth
- squareness
- angles
- measurements that can be read off
- analog, digital or other graduated devices
- plumbness

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are comparison devices
2. what are comparison measurements
3. what are comparative measurements
4. what are electrical/electronic devices
5. what are basic measuring devices
6. what are measuring instrument units, range and scale
7. what is the measuring instrument accuracy
8. how to follow instructions safely
9. how to use power tools and hand tools
10. how to use measuring devices
11. how to adjust measurements
12. how to handle material
13. how to select material
14. how to apply quality assurance procedures

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- apply safe working practices at all times
- 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 work
- perform all tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

ME00158:**Perform Manual Handling and Lifting****Unit Descriptor:**

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

ELEMENTS**PERFORMANCE CRITERIA**

Candidates must be able to:

1	Lift materials manually	1.1	Material weight is determined correctly utilizing most appropriate technique
		1.2	Lifting techniques are undertaken to safe work standards and standard operating procedures
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

Moving/shifting equipment include :

- hand trolleys
- wheelbarrows
- hand carts
- dedicated production or process lifting equipment
- rope
- backbrace

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are workplace and equipment safety requirements including relevant OSH guidelines and regulations
2. what is material classification
3. what are manual handling technique(s)/methods
4. what are handling processes
5. what is material identification, transportation and storage
6. what are handling tools and equipment
7. what is materials preparation
8. what is manual handling
9. what is weight determination
10. what are drawings, sketches, signage and instructions
11. how to work safely to instructions
12. how to communicate effectively
13. how to interpret related drawings, signage and instructions
14. how to use handling tools and equipment
15. how to identify/select material
16. how to identify/select handling method
17. how to handle material, tools and equipment
18. how to determine weights
19. how to identify/select materials relative to transportation and storage methods
20. how to manual handle material/equipment efficiently

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- comply with Occupational Safety and Health 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
- use safe and effective operational use of lifting equipment, tools, and attachments
- use correct procedures in manual handling
- give particular attention to safety and elimination of hazards
- demonstrate safe handling of material
- communicate with others to ensure safe operations
- use appropriate handling technique to produce designed outcome

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to

refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

ME00159: Use Electrical/Electronic Measuring Devices

Unit Descriptor:

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

ELEMENTS

PERFORMANCE CRITERIA

Candidates must be able to:

- | | | | |
|---|--|-----|---|
| 1 | Use electro-measuring devices to measure variables | 1.1 | Appropriate device or equipment and setting are selected to achieve required outcome |
| | | 1.2 | Appropriate connections are made to achieve required outcome according to standard operating procedures |
| | | 1.3 | Readings are obtained and interpreted correctly and conversion into the units of measurement made where necessary |
| 2 | Maintain electro devices | 2.1 | Routine care of devices undertaken according to manufacturer's specifications or standard operating procedures. |
| | | 2.2 | Store electro devices according to manufacturer's specifications |

RANGE STATEMENT

Measurement includes:

- voltage
- current
- frequency
- resistance
- temperature

Measuring devices include:

- analog/digital multimeters
- digital devices
- capacitor tester

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are comparison measurements
2. what are comparison devices
3. what are comparative measurements
4. what are measuring devices
5. what are electrical/electronic measurements
6. what are drawings and specifications
7. how to work safely to instructions
8. how to use power tools and hand tools
9. how to select equipment
10. how to apply quality assurance
11. how to read and interpret drawings and specifications
12. how to measure and calculate manually
13. how to record measurement
14. how to operate electronic measurement calculating devices

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

- apply safe working practices at all times
- measure and calculate manually
- operate electrical/electronic measuring devices
- record measurement
- perform tasks to specification
- use accepted engineering techniques, practices, processes and workplace procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

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



RANGE STATEMENT

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

Instructions may include but not limited to:

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

EVIDENCE GUIDE

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

(1) Critical Aspects of Evidence

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

During assessment the individual will:

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

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

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

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

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 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.

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

**(6) Context of Assessment**

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

CRITICAL EMPLOYABILITY SKILLS

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

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> 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.

ME00160: Perform Mechanical Procedures (Residential)

Unit Descriptor:

This competency unit deals with the skills and knowledge required for working in the refrigeration and air-conditioning industry. It deals with the skills and knowledge required to perform the mechanical task for the safe, effective and efficient operation of residential refrigeration and air-conditioning systems

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Recover and reuse the refrigerant	1.1	Select the recovery unit and material required to perform the recovery process
		1.2	Set up the recovery unit to recover the refrigerant according to international environmental protocols
		1.3	Perform the recovery process to remove and store the refrigerant according the manufacturer's instructions
2	Perform pressure testing operation	2.1	Select the pressure testing equipment according to the task and supervisor's instructions
		2.2	Set up the pressure testing equipment according to manufacturer's and company's instructions
		2.3	Pressure test the refrigeration system and components using the selected pressure testing equipment
3	Perform leak detection operation	3.1	Select the leak detection equipment according to the type of refrigeration system
		3.2	Use the selected leak detector to detect leaks and implement corrective action if necessary
4	Evacuate and charge the system	4.1	Select tools, material and equipment required to perform evacuation and charging according to the type of refrigeration system
		4.2	Set up the selected equipment to perform the evacuation and charging processes
		4.3	Perform evacuation process to remove air and moisture from the refrigeration system
		4.4	Perform the charging process using the correct quantity of refrigerant

