

INSTALL, SERVICE AND REPAIR REFRIGERATION UNITS

UNIT CODE: ENG/OS/RAC/CR/01/5/A

UNIT DESCRIPTION

This unit covers the competencies required to install, service and maintain refrigeration units. It also covers competencies for identifying and repairing faults, performing refrigerant recovery/recycling and retrofitting on refrigeration units as well as performing test-run on installed/repaired units.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range</i>
1. Conduct site survey	1.1. <i>Site conditions</i> and <i>installation requirements</i> are assessed according to manufacturer's specification 1.2. <i>Tools, equipment</i> and <i>materials</i> needed for installation are determined according to site conditions and site installation requirements 1.3. Site survey report is prepared in accordance with work place procedures 1.4. Safety procedures are adhered to according to workplace procedures and OSHA
2. Install electrical wiring for refrigeration unit	2.1 Electrical cabling and <i>wiring devices</i> are selected and safely installed in line with manufacturer's instructions and IEE regulations 2.2 Electrical circuit is tested in accordance with IEE regulations
3. Install refrigeration unit	3.1 Tools equipment and materials are assembled according to workplace procedures 3.2 <i>Unit</i> and components are prepared based on work place procedures 3.4 Unit is installed according to work place procedures and manufacturer's specifications. 3.5 Unit is positioned and leveled in line with manufacturer's specifications 3.6 Safe handling techniques are employed in line with manufacturer's specifications and OSHA 3.7 Voltage and current are ascertained according to unit's ratings.

	<p>3.8 Temperature settings are performed according to user requirements</p> <p>3.9 Unit is handed over to user as per work place procedures</p> <p>3.10 Installation report is prepared in line with workplace procedures.</p>
4. Service refrigeration unit	<p>4.1 Tools, equipment and materials are selected as per workplace procedures</p> <p>4.2 Refrigeration unit components are serviced and maintained according to manufacturer's specifications</p>
5. Identify and repair faults in refrigeration unit	<p>5.1 Appropriate diagrams, charts and manuals are interpreted in line with the job requirements</p> <p>5.2 Safe working practices are observed throughout the task as per work place procedures</p> <p>5.3 Tools, equipment and instruments are selected and used in line with job requirements</p> <p>5.4 Refrigeration unit components are tested following manufacturer's manuals</p> <p>5.5 Faulty components are repaired or replaced in line with manufacturer's manuals</p> <p>5.6 Refrigeration unit requiring recovery/recycling is identified</p> <p>5.7 Refrigerant recovery/recycling is performed according to manufacturer's manuals</p> <p>5.8 Retrofitting/conversion is performed according to manufacturer's manuals</p> <p>5.9 Housekeeping is performed</p> <p>5.10 Work is completed in line with workplace procedures and environmental legislations</p>
6. Test-run installed/ repaired unit	<p>6.1 Unit is tested in line with manufacturer's specifications</p> <p>6.2 Report is prepared in line with work place procedures</p> <p>6.3 Unit is commissioned and handed over to the user according to workplace procedures</p>

RANGE

This section provides work environment and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
1. Refrigeration unit may	<ul style="list-style-type: none"> • Refrigerators

include but not limited to:	<ul style="list-style-type: none"> • freezers • Water dispensers • Wine chillers • Bottle coolers • Ice makers
2. Tools, equipment and instruments may include but not limited to:	<ul style="list-style-type: none"> • Pliers • Screwdrivers • Hammers • Chisels • Spirit levels • Phase testers • Files • Fin combs • Nut drivers • Socket wrenches • Brazing equipment • Arc welding equipment • Multi-meters • Leak detectors • System analyzers • Recovery/recycling units • Weighing balance • Vacuum pumps • Refrigerant identifier • Clamp on ammeters • Lock ring tools
3. Refrigeration unit components may include but not limited to:	<ul style="list-style-type: none"> • Electrical controls <ul style="list-style-type: none"> • Thermostats • Defrost timers • Defrost sensors • Thermo discs • Relays • Switches • Compressors • Fan motors • Capacitors • Electronic control cards • Defrost heaters

	<ul style="list-style-type: none"> • Overload protectors
4. Environmental legislations may include but not limited to:	<ul style="list-style-type: none"> • Environmental Management Coordination Act • ISO standards on environment 140001
5. Materials may include but not limited to:	<ul style="list-style-type: none"> • Insulators • Cables • Socket outlets • Conduits and trunkings • Refrigerants • Lubricating oil

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Interpreting diagrams
- Preparing materials
- Handling of tools, equipment and instruments
- Testing electrical systems
- Tube processing
- Safe handling of refrigerants and lubricants
- Recovering/recycling refrigerants
- Retrofitting and conversion
- Brazing
- Installation of refrigeration units
- Troubleshooting

Required Knowledge

The individual needs to demonstrate knowledge of:

- Personal protective equipment
- Uses and handling of tools, equipment and instruments
- Safety signs and symbols
- Housekeeping
- Interpretation of diagrams
- Uses and specifications of refrigerants, refrigeration oil and refrigeration components

- Fundamentals of electrical installation
- Basic electronics
- Refrigeration principles
- Recovery/recycling process
- Retrofitting and conversion process
- Motor insulation testing procedure
- Wiring resistance testing procedure
- Compressor operations
- Motor starters
- Motors protection
- Relevant legislation

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1. Critical aspects of competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Adhered to safety procedures 1.2 Diagnosed refrigeration faults 1.3 Recovered/recycled refrigerants 1.4 Repaired and retrofitted refrigeration unit 1.5 Tested and commissioned refrigeration unit 1.6 Observed good housekeeping 1.7 Installed refrigeration units 1.8 Prepared installation and service reports
2. Resource implications	<p>The following resources must be provided:</p> <ul style="list-style-type: none"> 2.1 Work place location and refrigeration systems 2.2 Tools, equipment and instruments for installing, servicing and repairing refrigeration system 2.3 Materials relevant to the task 2.4 Diagrams, manufacturer's specifications and manuals relevant to the task
3. Methods of assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Demonstration 3.2 Direct observation with oral questioning 3.3 Written tests 3.4 Portfolio 3.5 Third party reports

4. Context for assessment	Competency may be assessed individually on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment or during industrial attachment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the sector, workplace and job role is recommended.

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