

<b>Title</b>	<b>Install and start-up pre-commission of air conditioning systems under supervision</b>		
<b>Level</b>	<b>3</b>	<b>Credits</b>	<b>15</b>

<b>Purpose</b>	People credited with this unit standard are able to: apply knowledge of pre-installation activities for air conditioning systems; install air conditioning systems under supervision; perform start-up pre-commissioning procedures under supervision; complete documentation for the installation and start-up pre-commission of air conditioning systems.
----------------	---

<b>Classification</b>	Mechanical Engineering > Refrigeration and Air Conditioning
-----------------------	---

<b>Available grade</b>	Achieved
------------------------	----------

---

### Guidance Information

- 1 Recommended skills and knowledge:  
Unit 32754, *Demonstrate knowledge of air conditioning systems principles, applications and hazards.*
- 2 Legislation and standards relevant to this unit standard:  
Building Act 2004;  
Climate Change Response Act 2002;  
Electricity Act 1992;  
Electricity Amendment Act 1997;  
Electricity (Safety) Regulations 2010;  
Hazardous Substances and New Organisms Amendment Act 2015;  
Health and Safety at Work Act 2015;  
Ozone Layer Protection Act 1996;  
AS/NZS 5149:2016, *Refrigerating systems and heat pumps parts 1:5 Refrigerating systems and heat pumps – Safety and environmental requirements*;  
AS/NZS ISO 817:2016, *Refrigerants – Designation and safety classification*;  
AS/NZS 3000:2007, *Electrical installations (known as the Australian/New Zealand Wiring Rules)*;  
and any subsequent amendments.
- 3 References  
Althouse, Turnquist, Bracciano. *Modern Refrigeration and Air Conditioning*. 21st edition. Tinley Park, Illinois: The Goodhouse-Willcox Company Inc. ISBN 1-63563-877-1.  
Institute of Refrigeration, Heating and Air Conditioning Engineers of New Zealand (IRHACE New Zealand). *2001 Code of Practice for the reduction of emissions of fluorocarbon refrigerants in refrigeration and air conditioning applications*. Available from IRHACE, <http://www.irhace.org.nz/>.

- 4 All worksite procedures must meet recognised codes of practice and documented safety procedures and safety plans (where these exceed the code) for personal and worksite safety, and obligations required under current legislation.
- 5 Definitions  
*Air conditioning systems* refer to systems that provide heating, cooling and suitable indoor air quality for use in domestic or light commercial applications.  
*Approved industry practices* refer to approved codes of practice and standardised procedures accepted by the wider refrigeration and air conditioning industry sectors as examples of best practice.  
*Specifications* refer to drawings, performance specification, parts list, installation instructions, commissioning tests and procedures, and operating instructions  
*Worksite procedures* refer to documented procedures used by the organisation carrying out the work and applicable to the tasks being carried out. They may include but are not limited to – standard operating procedures, site safety procedures, equipment operating procedures, codes of practice, quality assurance procedures, housekeeping standards, procedures to comply with legislative and local body requirements.
- 6 Range
- Air conditioning systems types include – roof top packaged unit, ducted indoor unit, high-wall indoor unit, air cooled outdoor condenser, air cooled outdoor multi system condenser, under-ceiling indoor unit, cassette indoor unit, floor console indoor unit, extract air systems, outdoor air supply system, heat recovery ventilator.
  - Specifications may include but are not limited to – drawings, performance specification, parts list, installation instructions, commissioning tests and procedures, and operating instructions.
- 7 Assessment information
- Competence is to be demonstrated on two occasions of installing and starting-up pre-commissioning air conditioning systems.
  - All activities and evidence must be in accordance with worksite procedures, approved industry practices and specifications.
  - Competence can be demonstrated in a training environment.

---

## Outcomes and performance criteria

### Outcome 1

Apply knowledge of pre-installation activities for air conditioning systems.

### Performance criteria

- 1.1 Timeframes for commissioning are established and agreed with stakeholders.
- 1.2 Drawings and manufacturers specifications are verified to ensure suitability of installation.
- 1.3 Materials and components are verified for installation.

Range correct quantity, suitability.

1.4 Tools and access equipment are selected for installation.

## Outcome 2

Install air conditioning systems under supervision.

### Performance criteria

2.1 Air conditioning plants and equipment are positioned and installed in accordance with specifications and site conditions plan.

Range may include but are not limited to – indoor unit, outdoor unit, packaged unit, fans;  
installation considerations may include but are not limited to – sufficient support, vibration elimination, seismic restraint, retaining building's structural integrity, water-tightness, passive fire.

2.2 Ancillary components and installation materials are installed.

Range ancillary components may include but are not limited to – valves, controls, filters, driers, condensate drains, solid ducting, flexible ducting;  
installation materials may include but are not limited to – supports and bracketing to secure pipework, piping, tubing, capping, thermal insulation;  
installation considerations may include but are not limited to – seismic restraint, nitrogen purging, internal cleanliness.

2.3 The work of associated trades personnel is identified and reported.

## Outcome 3

Perform start-up pre-commissioning procedures under supervision.

### Performance criteria

3.1 Refrigeration system, pipework and components are verified as safe to be exposed to test pressures.

Range may include but is not limited to – flared nuts, brazed joints, compression fittings, access ports;  
considerations – passive fire, seismic restraint.

3.2 Electrical requirements are confirmed with licenced personnel.

3.3 Integrity of the installation is confirmed by visual and tactile checks against plans.

Range may include but is not limited to – terminations, building penetrations, connections, condensate drains.

- 3.4 System and component integrity is confirmed by the use of leak detection methods and equipment.
- 3.5 Condensate drain is tested to ensure water flows from the outlet.
- 3.6 Ventilation system components and system integrity is identified and checked.  
Range may include but is not limited to – fans, flexible ducting, solid ducting, dampers, grilles, louvers, cowls, filters, mechanical joints, flanges, canvas joints.
- 3.7 System is evacuated in accordance with manufacturer’s recommendations to ensure that moisture, oxygen, and non-condensables are removed.  
Range evacuation tools include but are not limited to – schrader valve core removal tool, vacuum analyser, vacuum pump, short large-bore vacuum hose, solenoid valve, isolating valves.
- 3.8 Vacuum is broken with refrigerant charge after evacuation.  
Range charging scales, gauge manifold.

**Outcome 4**

Complete documentation for the installation and start-up pre-commission of air conditioning systems.

**Performance criteria**

- 4.1 Documentation for the installation and start-up pre-commission of air conditioning systems is completed.  
Range may include but is not limited to – warranty card, owner’s manual, electrical code of compliance, record of service, building warrant of fitness, asset register.

<b>Replacement information</b>	This unit standard replaced unit standard 22442.
--------------------------------	--

<b>Planned review date</b>	31 December 2026
----------------------------	------------------

**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	26 August 2021	N/A

<b>Consent and Moderation Requirements (CMR) reference</b>	0013
--	------

This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

---

### Comments on this unit standard

Please contact Competenz [qualifications@competenz.org.nz](mailto:qualifications@competenz.org.nz) if you wish to suggest changes to the content of this unit standard.