- | | | | |
|---|--|-----|--|
| 5 | Remove, test and re-install major refrigeration components | 5.1 | Select the tools and material required for removal and installation of the major refrigeration components |
| | | 5.2 | Inspect, test, and troubleshoot the components for operation, durability and efficiency |
| | | 5.3 | Remove and install the refrigeration components according to manufacturer's and company's instructions |
| 6 | Remove, test and re-install refrigeration accessories | 6.1 | Select the tools and material required for testing, removal and installation of the refrigeration accessories |
| | | 6.2 | Inspect, test and troubleshoot the refrigeration accessories for operation, durability and efficiency |
| | | 6.3 | Remove and install the refrigeration accessories according to manufacturer's and company's instructions |
| 7 | Perform brazing and silver soldering operations | 7.1 | Select the tools and material required for brazing and soldering operations |
| | | 7.2 | Set up the brazing and soldering equipment according to manufacturer's instructions |
| | | 7.3 | Perform the brazing and soldering operations according to standard operating procedures |
| 8 | Maintain work area | 8.1 | Clear work area of equipment, tools and excess material to provide a safe work site |
| | | 8.2 | Dismantle, secure, clean and store equipment, components tools and material according to manufacturer's instructions |

RANGE STATEMENT

Residential refrigeration and air-conditioning equipment includes:

- refrigerators (frost and non-frost)
- deep freezers (frost and non-frost)
- window units
- mini-split air-conditioning systems (up to 5 tons)

Leak detection equipment includes:

- leak testing with halide torch
- leak testing with soap and water
- electronic leak detector
- ultrasonic leak detector
- dye leak detector

Pressure testing equipment includes:

- Nitrogen cylinder
- Nitrogen regulator set

Brazing methods includes:

- Oxy-acetylene welding
- Map gas

Equipment includes:

- recovery unit
- pressure testing equipment
- leak detection equipment
- evacuation equipment
- charging equipment

Charging methods includes:

- by weight
- by pressure/temperature
- by manufacturer's instructions
- by liquid

Charging equipment and materials include:

- measuring scales
- refrigeration manifold gauge
- refrigerants cylinder

Test methods include:

- refrigeration system high and low pressures
- pressure-temperature relationship
- visual

Components include:

- Hermetic Compressors
- Direct Expansion (DX) Evaporator
- Air-cool Condensers
- Metering device
 - capillary tube
 - orifice

Accessories include:

- filter driers
 - sweat on
 - flare type

Recovery includes:

- recovery equipment
- hoses
- filters
- recovery bottles with sensor
- measuring scale

Recovery methods include:

- vapor recovery
- liquid recovery

Evacuation method includes:

- triple evacuation

Evacuation equipment and material include:

- two-stage vacuum pump
- nitrogen gas

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are the principles of refrigeration (heat; heat transfer, temperature; pressure, pressure-temperature relationship; pressure-volume relationship; change of state), superheat and sub-cool
2. what are the components and operation of a practical refrigeration cycle
3. what is a filter drier and its direction and location in a refrigeration system
4. what are sweat on and flare type filter driers
5. what are the different types of refrigerant- CFC, HFC and HCFC
6. what are the properties and uses of refrigerants
7. what safety precautions should be taken in handling refrigerants
8. why is it necessary to recover recycle and reclaim refrigerants
9. what is the significance of the Montreal Protocol with regard to the refrigeration and air-conditioning
10. what are liquid and vapour recovery methods
11. what is recovery, reuse, recycling and reclaiming of refrigerants
12. what are the different types of leak detection equipment
13. how are leak detecting equipment used to detect leaks
14. what are the pressure testing equipment
15. what safety precautions should be taken when pressure testing the refrigeration system
16. what is the preferred pressure testing gas
17. what are the maximum pressures used for pressure testing the components and system
18. what are compound gauges
19. what is triple evacuation
20. what are the methods of charging a refrigeration system
21. what determines the discharge and suction pressure of the refrigeration system
22. why do some systems need to be liquid charged
23. how does the manifold gauge operate
24. what are hermetic compressors
25. what is the construction and operation of reciprocating, scroll and rotary compressors
26. what are the symptoms and problems of malfunctioning hermetic reciprocating, scroll and rotary compressors
27. what are the different types of evaporators, condensers and metering devices
28. what are the construction and operation of evaporators, condensers and metering devices
29. what are the symptoms and problems of defective evaporators, condensers and metering devices
30. what safety precautions should be taken when performing brazing and soldering on the refrigeration system
31. what is the difference between brazing and soldering
32. what is the difference between phosphorus zero percent and silver soldering rods
33. why is it important to introduce nitrogen during brazing

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- test, remove and install refrigeration components
- recover, reuse and recycle refrigerants
- pressure test the system
- detect leaks in the refrigeration system
- evacuate and charge a refrigeration system
- remove, test and reinstall major refrigeration components and accessories

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

ME00161: Perform Electrical Procedures (Residential)**Unit Descriptor:**

This competency unit deals with the skills and knowledge required for working in the refrigeration and air-conditioning sector. It deals with the electrical tasks required for the safe, effective and efficient operation of residential refrigeration and air-conditioning systems

