



Australian Government

UEERA0046 Install and commission ammonia refrigeration systems, components and associated equipment

Release: 1

UEERA0046 Install and commission ammonia refrigeration systems, components and associated equipment

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to install and commission ammonia refrigeration system, components and associated equipment.

It includes installing and commissioning refrigeration equipment using ammonia as the refrigerant. It also includes applying safe working practices and refrigeration principles that apply to ammonia, interpreting plans and specifications, commissioning and completing the necessary commissioning documentation.

The skills and knowledge in this unit will be applied by refrigeration and air conditioning technicians during the installation and commissioning of refrigeration systems using ammonia refrigerant.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 volt (V) alternating current (a.c.) or 120 V direct current (d.c.).

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, skills and knowledge described in this unit require a relevant contract of training, such as an Australian Apprenticeship.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to refrigeration, air conditioning or electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

Permits may also be required for some work environments, such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

Pre-requisite Unit

UEERA0005 Apply safety awareness and legal requirements for ammonia refrigerant

UEERA0053 Install, commission, service and maintain medium temperature systems

Competency Field

Refrigeration and air-conditioning

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to install ammonia refrigeration system

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 WHS/OHS hazards, risk control methods, relevant standards, codes and legislation are obtained and applied

1.2 Safety hazards not previously identified are reported, assessed and advice on risk control measures sought from the project engineer

1.3 Nature of work is obtained from documentation or from project engineer to determine the scope of work to be undertaken

1.4 Advice is sought from the project engineer to ensure refrigeration work is coordinated effectively with others

1.5 Sources of materials required for work are determined in accordance with workplace procedures

1.6 Tools, equipment and testing devices needed to carry out refrigeration work are obtained and checked for correct operation and safety

2 Install and commission ammonia refrigeration system

2.1 Measuring system operating parameters are conducted in accordance with WHS/OHS requirements and workplace procedures

2.2 Major components and pipe work are installed in accordance with relevant industry standards, codes of practice and regulations

2.3 Pressure testing is conducted at a pressure compatible with ammonia and in accordance with industry standards and practices

2.4 Precautions are taken to prevent damage to components while pressure testing the system

- 2.5 Leaks are located and rectified using testing methods appropriate to the refrigeration system and in accordance with industry standards and practices
 - 2.6 Refrigeration system is evacuated in accordance with industry standards and practices
 - 2.7 Refrigeration system is charged safely with ammonia and lubricants in accordance with industry standards and practices
 - 2.8 Refrigeration pre-operational checks are carried out on operating and safety controls in accordance with manufacturer specifications
 - 2.9 Refrigeration system is commissioned and adjustments made to operating and safety controls
 - 2.10 Temperature reduction of cool rooms and freezers are undertaken in accordance with industry standards and practices
 - 2.11 Refrigeration maintenance is carried out and includes inspection and cleaning of strainers and filters and collection of oil sample for analysis
 - 2.12 Training is conducted for person/s responsible for the refrigeration system operation and maintenance
- 3 Complete and report on commissioning of ammonia refrigeration system**
- 3.1 Worksite is cleaned and made safe in accordance with workplace procedures
 - 3.2 Contaminated refrigerant and lubricant are dealt with in accordance with legislative/regulatory requirements
 - 3.3 Refrigeration operation condition and commissioning data are documented and includes parameters not within the specified range for the system
 - 3.4 Refrigeration mechanical and electrical commissioning documentation is completed in accordance with workplace procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of

competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Installing and commissioning ammonia refrigeration system must include at least the following:

- determining:
 - suction and discharge pressures
 - ambient, evaporator and condensing temperatures
 - evaporator and condenser temperature difference
 - critical point of ammonia (R717)

Charging and discharging must include the following:

- ammonia (R717) system with refrigerant and lubricant in a safe and environmentally responsible manner
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Unit Mapping Information

This unit replaces and is equivalent to UEENEEJ180A Install and commission ammonia refrigeration systems, components and associated equipment.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEERA0046 Install and commission ammonia refrigeration systems, components and associated equipment

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions on at least two separate occasions and include:

- applying relevant legislative, industry standards and practices
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements and workplace procedures and practices, including using risk control measures
- applying sustainable energy principles and practices
- conducting refrigeration system operation and maintenance
- dealing with unplanned events/situations in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
- discharging/charging refrigerant/lubricants and pressure testing the system without damage to components
- documenting operating conditions correctly
- identifying the conditions of the ammonia (R717) refrigerant at various locations in the vapour compression and liquid recirculation system
- installing, connecting, securing and aligning components and equipment and ensuring that equipment and pipe work is compliant with relevant industry standards, codes of practice and regulations
- locating and rectifying leaks
- optimising system performance and efficiency
- pressure testing entire system at the appropriate design test pressures
- pressure testing, charging/discharging refrigerant/lubricants and determining the operating conditions of ammonia vapour compression and liquid recirculation refrigeration system
- recording measurements
- removing system contaminants and evacuating
- selecting and using appropriate measuring devices correctly
- using calculation methods accurately
- using methodical and efficient commissioning techniques in accordance with workplace procedures.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements, performance criteria and range of conditions and include knowledge of:

- cool room and freezer construction, including:
 - commissioning procedures
 - construction materials
 - construction methods
 - defrost methods
 - underfloor heating
- installation and commissioning techniques for ammonia refrigeration systems
- insulation and vapour barrier, including insulation materials and vapour barriers
- refrigeration control system testing and adjustment, including:
 - central programmable logic controller (PLC) system
 - defrost methods and controls
 - flow controls
 - refrigerant level controls
 - refrigerant pressure controls
 - temperature controls
- refrigerant piping, including:
 - hydraulic shock
 - installation principles
 - material compatibility
 - pipe sizing principles
 - pressure testing/evacuation
 - relief valves
 - welding
- relevant job safety assessments or risk mitigation processes
- relevant legislative, industry standards and practices
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation, including reports on installation and commissioning of ammonia refrigeration systems
- relevant workplace policies and procedures, including workplace emergency response plan
- testing and commissioning ammonia refrigeration systems, including:
 - air cooled condensers
 - compressors
 - direct contact freezing
 - evaporative condensers
 - evaporators (air/fluid cooling)

- high pressure receivers
- secondary refrigerants
- start-up and shutdown procedures
- water cooled condensers.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- resources that reflect current industry practices in relation to installing and commissioning, as well as determining the operating conditions of ammonia vapour compression and liquid recirculation systems
- applicable documentation, including workplace procedures, emergency response plan, equipment specifications, regulations, codes of practice and operation manuals.

Links

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