

<b>Title</b>	<b>Commission commercial refrigeration and/or air conditioning systems rated below 50 kilowatts</b>		
<b>Level</b>	<b>4</b>	<b>Credits</b>	<b>20</b>

<b>Purpose</b>	<p>This unit standard is for people who work in the refrigeration and air conditioning sector of the engineering industry.</p> <p>People credited with this unit standard are able to, for commercial and/or air conditioning systems: verify the integrity of systems; evacuate systems; perform pre-start checks; charge systems and confirm the operation; and complete commissioning activities, check and verify operating manuals, and instruct operators.</p>
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<b>Classification</b>	Mechanical Engineering > Refrigeration and Air Conditioning
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<b>Available grade</b>	Achieved
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<b>Prerequisites</b>	People undergoing training and assessment towards the competencies in this unit standard must be licensed by the Electrical Workers Registration Board as Electrical Service Technician.
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## Guidance Information

- 1 Legislation and standards
  - Health and Safety at Work Act 2015;
  - Building Act 2004;
  - Climate Change Response Act 2002;
  - Electricity (Safety) Regulations 2010;
  - Electricity Act 1992;
  - Hazardous Substances and New Organisms Amendment Act 2015;
  - Ozone Layer Protection Act 1996;
  - AS/NZS 5149:2016 *Parts 1:5 Refrigerating Systems and Heat pumps – Safety and environment requirements*;
  - AS/NZS 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.
  
- 2 Reference
  - Althouse, Turnquist, Bracciano. *Modern Refrigeration and Air Conditioning*. 19th edition. Tinley Park, Illinois: The Goodhouse-Willcox Company Inc. ISBN 1-59070-280-8.

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/>.

- 3 All worksite practices 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.
- 4 Definitions  
*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.  
*Commission commercial refrigeration and/or air conditioning systems rated below 50 kilowatts* refer to items such as: refrigeration equipment as found in retail food outlets, truck and shipping-container refrigeration, horticultural cool room refrigeration, controlled atmosphere fruit stores; and air conditioning equipment as found in commercial buildings.  
*EWRB* refers to the Electrical Workers Registration Board.  
*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.
- 5 Range  
 Competence is to be demonstrated on three occasions of commissioning systems. These systems may be any of: refrigeration; air conditioning; or combined refrigeration and air conditioning.

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## Outcomes and performance criteria

### Outcome 1

Verify the integrity of commercial refrigeration and/or air conditioning systems.

### Performance criteria

- 1.1 Timeframes for commissioning are established and agreed with stakeholders in accordance with approved industry practice.
- Range stakeholders may include but are not limited to – manager, supervisor, contract manager, contractor, internal staff.
- 1.2 System is prepared for commissioning in accordance with worksite procedures.
- 1.3 Systems are tested to specified pressures in accordance with worksite procedures and are verified as leak free.
- 1.4 System safety devices are tested, and systems are verified as safe to be exposed to operating pressures.

1.5 Ancillary pipework is flushed, purged, and verified clean and leak free.

### **Outcome 2**

Evacuate commercial refrigeration and/or air conditioning systems.

#### **Performance criteria**

- 2.1 Unwanted moisture and gases are removed from systems by evacuating them to required levels of high vacuum.
- 2.2 Refrigerant is recovered and stored in accordance with worksite procedures.
- 2.3 Vacuums are broken with appropriate refrigerants prior to charging.

### **Outcome 3**

Perform pre-start checks on commercial refrigeration and/or air conditioning systems.

#### **Performance criteria**

- 3.1 Controls are tested and set to meet performance and safety requirements.
- 3.2 Programmable controller inputs and outputs are tested and compliance with performance requirements is confirmed.
- 3.3 Electrical systems are checked and compliance with performance and safety requirements is confirmed.
- 3.4 Motor and pump rotation directions are verified.
- 3.5 Motor ratings are verified against fuse ratings and overload settings.
- 3.6 Fluid flows are tested and balanced.
- 3.7 Noise and vibration levels are confirmed as within limits in accordance with worksite procedures.

### **Outcome 4**

Charge commercial refrigeration and/or air conditioning systems and confirm the operation of systems.

#### **Performance criteria**

- 4.1 Systems are charged with refrigerants in accordance with system specifications.
- 4.2 Systems are test-run, checked, and adjusted as required to meet performance requirements.

- 4.3 Super-heats are tested and adjusted as required to meet performance requirements.
- 4.4 Control settings are verified for operational performance in accordance with system specifications.
- 4.5 Refrigerant and oil levels and flows are adjusted as required to meet performance requirement.
- 4.6 System performance data is recorded in accordance with operational specifications and worksite procedures.

Range            temperatures, pressures, super-heats, current draw, fluid flows, humidity, sub-cooling.

**Outcome 5**

Complete commissioning activities, check and verify operating manuals, and instruct operators of commercial refrigeration and/or air conditioning systems.

**Performance criteria**

- 5.1 Commissioning activities are completed in accordance with agreed timeframes.
- 5.2 Where applicable, the integrity of building penetrations is confirmed by appropriate visual and tactile checks.
- 5.3 Warranty cards are completed in accordance with worksite procedures.
- 5.4 Manuals and operating instructions are finalised and verified as matching commissioned refrigeration and/or air conditioning systems.
- 5.5 Operators are familiarised with manuals and operating instructions in accordance with worksite procedures.
- 5.6 Operators are instructed to operate refrigeration and/or air conditioning systems within design parameters, and in accordance with operational and worksite procedures.
- 5.7 Job content, materials, and labour inputs are described for both invoicing and customer reports in accordance with worksite procedures.

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<b>Planned review date</b>	31 December 2020
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**Status information and last date for assessment for superseded versions**

Process	Version	Date	Last Date for Assessment
Registration	1	9 April 1995	31 December 2017
Review	2	17 August 1995	31 December 2017
Revision	3	14 April 1997	31 December 2017
Revision	4	5 January 1999	31 December 2017
Revision	5	13 November 2001	31 December 2017
Review	6	20 June 2006	31 December 2019
Review	7	18 June 2015	31 December 2020
Revision	8	16 February 2017	N/A
Revision	9	22 October 2020	N/A

**Consent and Moderation Requirements (CMR) reference**

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.