ELEMENTS**PERFORMANCE CRITERIA**

Candidates must be able to:

1	Perform wire joining operation	1.1	Select the tools and material required for wire joining operations
		1.2	Perform the joining of wires according to the national codes and regulations
2	Select and use electrical test equipment	2.1	Select the electrical test instrument required for performing electrical tests
		2.2	Measure and interpret the voltage, resistance, continuity, amperage and capacitance using the required electrical test equipment
3	Remove, test and re-install single phase motors	3.1	Select the tools and electrical test instrument for testing, removal and re-installation of the single phase motor
		3.2	Determine the single phase motor common, start and run terminals according to manufacturer's instructions
		3.3	Test and troubleshoot the single phase motor to identify open, shunt or ground windings
		3.4	Remove, reinstall and re-wire single phase motors according to manufacturer's instructions
4	Read, trace and interpret wire diagrams	4.1	Select the tools required to wire the refrigeration and air-conditioning system
		4.2	Read the ladder and component diagrams and trace the wires on the refrigeration system
		4.3	Wire the refrigeration system according to the wiring and component diagrams
		4.4	Secure and store the tools and wiring diagrams in the respective locations
5	Test, remove and re-install start	5.1	Select the tools and electrical test equipment required for

components of single phase and hermetic compressor motors	testing, removal and installation of the motor start components
	5.2 Test the single phase motor start components using the selected tools and test equipment
	5.3 Remove, install and re-wire the single phase motor start components according to manufacturer's instructions.
6 Clean work area	6.1 Clear work area of equipment, tools and excess material to provide a safe work site
	6.2 Dismantle, secure, clean and store equipment, tools and material safely and correctly to prevent damage

RANGE STATEMENT

Residential refrigeration and air-conditioning equipment includes:

- Refrigerators (frost and non-frost)
- Deep freezers (frost and non-frost)
- Window units
- Mini-split air-conditioning systems (up to 5 tons)

Single phase motor start components include:

- current relay
- capacitor
- solid state relay
- potential relay

Joining operation includes:

- soldering
- screw connector
- crimp terminal connections

Single phase motor includes:

- Resistance start induction run motor (RSIR)
- Resistance start capacitor run motor (RSCR)
- Capacitor start capacitor run motor (CSR)
- Permanent split capacitor (PSC)

Wire diagrams include:

- ladder
- component arrangement
- pictorial

Tests include:

- voltage
- resistance
- continuity
- capacitance
- amperage measurement

Test equipment includes:

- multi meter
- clamp on amperage meter
- capacitance tester

Tools and equipment include:

- soldering irons
- crimping tools
- wire cutter and stripper
- pliers
- test equipment
- screw drivers

- Multi-speed single phase motors

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what is the basic construction and operation of single phase motors
2. how to identify Resistance start induction run motors (RSIR); Resistance start capacitor run motor (RSCR); Capacitor start capacitor run motor (CSR); Permanent split capacitor (PSC); Multi-speed single phase motors
3. what are the problems and symptoms of a defective single phase motor
4. how to identify single phase motor common, start and run terminals
5. what is the construction and operation of current and potential relay
6. what are the problems and symptoms of defective current and potential relays
7. what is the construction and operation of capacitors
8. how to identify start and run capacitors
9. what are problems and symptoms of defective capacitors
10. how to test voltage, resistance, current, continuity in a simple, series and parallel circuits
11. how to identify and use appropriate electrical test equipment
12. what are ladder, component and pictorial schematics diagrams
13. how to read wiring diagrams
14. what is a hermetic compressor motor

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

- remove, install and wire single phase motors
- identify single phase motors common, start and run terminals
- remove, install and wire the single phase motor starting gears
- join wires using solder
- read, interpret and use wiring or schematic diagram
- use test results to troubleshoot refrigeration systems
- adhere to safety rules and procedures
- perform all tasks according to established procedures
- report problems according to established procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those

required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

ME00162: Perform Control and Protection Procedures (Residential)

Unit Descriptor:

This unit deals with the skills and knowledge required to troubleshoot, remove and reinstall the controls and protective components which contribute to the control of the system and the protection of the residential refrigeration systems

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Test, remove and re-install thermostat	1.1	Select the tools required for testing, removal and re-installation of the thermostat
		1.2	Test the thermostat to determine its efficiency and effective operation
		1.3	Remove and reinstall the thermostat safely according to manufacturer's instructions
2.	Test, remove and re-install the defrost cycle components	2.1	Select the tools required for testing, removal and reinstallation of the defrost cycle
		2.2	Test the defrost timer, defrost heater and termination thermostat for proper operation according to manufacturer's instructions
		2.3	Remove and reinstall the defrost timer, defrost heater and termination thermostat according to manufacturer's procedures
3.	Test, remove and re-install the refrigeration protective devices	3.1	Select the tools required to test, remove and install the refrigeration protective devices
		3.2	Test the protective devices for effective and efficient operation using the appropriate tools
		3.3	Remove and replace the protective devices according to manufacturer's instructions
4	Clean work area	4.1	Clear work area of equipment, tools and excess material to provide a safe work site
		4.2	Dismantle, secure, clean and store equipment, tools and material safely according to manufacturer's instructions

