Australian Government

UEENEEJ106A Install refrigerant pipe work, flow controls and accessories

Release: 4

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEJ106A Install refrigerant pipe work, flow controls and accessories

Modification History

Release	Action	Core/Elective	Details	Points
2	Update	N/A	Concurrent Assessment Unit to UEENEEJ107A	N/A

Unit Descriptor

Unit Descriptor **1)**

1.1) Descriptor

This unit covers the installation, in buildings and premises, of refrigerant piping/tubing, fittings, flow controlsand accessories for refrigeration and air conditioning systems. It encompasses working safely and to installation standards, routing pipe work to specified locations, connecting components and accessories and documenting installation work.

Application of the Unit

Application of the Unit **4)**

This unit is intended for competency development entry-level employment-based programs incorporated in approved contracts of training. It is suitable for augmenting previously acquired competencies.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may, in some jurisdictions, require a license to practice in the workplace subject to regulations for undertaking refrigeration and air conditioning work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:
1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Pre-Requisites

Prerequisite Unit(s) **2)**

2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE137A	Document and apply measures to control OHS risks associated with electrotechnology work
UEENEEJ102A	Prepare and connect refrigerant tubing and fittings

Prerequisite Unit(s) **2)**

UEENEEJ103A	Establish the basic operating conditions of vapour compression systems
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

Employability Skills Information

Employability Skills **3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA	
1 Prepare to install pipe work, flow controls and accessories	1.1	OHS procedures for a given work area are identified, obtained and understood
	1.2	Established OHS risk control measures and procedures in preparation for the work are followed
	1.3	Safety hazards which have not previously been

ELEMENT	PERFORMANCE CRITERIA	
		identified are noted and established risk control measures are implemented
	1.4	Pipe work, flow control and accessory installation is appropriately sequenced in accordance with job schedule
	1.5	The nature and location of the work is determined from documentation or appropriate person(s) to establish the scope of work to be undertaken
	1.6	Pipe work routes are planned within the constraints of the building structure, (heritage) significants, specifications and regulations
	1.7	Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site
	1.8	Materials needed install pipe work, flow controls and accessories are obtained in accordance with established procedures and checked against job requirements
	1.9	Tools, equipment and testing devices needed to install the pipe work, flow controls and accessories are obtained in accordance with established procedures and checked for correct operation and safety
	1.10	Preparatory work is checked to ensure no damage has occurred and complies with requirements
2 Install pipe work, flow controls and accessories	2.1	OHS risk control measures and procedures for carrying out the work are followed
	2.2	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OH&S requirements and procedures
	2.3	Pipework, flow controls and accessories are installed to comply with technical standards and job specifications and requirements with sufficient access to affect connections and maintenance
	2.4	Pipework, flow controls and accessories are installed straight and square in the required locations and within acceptable tolerances

ELEMENT	PERFORMANCE CRITERIA	
	2.5	Refrigerant tubing and fittings are silver brazed with the use of dry nitrogen to prevent contamination
	2.6	Problematic situations that arise from the installation of the pipe work, flow controls and accessories are dealt with in an appropriate manner.
	2.7	Ongoing checks of the quality of pipe work, flow controls and accessories are undertaken including pressure testing and repair of leaks in accordance with the relevant technical standards and specifications and established procedures
	2.8	Checking operation, adjusting settings and replacement of flow controls
	2.9	Pipe work, flow controls and accessories areinstalled efficiently without waste of materials, damage or contamination to apparatus and the surrounding environment or services and using sustainable energy practices
3 Completion of pipe work, flow controls and accessories installation.	3.1	OHS risk control measures and procedures at the completion of work are followed
	3.2	Work site is cleaned and made safe in accordance with established procedures
	3.3	Final check of the installed pipe work is made to verify that it complies to all requirements
	3.4	'As-installed' pipe work, flow controls and accessories are documented and an appropriate person or persons notified in accordance with established procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and installing pipe work for refrigeration and air conditioning systems.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EJ106A Refrigerant pipework, flow controls and accessories

Evidence shall show an understanding of refrigerant pipework, flow controls and accessories, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1 Environmental and building regulation

- types of heritage listings
- purpose and principles of regulations related maintaining heritage sites
- responsibilities of those working in and around heritage sites
- scope of environmental protection and related regulations
- purpose and principles of regulations related to environmental protection
- responsibilities of those working in and around environmentally protected sites
- the protocols for working in and around protected environments and heritage sites.

T2 Refrigeration pipework

- appropriate piping arrangements for refrigerant lines including discharge lines, liquid lines, suction lines
- position of equipment in relation pipework
- requirements for vertical and horizontal pipe runs.
- requirements for oil return and prevention of flood back
- techniques for the prevention of noise and vibration
- insulation requirements and materials
- pipework insulation requirements, including relevant technical standards, regulations and codes
- pipe work installation techniques
- insulation requirements and materials

T3 Refrigerant pipework accessories

- types
  - including pipe work fittings, hand valves, isolation valves, solenoid valves,

REQUIRED SKILLS AND KNOWLEDGE

check valves, reversing valves, filter/dryers, sight glasses, accumulators, oil separators, pressure relief devices

- applications
- operation
- location and installation
- testing
- replacement

T4 Refrigerant liquid flow controls and distributors

- types
  - including capillary, hand expansion valve, thermostatic expansion valve, thermo-electric expansion valve, electronic expansion valve, low side floats, high side floats, liquid level controllers
- applications
- operation
- location and installation
- testing and adjusting settings
- replacement

T5 Refrigerant vapour flow controls

- types
  - including evaporator pressure regulators, crankcase pressure regulators, condenser bypass valves, electronic valves/controllers
- applications
- operation
- location and installation
- testing and adjusting settings
- replacement

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. .

The Evidence Guide forms an integral part of this Unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

EVIDENCE GUIDE

Overview of Assessment

9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence decisions about how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

Critical aspects of evidence required to demonstrate competency in this unit

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

EVIDENCE GUIDE

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
  - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
  - Demonstrate an appropriate level of skills enabling employment
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Install refrigerant pipe work, flow controls and accessories for refrigeration and air conditioning systems as described in 8) and including:

A Reading and interpreting drawings related to pipe work layouts and apparatus locations

B Routing, placing and securing pipe work to comply with requirements

C Placing and securing flow controls and accessories accurately

D Connecting pipe work, flow controls and accessories to comply with requirements

E Cleaning pipe work of contaminants

F Ensuring pipe work, flow controls and accessories will not leak under pressure

EVIDENCE GUIDE

G Checking operation, adjusting settings and replacement of flow controls

H Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Note:
Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

Evidence should show demonstrated competency in installing pipe work for refrigeration and air conditioning systems.

EVIDENCE GUIDE

Method of assessment **9.4**)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:
Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units **9.5**)

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEJ107A	Install refrigeration and air conditioning systems, major components and associated equipment

Range Statement

RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit must be demonstrated in relation to the installation of pipe work,flow controls and accessories for at least two different types of refrigeration and/or air conditioning systems.

The pipe work shall include suction lines, liquid lines, discharge lines andcontrol lines.. Accessories shall include pipe work fittings, hand valves, isolation valves, solenoid valves, check valves, reversing valves, filter/dryers, sight glasses, accumulators, oil separators. Flow controls shall include both liquid and vapour flow controls, mechanical and electronic.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not Applicable

Competency Field

2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	3	Writing	3	Numeracy	3

Custom Content Section

Competency Field **5)**

Refrigeration and Air Conditioning