RANGE STATEMENT

Residential refrigeration and air-conditioning equipment includes:

- Refrigerators (frost and non-frost)
- Deep freezers (frost and non-frost)
- Window units
- Mini-split air-conditioning systems (up to 5 tons)

Thermostat includes:

- Thermistor/circuit board
- In-line thermostat (takes load of compressor)

Protective devices include:

- external current overload
- internal current overload

Test equipment include:

- multi meter
- clamp on amperage meter

Defrost cycle includes:

- domestic defrost timers- electro/mechanical and electronic
- defrost heaters
- domestic termination(defrost) thermostat

Tests include:

- voltage
- resistance
- amperage measurement

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what is the construction and operation of the thermostat, defrost timer, defrost heater, termination thermostat, current overload internal and external
2. what are the problems and symptoms of a defective thermostat, defrost timer, defrost heater, termination thermostat and current external and internal overload
3. what is the basic operation of the electronic circuit board
4. what are the problems and symptoms of a defective electronic circuit board
5. what is voltage, resistance, current, continuity, magnetism, electromagnet, simple, series and parallel circuits
6. how to identify and use appropriate electrical test equipment

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

- test, remove and install thermostat
- test, remove and install defrost cycle components
- test, remove and replace refrigeration protective devices

- adhere to safety rules and procedures
- perform all tasks according to established procedures
- report problems according to established procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

ME00163: Maintain System Components (Residential)
Unit Descriptor:

This unit deals with the skills and knowledge required to perform routine maintenance procedures on filters, compressors, condensers, evaporators and fans. It involves the skills and knowledge required to inspect and clean the different components of the residential system

ELEMENTS**PERFORMANCE CRITERIA**

Candidates must be able to:

- | | | |
|---|---------------------|--|
| 1 | Service filters | 1.1 Select the tools required to service the filters of the system according to the manufacturer's instructions

1.2 Remove and inspect the filter for damage and cleanliness and implement corrective action if necessary

1.3 Wash and dry dirty filters according to manufacturer's instructions

1.4 Reinstall the filter according to the manufacturer's instructions to ensure proper operation of the system |
| 2 | Maintain compressor | 2.1 Select the tools required to maintain the compressor of the system

2.2 Clean compressor by removing dirt and rust using appropriate cleaning tools and material

2.3 Paint rusted parts of the compressor using company approved material

2.4 Inspect compressor suspension and joints for deterioration and leaks

2.5 Inspect motor and compressor wire terminals for corroded connections and implement corrective action where necessary |
| 3 | Maintain condenser | 3.1 Select tools required to maintain the condenser of the system

3.2 Examine coil and fan for physical damage which contributes to airflow restrictions

3.3 Examine motor power and control wiring for burns and corrosion |

-
- 3.4 Clean condenser and lubricate motor bearing according to manufacturer's instructions
 - 3.5 Remove and replace defective condenser coil safely according to supervisor's instructions
 - 3.6 Check joints of condenser and refrigerant piping connections for leaks and implement corrective action where necessary
 - 4 Maintain evaporator
 - 4.1 Select tools required to maintain the evaporator of the system
 - 4.2 Clean evaporator and lubricate motor bearing according to manufacturer's instructions
 - 4.3 Examine coil and fan for physical damage which contributes to airflow restrictions
 - 4.4 Examine motor power and control wiring for burns and corrosion and implement corrective action if necessary
 - 4.5 Remove and replace defective evaporator coil safely according to supervisor's instructions
 - 4.6 Check joints of evaporator and refrigerant piping connections for leaks and implement corrective action where necessary
 - 4.7 Inspect and clean the drain pan and drain pipe according to manufacturer's and company's instructions
 - 5 Service fans
 - 5.1 Select tools required for routine maintenance of fans of the system
 - 5.2 Clean and repair fan, fan housing and blades according to manufacturer's instructions
 - 5.3 Secure locking collars, keys and screws to prevent rotation of fans on shaft
 - 5.4 Check fan for direction, alignment and defects and implement corrective action if necessary
 - 5.5 Clean, repair or replace components not satisfying performance specifications
 - 6 Contribute to the maintenance or servicing of refrigeration system
 - 6.1 Select the tools required for maintenance of refrigeration system
 - 6.2 Check all pipes and hoses for damage, leaks and insulation

properties

- 6.3 Check and adjust refrigerant charge according to manufacturer's and company's instructions
- 6.4 Inspect wires for corrosion, burns and loose connections and take appropriate action if necessary
- 6.5 Measure and record system voltage and current draw using the company approved documents
- 6.6 Inspect capacitors for defects and take appropriate action if necessary

RANGE STATEMENT

Residential refrigeration and air-conditioning equipment includes:

- Refrigerators (frost and non-frost)
- Deep freezers (frost and non-frost)
- Window units
- Mini-split air-conditioning systems (up to 5 tons)

Filters include:

- disposable pleated paper type filters
- washable / reusable aluminum mesh filters
- electrostatic

Condensers include:

- air cool
 - natural convection
- force draft

Defects include:

- warping
- breakage and cracks
- loose shaft and hub
- corrosion
- broken and missing blades

Materials include:

- oil
- refrigerants
- coil cleaners

Compressors include:

- hermetic
 - reciprocating
 - rotary type
 - scroll type

Evaporators include:

- plate
- force draft

Tools and equipment include:

- multi-meter
- clamp-on ammeter
- wash pump
- leak detector
- oil can
- brazing/soldering equipment
- manifold gauge
- spray can

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are the types of filters, and fans
2. how to locate and access filters
3. what are appropriate methods for cleaning filters condensers, compressors, evaporators (and surroundings) and fans
4. what is the construction, operation, types and problems of capacitors
5. what are the different types of compressors, condensers, metering devices, evaporators, filter/driers
6. how to inspect compressor electrical terminals and conduct visual inspection
7. how to recognize signs of refrigerant leaks
8. how to inspect service valves, fan blades, motor brackets, grommets, wiring, and housings
9. how to inspect blower wheels, metering devices, motor and bracket, insulation
10. how to identify defects on fans
11. what is superheat and subcooling

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- service filters
- maintain compressors
- maintain condensers
- maintain evaporators
- conduct routine servicing of fans
- adhere to safety rules and procedures
- perform all tasks according to established procedures
- report problems according to established procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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

ME00164: Install Air-Conditioning, Refrigeration And Ventilation Equipment and Components (Residential)

Unit Descriptor:

This competency unit deals with the skills and knowledge required for working in the refrigeration and air-conditioning industry. It deals with the skills and knowledge required to perform installation activities for refrigeration and air-conditioning systems and installing the components of residential refrigeration and air-conditioning systems.

ELEMENTS

PERFORMANCE CRITERIA

Candidates must be able to:

- | | | |
|---|--|--|
| 1 | Prepare work locations | <ul style="list-style-type: none"> 1.1 Determine the best work location, condition and layout in accordance with the manufacturer's and company's work specifications 1.2 Determine the work location which is accessible and free from obstruction for the delivery and storage of materials and resources 1.3 Determine the indoor unit location which facilitates the condensate drainage 1.4 Record and report site defects and potential dangers to the appropriate personnel before work begins 1.5 Select the location for the air-cooled condensing equipment to ensure ample space for air movement and to conduct service and repairs |
| 2 | Install equipment and components | <ul style="list-style-type: none"> 2.1 Select components which are undamaged, of the appropriate type, quality and conforms to specifications 2.2 Select tools and material required for the installation of the equipment and components 2.3 Position and fix components according to manufacturer's and company's instructions |
| 3 | Contribute to the installation of pipes and tubing | <ul style="list-style-type: none"> 3.1 Select tools and materials required for the installation of pipes and tubing 3.2 Measure, flare, swage and cut pipes and tubing using the appropriate tools 3.3 Install insulation on pipes and tubing according to |

- supervisor's work instructions
- 3.4 Install the connecting pipes using the mechanical joining process
 - 3.5 Install clamps securely at the required spacing according to supervisor's instructions
4. Install drain pipe
 - 4.1 Select the tools and materials required for the installation of the drain pipe
 - 4.2 Install the drain pipe according to the supervisor's instructions
 - 4.3 Check drain pipe for flow and leaks and implement corrective action if necessary
5. Clean work area
 - 5.1 Clear work area of equipment, tools and excess material to provide a safe work site
 - 5.2 Dismantle, secure, clean and store equipment, tools and material safely and correctly to prevent damage

RANGE STATEMENT

Residential refrigeration and air-conditioning equipment includes:

- refrigerators (frost and non-frost)
- deep freezers (frost and non-frost)
- window units
- mini-split air-conditioning systems (up to 5 tons)

Tools and material includes:

- copper tubes
- tube cutter
- pipe insulation
- drier
- P.V.C. pipe and fittings (elbows, tees, etc.)
- fixing devices
- support brackets
- hand drills
- levels
- measuring tape

Work instructions include:

- written sketch
- verbal instructions
- safety requirement

Mechanical joining process includes:

- brazing and silver soldering process
- flaring and swaging
- joint sealing (rubber tex, PVC pipe)

Record documents include:

- job ticket
- job inspection forms

- flare and swaging tools
- ladders
- extension cords

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are safety requirements for preparing site
2. what are manufacturer's guidelines for positioning equipment
3. how to identify and use appropriate tools and equipment required for installation
4. what are the components required for installation
5. how to identify pipes, tubing and insulation according to size and type
6. how do you know that pipes, tubing are free from debris
7. how to identify and report potential disruption to normal activities
8. what are the components and operation of the refrigeration and air conditioning system
9. what are refrigeration system accessories
10. what are indoor and outdoor units
11. what are wall mounted, floor and ceiling units
12. why is insulation required on pipes
13. what are condensates

EVIDENCE GUIDE

(1) Critical Aspects of Evidence

Evidence should include a demonstrated ability to:

- prepare the work location for the required task
- follow procedures for installing pipes and tubing
- follow procedures for installation of equipment and components
- follow procedures for installing drain pipes
- adhere to safety rules and procedures
- perform all tasks according to established procedures
- report problems according to established procedures

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those

required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

**MEMCOM0023A: Perform internal/external customer service**

Competency Descriptor:

This unit deals with the skills and knowledge required to effectively perform internal/external customer service at the workplace, and applies to individuals working in the metal, engineering and maintenance industry.

Competency Field:

Metal, Engineering and Maintenance

ELEMENT OF COMPETENCY PERFORMANCE CRITERIA

1. Identify customer requirements	1.1	Customer requirements are identified from verbal or written communication.
	1.2	Degree to which customer requirements can be met is clearly communicated including details such as cost, delivery date, quantity or quality.
	1.3	Alternatives are proposed for any inability to completely satisfy customer requirements.
2. Action customer requirements	2.1	Appropriate action is taken to implement customer requirements.
	2.2	Customer requirements that cannot be met are recorded and followed up on.

RANGE STATEMENT

This unit covers the knowledge and skills required for the provision of assistance to internal/external customers across a range of products and services.

Situations covered would go beyond simple sales and enquiries and could include taking one-off or special orders requiring detailed descriptions or handling of complaints.

Customers liaison can be undertaken through telephone, written, e-mail or face to face contact.

Typical applications of this unit would be found in service and maintenance departments.



EVIDENCE GUIDE

Competency is to be demonstrated by safely and effectively performing internal/external customer service duties in accordance with the range listed within the range of variables statement.

(1) Critical Aspects of Evidence

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

(2) Pre-requisite Relationship of Units

- MEMCOR0131A Undertake interactive workplace communication

(3) Underpinning Knowledge and Skills

Knowledge

Knowledge of:

- basic level of ability in speaking
- basic level in reading
- basic level in writing English
- basic numeracy
- work place safety requirements
- organizations policy and procedures
- client services techniques
- the use of work schedules, charts, work bulletins and memos

Skills

The ability to:

- listen effectively
- work safely to instructions
- convey information in simple English to invoke correct actions
- perform internal/external customer service duties

(4) Resource Implications

The following resources should be made available:

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

(5) Method of Assessment

The candidate will be required to:

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

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

**(6) Context of Assessment**

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

The communication activities undertaken should be consistent with the individual's field of work and be based on interaction with others related to workplace tasks and procedures, tools, equipment, materials and documentation relevant to that field of work.

The competencies covered by this unit should be demonstrated by an individual working alone or as part of a team. Assessment should be conducted in an environment that the individual is familiar with.

CRITICAL EMPLOYABILITY SKILLS

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

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> 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.

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

- | 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 the respective regional country are correctly identified and explained.
1.3 The importance of entrepreneurship to economic development and employment is explained clearly.
1.4 The findings of research conducted on entrepreneurial ventures and successes in the Caribbean region are clearly presented in an appropriate format.
1.5 Differences between wage employment and entrepreneurial ventures are correctly stated. |
| 2. Identify and assess entrepreneurial characteristics | 2.1 Relevant research is carried out and required entrepreneurial characteristics identified.
2.2 Entrepreneurial characteristics identified are assessed and ranked.
2.3 An understanding of the process and discipline that enable an individual to evaluate and shape choices and to initiate effective action is correctly demonstrated.
2.4 Factors that will help an entrepreneur to manage the risk and uncertainties of the future, while maintaining a future orientated frame of mind, are identified. |

- | | | | |
|----|-----------------------------------|-----|---|
| 3. | Develop self-assessment profile | 3.1 | Self-assessment tools/methods to identify personal entrepreneurial potential are identified and properly used. |
| | | 3.2 | The ability to apply creativity, problem-solving techniques and principles to solve business related problems are demonstrated. |
| | | 3.3 | Feedback from others for the purpose of becoming aware of blind spots and for reinforcing or changing existing perceptions of strengths/ weaknesses is appropriately obtained. |
| 4. | Craft an entrepreneurial strategy | 4.1 | A profile of the past that includes accomplishments and preferences in terms of life and work styles, coupled with a look into the future and an identification of what one would like to do is developed. |
| | | 4.2 | Commitment, determination and perseverance; orientation towards goals; taking initiative and accepting personal responsibility; recognizing management competencies and identifying areas for development are determined. |
| | | 4.3 | Written guidelines to obtain feedback that is solicited, honest, straightforward, and helpful but not all positive or negative are developed to facilitate reviews. |
| | | 4.4 | Framework and process for setting goals which demand time, self-discipline, commitment, dedication and practice are developed. |
| | | 4.5 | Goals established are specific and concrete, measurable, relate to time, realistic and attainable. |
| | | 4.6 | Priorities, including identifying conflicts and trade-offs and how these may be resolved are established. |
| | | 4.7 | Potential problems, obstacles and risks in meeting goals are identified. |
| | | 4.8 | Specified action steps that are to be performed in order to accomplish goals are identified. |
| | | 4.9 | The method by which results will be measured is indicated. |

- 4.10 Milestones for reviewing progress and tying these to specific dates on a calendar are established.
- 4.11 Sources of help to obtain resources are identified.
- 4.12 Evidence of the ability to review process and periodically revise goals is demonstrated.

RANGE STATEMENT

At this stage of the entrepreneurial process the entrepreneur must be able to conduct a self-assessment profile, examine the frame work for self assessment, develop a personal entrepreneurial strategy, identify data to be collected in the self-assessment process and learn about receiving feedback and setting goals.

Concepts associated to include:

- risk
- entrepreneurship
- macro-screening
- micro-screening
- competition
- wage employment

Influencing factors to include:

- market conditions
- markets – demand/supply
- global trends
- level of economic activities
- funding
- economic stability
- social stability
- resources availability

The entrepreneur must be able to:

- understand the extreme complexity in predicting or aligning him/herself to specific careers in an environment of constant change
- determine the kind of entrepreneur he or she wants to become based on attitudes, behaviours, competencies, experience and how these fit with the requirements and demands for a specific opportunity
- evaluate thoroughly his or her attraction to entrepreneurship
- effectively develop personal plan
- utilize available information that will enhance his or her ability to achieve success

The entrepreneur may encounter setbacks if the planning process is not effectively pursued.

Pitfalls may include:

- proceeding without effective planning which may result in commitment to uncertainty
- commitment to a premature path with the desirability of flexibility can lead to disaster
- personal plans fail for the same reasons as business plans including frustration if the plan appears not to be working immediately and the challenges of changing behaviour from an activity-oriented routine to one that is goal oriented
- developing plans that fail to anticipate obstacles, and those that lack progress milestones and reviews

EVIDENCE GUIDE

Competency is to be demonstrated when the entrepreneur is able to undertake a personal entrepreneurial assessment exercise to determine if he or she possesses the necessary credentials to be a successful entrepreneur. This stage of the entrepreneurial process is critical since experience has shown that the founder is one of the deciding forces if the venture is to succeed and prosper.

(1) Critical Aspects of Evidence

The entrepreneur will be assessed by his/her action in developing an orchestrated plan in order to effectively pursue the business concept.

(2) Pre-requisite Relationship of Units

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

Knowledge of:

- personal entrepreneurial profile systems
- effective management systems: marketing, operations/productions, finance, administration, law
- how to measure feedback
- the method of developing a personal plan and a business plan
- understanding the difference between entrepreneurial culture and management culture

Skills

The ability to:

- determine barriers to entrepreneurship
- minimize exposure to risk
- exploit any available resource pool
- tailor reward systems to meet a particular situation
- effectively plan and execute activities
- use computer technology to undertake assessments

(4) Resource Implications

The following resources should be made available:

Personal computer with access to the internet and appropriate software that will enable one to conduct the necessary analysis using the internet

(5) Method of Assessment

A useful method of assessment is to determine if the venture can stand up to the test of critical evaluation.

(6) Context of Assessment

This stage of the entrepreneurial process is assessed when comparisons are made between actual outcomes and plans/projections.

CRITICAL EMPLOYABILITY SKILLS

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

Levels of Competency		
Level 1	Level 2	Level 3
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> 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.

**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	<ul style="list-style-type: none">1.1 Job requirements determined from specifications and/ or instructions.1.2 Materials correctly prepared using appropriate tools and techniques.1.3 Materials correctly assembled/aligned to meet specifications as required.1.4 Distortion prevention measures identified and appropriate action taken as required.1.5 Heating equipment assembled and set up safely and correctly in accordance with standard operating procedures.1.6 Correct and appropriate consumables selected and prepared.1.7 Test run undertaken and verified as required.
2. Braze and/or silver solder	<ul style="list-style-type: none">2.1 Correct and appropriate process selected to meet specifications.2.2 Materials preheated as required.2.3 Consumables applied using correct and appropriate techniques.2.4 Jointing material applied correctly and in appropriate quantities to meet job/specifications.2.5 Correct temperatures using appropriate techniques.



- | | | | |
|----|----------------|-----|---|
| 3. | Inspect joints | 3.1 | Excess jointing materials removed using correct and appropriate techniques. |
| | | 3.2 | Inspection of joints undertaken using standard operating procedures and meeting specifications. |
| | | 3.3 | Inspection results 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

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



Critical Aspects of Evidence (Cont'd)

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

(2) Pre-requisite Relationship of Units

- MEMCOR0141A Apply principles of occupational health and safety (OH&S) in work environment
- MEMCOR01611A Plan and undertake a routine task
- MEMCOR0171A Use graduated measuring devices
- MEMCOR0081A Mark off/out (general engineering)
- MEMCOR0121A Classify engineering materials
- MEMCOR191A Use hand tools

(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/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 orally, or by other methods of communication:

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

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

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

(6) Context of Assessment

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

The assessment environment should not disadvantage the candidate.

CRITICAL EMPLOYABILITY SKILLS

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

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> • Carries out established processes • Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> • Manages process • Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> • 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.

ME00165: Attach Flexible Cables and Plugs To Electrical Machinery Appliances and Fixtures

Unit Descriptor:

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

ELEMENTS		PERFORMANCE CRITERIA	
Candidates must be able to:			
1	Plan and prepare to attach flexible cable(s) and plug(s)	1.1	Work is planned and prepared to ensure OSH policies and procedures are followed, and the work is appropriately sequenced in accordance with requirements
		1.2	Condition and ratings under which the flexible cable(s) and plug(s) is to operate is determined from requirements and in consultation with appropriate personnel followed by written instruction
		1.3	Flexible cable(s) and plug(s) are selected to comply with standards and requirements for the condition and rating to be determined
		1.4	Materials necessary to complete the work are obtained in accordance with established procedures and checked against job requirements
		1.5	Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety
		1.6	Flexible cable(s) is prepared without damage to insulation and conductors and in accordance with requirements
2	Attach flexible cable(s) and plug(s)	2.1	OSH policies and procedures are followed
		2.2	Single insulated metal-framed equipment is earthed in accordance with requirements
		2.3	The integrity of double insulated equipment is maintained in accordance with requirements
		2.4	Conductors are connected to terminals in accordance with requirements to ensure the required polarity is affected
3	Test equipment for operation and safety	3.1	Appropriate tests of the cables(s) and plug(s) connected to the electrical equipment are conducted in accordance with

requirements and to established procedures to ensure safe installation and operation

- | | | | |
|---|--------------------------|-----|---|
| 4 | Provide status report(s) | 4.1 | Status report(s) are completed and notified in accordance with established procedures |
|---|--------------------------|-----|---|

RANGE STATEMENT

Work includes:

- preparing to disconnect electrical equipment
- disconnect electrical equipment
- prepare to reconnect electrical equipment
- test the reconnected electrical equipment for safe operation
- provide status reports
- testing to ensure safety, including earth continuity and insulation integrity
- OSH practice
- determining electrical characteristics of equipment
- isolating equipment –unplug or disconnection switch
- disconnection techniques
- reconnection techniques
- applying techniques, procedures, information and resources relevant to performance

Electrical characteristics include:

- voltage
- current rating
- power rating
- direction of rotation
- name plates information and duty

Electrical equipment includes:

- refrigeration and air-conditioning systems
- pre-assembled
- electrical heaters
- motors

UNDERPINNING KNOWLEDGE & SKILLS

Candidates must know:

1. what are the hazards in the (electrical) work environment: shock hazards; fire hazards; chemical hazards
2. what are the procedures for dealing with fires associated with electrical equipment
3. what are procedures for dealing with PCBs
4. what are fundamental electrical concepts: current; voltage; resistance
5. what are circuit isolation and protection devices
6. what are isolation procedures: work clearance; testing for voltage; lock-off and tagging; techniques, regulation, codes of practice and procedures up to 1,000Volts A.C./1,500Volts D.C. appliance/electrical equipment applications
7. what are basic principles of appliance/electrical equipment (non mathematical)
8. what is equipment identification; appliance/electrical equipment ratings
9. what are the basic principles of operation of control equipment and protection devices; fault conditions and symptoms
10. what are the test equipment
11. what are safe testing procedures, including continuity; fault types in appliances/electrical equipment; fault-finding procedures (prescriptive)
12. what are circuit connections and functions: open circuit; closed circuit; short circuit
13. what is basic voltage, current and resistance measurement and calculation
14. what is insulation resistance measurement and requirements
15. what are cable types and conductor termination methods and techniques
16. what are colour codes
17. what are cable ratings up to 1,000Volts A.C./1,500Volts D.C. flexible cords/cables for use with single phase appliances/apparatus
18. what is service duty up to 1,000Volts A.C./ 1,500Volts D.C.
19. what plugs are used for single phase applications/apparatus
20. what is IP rating
21. what is continuity testing
22. what are connection requirements and techniques
23. what is safety testing
24. how to work safely to instructions
25. how to use tools and plant
26. how to use ladders and elevated work platforms
27. how to ensure equipment is safe to connect to supply
28. how to return equipment to service
29. how to position and fix fixtures in place
30. how to connect wires to terminals, plugs and electrical equipment

EVIDENCE GUIDE**(1) Critical Aspects of Evidence**

Evidence should include a demonstrated ability to:

- plan and prepare work to OSH procedures and policies
- select the materials to perform the tasks
- obtain and use tools, equipment and testing devices

- complete reports according to company approved procedures
- attach flexible cable and plugs to electrical equipment to 1,000 Vac/1,500 VDC
- communicate information about processes, events or tasks being undertaken to ensure a safe and efficient working environment
- plan tasks in all situations and review task requirements as appropriate
- perform all tasks in accordance with standard operating procedures
- perform all related tasks to specification

(2) Method of Assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

(3) Context of Assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. 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.

ITICOR0011A: Carry out data entry and retrieval procedures

Competency Descriptor:

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

Competency Field: Information Technology and Communications - Operations

ELEMENT OF COMPETENCY PERFORMANCE CRITERIA

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

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

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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

Input devices:

- keyboard
- mouse
- scanner
- microphone
- camera

Software systems to include for:

- word processing
- spread sheet
- internet access

Files save on:

- network
- magnetic media
- personal PC

Data:

- textual
- numerical
- graphical

File operations:

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

Maintenance:

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

EVIDENCE GUIDE

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

(1) Critical Aspects and Evidence

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

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

(2) Pre-requisite Relationship of Units

The pre-requisite for this unit is:

- Nil

(3) Underpinning Knowledge and SkillsKnowledge

knowledge of:

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

Skills

The ability to:

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

(4) Resource Implications

Files saved on network, magnetic media, personal Computer

Input devices: Keyboard, mouse, other selection devices

(5) Method of Assessment

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

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

(6) Context of Assessment

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

CRITICAL EMPLOYABILITY SKILLS

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

Levels of Competency		
Level 1.	Level 2.	Level 3.
<ul style="list-style-type: none"> Carries out established processes Makes judgement of quality using given criteria 	<ul style="list-style-type: none"> Manages process Selects the criteria for the evaluation process 	<ul style="list-style-type: none"> 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.